

Comment

THE SOCIALISATION OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH

Technoscience, technological cultures and socialisation

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ABSTRACT: Technoscience is deeply linked to national cultures across terrains as diverse as medicine, agricultural biotechnologies, ICTs, energy technologies, etc. Understanding the cultural dimension of technoscience is vital for the project of socialisation. This project should be embedded in technological and political cultures, taking variation in cultural approaches to technoscience, national identity and political decision-making seriously. Socialisation of science and technology in Europe should therefore approach socio-technical developments in a way that allows for the emergence of controversies and alternative scenarios and their resolution. Only when we take the links between technological cultures, liberal democracy and technoscience seriously we will be able to confront some of today's most pressing and complex problems.

This past summer saw a worldwide celebration of one of mankind's most "giant leaps" in terms of scientific and technological achievements; the 40th anniversary of the Apollo 11 mission that brought men on the moon for the first time. Interestingly, one of the most highly publicised comments on the event came from Neil Armstrong, who had kept silent for the better part of four decades and now described the race for the moon as a "peaceful competition" between the Cold War adversaries of the US and the USSR. Inspired by Armstrong's terminology, a commentary in one of the major daily newspapers in the Netherlands noted how possible American efforts to travel to Mars, highly endorsed by the former astronauts, are bound to be challenged by other powers such as Russia and China. Clearly, one of the most highly sophisticated forms of technoscience (a term to describe the intricate mutual dependencies between contemporary science and technology) we know is deeply connected to national identity and self-awareness. In this commentary, I will argue that this is not a coincidence. Instead, there are deep links between national cultures and technoscience across terrains as diverse as medicine, agricultural biotechnologies, ICTs, energy technologies, etcetera. Understanding this cultural dimension of technoscience, so I will claim, is vital for the project of socialisation. Socialisation initiatives can only be effective when taking political cultures of technoscience seriously.

To arrive at this point, it is fruitful to briefly go over some of the most important lessons social studies of science and technology (STS) have taught us. The first of these, which is probably closest to people's everyday experiences, is that developments in science and technology deeply affect our everyday lives and culture. To briefly think about the means of transportation and communication available to our grandparents and compare them to the options we have today is sufficient to understand this point. At the same time, a second and equally fundamental insight from STS is that science and technology can never develop outside of their social context. STS scholars have shown how both facts and artefacts are ultimately shaped in and by a particular social environment. An example is that the technology of 'packet-switching', a vital part of today's Internet that slices up and stitches back together information transmitted over the Web, was originally developed for sending classified military messages [1]. Thirdly, STS researchers have forcefully argued that the fact that technoscience changes our world and the fact that human intervention in the development of science and technology is possible make technoscientific issues matters of political interest [4],[10]. This is also apparent from the numerous occasions where public controversies have arisen over scientific and technological issues in the last few decades, varying from nuclear energy to stem cell research and from genetically modified organisms to global warming. Fourth and finally, in recent years STS scholars have increasingly laid bare that our culture is not only technological in a universal, global sense, but that different national states also have their own particular technological culture in terms of how

technoscience is socially and politically understood, imagined and governed (for the idea of technological cultures, see [2],[3]). This fourth insight deserves some further consideration.

Over the last decade or so, an increasing amount of studies has been published that compare how different national states have responded to technoscientific developments. Most of these studies point towards differences in ‘political culture’ between these countries. That is, they point out how countries have varying routines in addressing public problems, in conducting public debates, in making public policies and in evaluating scientific ‘evidence’ brought forward in the context of such problems. One of the most elaborate examples of such a study is Jasanoff’s *Designs on Nature*, in which she compares political responses to developments in biotechnology writ large across the US, the EU, and two of its member states in Britain and Germany [8]. The concept of political cultures, so she argues, can for example help in understanding the differences in degree of public controversy over GM foods across the three countries. Still more recently, the link between national identity and technoscience suggested by the example of space travel has been made more explicit in STS. In a comparison of the development of nuclear energy in the US and South-Korea, Jasanoff and Kim introduce the concept of ‘sociotechnical imaginaries’ to highlight how policies for the stimulation or control of scientific developments always (implicitly) contain notions of a desired social order [9]. Thus, in sociotechnical imaginaries policies addressing science and technology always contain ideas on how technoscience figures in social organisation. These examples highlight what is meant by technological cultures in the plural – locally specific ways of incorporating science and technology in society, which are fundamentally of political interest for the way technoscience relates to social order.

Clearly, the above has consequences for the project of ‘socialisation’ of scientific and technological research. But what are these consequences? First, socialisation of science and technology can not be understood as an unequivocal, unambiguous phenomenon. Socialisation of science and technology is not simply better or worse in specific places compared to others. Instead, science and technology always develop within a specific social context –and in that sense are always socialised. The image of the lonely, Einstein look-alike genius solving nature’s mysteries is thoroughly outdated and challenged in multiple ways. On the one hand, there are analyses of contemporary shifts in science and technology, described by catchphrases such as Mode 2 knowledge production, postnormal science or the Triple Helix of university, government and industry [5],[6],[7]. These descriptions of contemporary science have in common that they point out how science is increasingly application-driven and shaped and steered by social processes. On the other hand, historians of science have pointed out how science *has never been* a solitary activity driven by purely intellectual inspiration. Take for example the experimental method of scientific research. This method could only become what it is today through the way Robert Boyle, its main seventeenth century advocate, organised demonstrations of his machines and by the way London’s Royal Society distributed membership. Moreover, the method’s initial success depended to a great extent on how it related to socio-political developments in Restoration England [11]. Thus, the particular socio-cultural environment mattered to the establishment of this method as a basic principle of science. This means that the claim that ‘social context matters’ is in itself insufficient, since it fails to recognise the relevance of cultural particularities and of tensions and contestations within that social context. This is also one of the major weaknesses of rather generic notions such as ‘Mode 2’ or ‘Triple Helix’.

The importance of culture in the formation of sociotechnical realities implies that there is not one recipe for the project of strengthening the socialisation of science and technology. Initiatives to simply enhance the social status of technoscience through a predetermined set of interventions are misdirected in two ways. The first of these is the idea that socialisation is about support for science and technology. Such a conviction echoes the so-called deficit model in the public understanding of science [12], a model that basically claims that individuals only oppose science and technology because they do not understand it sufficiently. Approaching socialisation in those terms ignores the risks that are inherent to technoscientific developments, as well as the experiences and priorities of people confronted with science and technologies in their everyday lives. The second way that the ‘one-recipe-approach’ is misdirected follows from the first one and returns to the notion of political culture. As I have argued throughout this commentary, technosciences develop in diverse and complex ways across different cultures. This means that culturally specific approaches to socialisation are needed. But this cultural specificity does not only refer to the production of socio-technical linkages, it also entails the organisation and routines of political decision making. Thus, the project of socialisation

should be embedded in technological and political cultures, taking cultural approaches to technoscience, national identity and political decision-making seriously. The claim that Europe should emulate emerging economies in Asia in stimulating science and technology is therefore a hollow one. Instead, socialisation of science and technology in Europe should approach socio-technical developments in a way that allows for the emergence of controversies and alternative scenarios *and* their resolution, aiming to establish a tradition of sustainability, transparency and democracy that befits the close ties between science and liberal democracies that developed throughout European history since the Middle Ages.

Fostering debate and alternative scenarios for socialisation are unlikely to take us to Mars. But as I hope to have shown here, any straightforward analogies between travelling to the moon and going to Mars are flawed. Taking a historically and culturally grounded view, it becomes clear that the Apollo program, which started off with President Kennedy's assertion that there would be a man on the moon before the end of the 1960s, can only be understood in its particular context, as is so beautifully shown in the 2007 documentary film *In the Shadow of the Moon*. It was an age of techno-optimism and large scale projects in physics and engineering and simultaneously a time in which the Americans feared to be on the losing side of history following the successful launch of Sputnik by the Soviets in 1957. Such circumstances are unlikely to return. But when we take the project of socialisation and the cultural context of sociotechnical developments seriously, there is a chance that we may be better equipped to address today's more pressing and complex problems. After all, issues like climate change, decreasing bio-diversity, hunger and disease pandemics call for an engagement across scientific disciplines, politicians and the broader public.

Notes and references

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