A Social Licence for Science: Capturing the Public or Co-constructing Research?

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Abstract

The 'social licence to operate' has been invoked in science policy discussions including the 2007 Universal Ethical Code for scientists issued by the UK Government Office for Science. Drawing from sociological research on social licence and STS interventions in science policy, the authors explore the relevance of expectations of a social license for scientific research and scientific contributions to public decision-making, and what might be involved in seeking to create one. The process of seeking a social licence is not the same as trying to create public or community acceptance for a project whose boundaries and aims have already been fully defined prior to engagement. Such attempts to 'capture' the public might be successful from time to time but their legitimacy is open to question especially where their engagement with alternative research futures is 'thin'. Contrasting a national dialogue on stem cells with the early history of research into bioenergy, we argue that social license activities need to be open to a 'thicker' engagement with the social. Co-constructing a licence suggests a reciprocal relationship between the social and the scientific with obligations for public and private institutions that shape and are shaped by science, rather than just science alone.

Introduction

The concept of a 'social licence to operate' is largely discussed in the context of corporate behaviour and the relationship of companies to those local communities in which they do business. In this paper, we examine its relevance for the normative expectations and challenges emerging around the governance of scientific research, in particular, research associated with new technologies.

In Britain, the science policy establishment has introduced a number of initiatives since the late 1990s which on the face of it signal a collective attempt to 'make research social' in the sense of developing new forms of engagement between scientists and research funders on the one hand, and 'society' or 'the public' on the other. These include sponsorship of public dialogues around emerging technologies, the inclusion of so-called 'lay' representatives on science advisory committees, and transparency initiatives in science policy decision-making and in science itself (e.g., BIS 2010; The Royal Society 2012). The European Commission has similarly introduced 'science and society' activities since the early 2000s, though the programme was subsequently re-named 'science-in-society' in 2007, and by 2013 become a framework for 'responsible research and innovation' (RRI). In 2007, the then British Chief Scientific Adviser explicitly invoked the concept of a 'social licence to operate' in a newly developed Universal Ethical Code that was billed as a public statement of values and responsibilities in doing science. But what would it mean to try and secure a social licence for research and for other scientific contributions such as to the making of public policy? What does this demand in practice?

We propose to investigate this question by drawing on recent work in science and technology studies (STS) that is also oriented towards 'making research social', and engaging with insights from social licence research on environmental behaviour of corporations (Gunningham, Kagan and Thornton 2004) and on the professions (Hughes 1959; Dingwall and Allen 2001). We consider STS work that has been produced for policy and public audiences as well as academic literature. Key sources here include work on: anticipatory governance (Guston 2008), responsible innovation (Stilgoe, Owen and Macnaghten 2013), and proposals for making explicit the public value of science (Wilsdon, Wynne and Stilgoe 2005).

Collectively, these perspectives reinvigorate the domain of research governance by broadening the nature and scope of social expectations from scientific research beyond formal compliance with risk regulations (e.g., mandatory health and safety rules in laboratory activities) or compliance with increasingly formalised ethical guidelines (e.g., through research ethics committees). They also highlight expectations of research 'impact' beyond those based solely on economic/industry benefits and aim to open up assumptions that science will deliver technological fixes for 'grand challenges' facing contemporary societies such as climate change, environmental degradation, improvement of health outcomes and so on. They do so by raising a number of fundamental questions about the purposes of science-based innovation, the ways in which specific technological options are predicated on implicit assumptions and value judgments that might be open to contestation, the need for recognizing and deliberating alternative socio-technological pathways that are effectively precluded by those currently promoted, and the possibility of imagining different futures and different ways of doing research (e.g., Felt and Wynne 2007). Some of these discourses

appear to have influenced the science policy developments mentioned above, but the extent to which they have substantially reshaped policy thinking and practice remains contentious; key tensions are evident as we will demonstrate in this paper.

In sum, this line of STS work (especially work produced for or in engagement with policy) might be seen to represent a movement and a community oriented towards trying to make scientific research more social. This overlaps significantly with the philosophical project of social epistemology which aims to "reconstruct a normative order for science" in light of significantly expanded understandings of its social contexts and consequences (Fuller 2006), though each uses different means and concepts. Our primary aim is to clarify how the concept of a social licence might help further translate and clarify the normative objectives underpinning this collective project of STS-in-the-world. We also consider the implications of our analysis for social licence research in corporate domains where the concept has been more widely applied. The worlds of research and industry are not that dissimilar given that significant research efforts are located within industry, and links between academic research and industry that are widely embedded in research systems today. There are also similarities between research and the specific case of mining (where much of the work on a 'social licence to operate' is located) which may not be evident at the start, but emerge as one looks more closely at research from a social licence lens.

To flesh out our analysis, we engage with social licence research in the environmental domain (Gunningham, Kagan and Thornton 2004) as well as the use of social licence concepts in the sociology of the professions, notably, work drawing from Chicago School sociologist, Everett Hughes who distinguished between the licence and the mandate of professional work. We also draw on lessons from empirical research reported elsewhere on two different cases of what might be seen as ways of making science social: a national dialogue on stem cell research that was held by UK research councils in 2008 (Mohr and Raman 2012) and the early history of research on bioenergy as a sustainable alternative to fossil fuels (Raman and Mohr 2013).

Social Licence Research and the Social Contract with Science

Academics and practitioners have elaborated the concept of social licence in different ways. For practitioners, it has an instrumental meaning in the sense of alerting private companies to the steps they need to take to secure their business in the light of potential reputational threats posed by environmental and social justice campaigners, and possible resistance from the local communities in which they seek to work. For example, writing on corporate social responsibility in *Forbes* magazine, journalist-blogger Paul Klein offers three principles for companies seeking to establish and maintain a social licence to operate: be a social purpose leader; give more control to local communities and stakeholders; and build partnerships with "the right and the wrong" NGOs.[1] Klein suggests that although SLO emerged in the context of resource extraction, it has become more broadly relevant, given the range of human rights and environmental issues that campaigners have brought to bear on numerous industries.

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[1] http://www.forbes.com/sites/csr/2012/12/28/three-ways-to-secure-your-social-licence-to-operate-in-2013/ Accessed 15.11.13

For academics in socio-legal studies interested in how law works with and through society, the notion of a social licence has analytical purchase for explaining some unexpected forms of corporate behaviour. For example, Gunningham et al (2004) draw on the concept to account for why companies sometimes 'overcomply' with environmental regulation as studies of US pulp and paper mills had already documented. Socio-legal scholars had largely tended to focus on 'negative' factors (fear of punishment) to understand compliance with law; examples where company practices did seem to exceed legal requirements, these were explained with reference to expectations of profitability. By contrast, Gunningham and colleagues (2004) argue that the notion of a social licence helps explain situations where such behaviour does not appear to have direct implications for profits.

While academics are typically wary of instrumental tales of the kind related by business journalists and managers, socio-legal scholarship does provide more nuanced perspectives on the implications of research on social licence for a wider range of societal actors beyond companies alone. Gunningham et al (2004) suggest that the emergence of a sense of their need for a social licence on the part of companies arises from the manner in which demands are articulated and backed up. So, communities require a level of organizational competence to understand the potential for environmental harm and spell out the implications in a way that forces companies to listen and respond. Economic, legal and social mechanisms may be needed to enforce and monitor the terms of the licence which requires community and environmental groups to maintain some level of social pressure. The same authors also highlight cases where social licence pressures on companies are *insufficient* to improve environmental performance and where strong legal-regulatory pressures backed up by threat of punishment are essential for companies to change (Thornton et al 2009).

In sum, socio-legal studies offer a way of thinking through the *conditions* under which social licences emerge and become maintained in specific contexts. This perspective is grounded in the coexistence and interrelationship between economic, legal and social activity – so, although the research arises from a need to explain action 'beyond' legal and market forces, it retains a keen sense of how law and economics shape the capacity for such social licence-related demands and practices to be articulated, enacted and enforced. By adding the phrase "to operate",[2] the business literature gives the concept a further material-instrumental grounding in particular types of action that companies can embark upon in order to secure their reputational capital in a competitive marketplace.

The concept of social licence has also been influential in the study of the professions including law, medicine and nursing with scholars building on the work of Chicago School sociologist, Everett Hughes, notably his 1958 book entitled *Licence and Mandate.* For purposes of this paper, we rely on a subsequent paper by Hughes (1959) and further discussion of the concepts in Dingwall and Allen (2001). Hughes (1959) observes that all occupations have an implicit or explicit bargain with the societies in which they are located. They have a licence to do something that only they do which includes the privilege of inhabiting particular modes of thought and practice that might be alien to the rest of society. However, their mandate is distinguishable from this licence in the sense that it is something the profession claims is good not only for themselves and their practice but for society as a

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[2] Socio-legal scholars refer to 'social licence' rather than to a 'social licence to operate'.

whole. For example, "physicians are not content with a licence to practise; they would like all of us to accept their philosophy of health and disease and their notions about how medical services are to be distributed", Hughes (1959, p. 404) suggests. With this extension, the profession lays claim to a wider mandate than is strictly part of their licence. For Dingwall and Allen (2001), therefore, analysing the licence of any profession "draws us toward its material base and the structural constraints of its work settings" while the mandate "draws us toward the culture and ideals of the profession" (p. 1).

For Hughes, mandates are central to the character of modern professions, especially the fact that they represent a *moral* division of labour (the allocation of particular functions to certain groups, and the placing of social/collective responsibilities on some shoulders over others) as well as a technical one. However, "in some respects an occupation will want a larger mandate than the public is ready to grant it; in others, it may shy away from responsibilities which others put upon it" (Hughes 1959, p.405). When mandates are articulated either by the profession or by publics or institutions that scrutinize, reinforce or challenge professional activities, a space is created for debating the nature and boundaries of the profession's social licence and its proper relationship to its mandate.

The distinction between licence and mandate is particularly useful for thinking about scientific research where 'social licence' questions arise in a variety of ways with potentially different issues at stake. We discuss these further in the next section, but first, it is worth noting that Hughes himself explored the mandate of social science in his 1959 paper, while Dixon-Woods and Ashcroft (2008) have applied Hughes' concepts of licence and mandate to the case of medical research. But the indispensable source on social licence as it has been translated to make sense of post-World War II arrangements for science research funding and their subsequent transformation is Guston (2000a). Guston provides a critical genealogy of the 'social contract for science', the term that became ubiquitous in science policy discussions in the United States.

In the US, 'the social contract for science' is/was typically invoked to refer to a tacit agreement between government (acting on behalf of society) and science whereby scientists would be given research funding and autonomy to govern themselves on the assumption that research outcomes would eventually lead to societal benefit. Guston (2000a, 2000b) argues that this contract began to break down in the 1970s-80s in part due to the questionable assumption that it automatically assured research integrity and productivity. In its place are emerging systems of what he calls 'collaborative assurance' (Guston 2000b) which include regimes of public/private partnerships as well as attempts to democratize science by building "institutions and practices that fully incorporate principles of accessibility, transparency, and accountability" (Guston 2004).

In Britain, the traditional social contract between science and society is captured by invocations of the so-called Haldane Principle, normally traced to a 1918 report by Viscount Haldane which eventually led to the creation of research councils for funding. According to this Principle, decisions on projects to select for funding are supposed to be left to scientists themselves rather than government. Efforts to introduce impact-based and other policy criteria for funding have been criticised as violating the Haldane Principle, though the current British Minister for universities, David Willetts, has said that the Principle only applies to research council funding (as distinct from research funded by government departments)

where he claims it still applies.[3] Edgerton (2009) argues that the existence of such a principle is a myth, though Bird and Ladyman (2013) disagree in their recent defence of the Haldane Principle in this journal.

For our purposes, the key concern is not so much whether a *particular* social contract granting scientists autonomy exists or existed, but rather the idea of *a* contract between science and society or 'social licence' for research. What could this mean in practice? What does Hughes' distinction between licence and mandate contribute to thinking through these issues? These are the questions that concern us in this paper. But even before that, why is the idea of social licence important for research? Before we look at how the criteria for social licence might vary across research contexts, we need to consider whether the call for such a licence is appropriate in the first place.

From a social licence perspective, scientific researchers do not only need a professional licence (accreditation by their own disciplinary community in science) or a legal licence for certain kinds of research (approval from specialised institutional committees or agencies), but something more. What becomes part of the 'more' can be debated, but the very principle of looking beyond the discipline or committee alone for legitimacy has often been in question. For example, Guston discusses the notion advanced by sociologist, Harriet Zuckerman, that science does not have the obligations of professions like medicine or law since it lacks a specific client. Elsewhere, a 'right' to conduct research has been asserted, notably in 2004 in the state of California's Proposition 71 on stem cell research. But as Brown and Guston (2009, p.364) argue, such rights-based claims are properly understood as a way of initiating wider *discussion* on what sort of research is appropriate, legitimate, desirable and so on rather than as a way to remove these questions from democratic debate. Assertions that scientific research necessarily produces public goods should likewise be seen as "the *commencement* rather than the *completion* of public policy" (Guston 2000a, p.48, emphasis added) which in turn means opening up the question to societal scrutiny.

Guston (2000a, p.47) argues that science (in the sense of research) does indeed have a client, namely, the polity. Depending on the nature of the research in question, the polity might seem too 'large' and anonymous by contrast with 'local communities' of the kind discussed in social licence literature on mining – but it is a place from which to start to flesh out what lies beyond strict professional or legal obligations in the process of undertaking research. In this paper, we focus on what then follows for thinking about social licence (and mandates) for scientific research. We only briefly consider the case of social science, not because this is unimportant, but in part because the relationship between social science and society represents an established tradition of writing and debate (e.g., most recently under the umbrella of 'public sociology' proposed by Michael Burawoy). Also, Brown and Guston (2009) argue that scientific research has much greater power to transform society than other forms of knowledge because science has the capacity to become embedded in material arrangements including technologies, transform social and cultural relations, and shape the environment. Science has a higher degree of what they call *materiality* and *sociality* by

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comparison with other forms of inquiry. Indeed, material impacts lie at the heart of the case made for research funding on grand challenges. The scope and strength of these relationships mean, for Brown and Guston, that science has a higher burden to bear in terms of demonstrating through societal engagement its right to research specific things.

We now consider recent developments in Britain and the EU which collectively suggest an emergent movement around what we are calling 'making research social'. These parallel the demise of the old social contract with science described by Guston (2000b) for the United States.

Making research social?

Towards the end of Sir David's King tenure as Chief Scientific Adviser to the UK Government, the Government Office for Science (which King headed) issued a Universal Ethical Code for Scientists. The Code begins with the following quote from Sir David:

> "*our social licence to operate as scientists* needs to be founded on a continually renewed relationship of trust between scientists and society. The code has been developed in my Office to help us meet this challenge" (emphasis added)

Under the headings of Rigour, Respect and Responsibility, this 2007 document set out a brief summary of key principles that all scientists should follow – though subsequent presentations of the code seemed to imply that this was simultaneously a statement to reassure the public that such principles were the norm for science as currently practiced. The principles included: integrity in the conduct of research (rigour), trying to minimise any adverse effects on people, animals and the environment (respect) and seeking to listen to people's aspirations and concerns and discuss issues raised by one's research for society without misleading on scientific matters (responsibility). The document contained a statement that the code is not mandatory which seems puzzling as it might be taken to imply that people could opt-out of subscribing to the summary of what was described as "the values and responsibilities of all scientists", though this ambiguity is just one of several that emerged in the responses that followed its publication.

Asked by the Government Office for Science to assess if the Code was effective in addressing an apparent crisis of public trust in science, philosophers of science Stephen John and Tim Lewens (2010) pointed out a basic tension in this question. The code could certainly be seen as a way of reassuring the public about science, to "convince the public that scientists *are* trustworthy" (p. 27, emphasis original), but if people already believed there was a problem, it was difficult to see how the publication of a code would convince them otherwise, they argued. Alternatively, the code could be a mechanism to reshape the professional ethos of science itself, "to *make* scientists trustworthy" (p.27, emphasis original). John and Lewens argued that this seemed a more promising purpose for such a code, though they added that "altering professional ethos cannot plausibly be achieved by a code alone: forms of training, comprehension, sympathy and enculturation are also essential" (p.4).

Elsewhere, commenting on the rise of bioethics frameworks governing biomedical research in India, Madhiwalla (2011) similarly highlights the importance of looking beyond the formal face of what we are calling efforts to make research social; the recent growth in the

paraphernalia of research ethics guidelines has come about, she argues "without the churning, debating and refining of ideas and concepts, application to practice and critiquing of that practice, the breaking and formation of public opinion, the coming together and parting ways of different groups" (p.3) which are essential for normative principles to become embedded. Making research social is a *process* – it cannot be brought about just by edict.

Nonetheless, edicts and other codified representations of attempts to secure a social licence for scientific research (as well as other activities) might play a useful role in creating focal points for the kind of 'churning' of reflection, practice and critique to which Madhiwalla refers. For instance, the Universal Ethical Code included a statement encouraging scientists and institutions to reflect on the guidelines and debate their relevance. While various British universities make reference to it in their formal statements of ethical research practice, the code does not appear to have attracted this kind of widespread reflection and discussion as far as we are aware (though we do use it in our own classroom discussions on technology and society with science and engineering students).

But perhaps a more fundamental ambiguity lies in the framing of social licence issues in terms of trust. John and Lewens (2010) spell out some seven different meanings to which assertions about mistrust in science might refer. In the format of a public opinion survey in which pollsters ask people whether they trust various groups – scientists, politicians, doctors, lawyers, journalists and so on - the question might be interpreted in terms of individual virtue: are scientists (or politicians or journalists, etc) truthful? are they reliable? Framed this way there is little evidence either of a lack of virtue or of a breakdown of public trust – as many have noted, scientists tend to figure at the top end of favourability ratings in public opinion surveys.

But other allied initiatives from the science policy establishment that might also be seen as representing efforts to make research social have indeed stimulated significant debate in commentaries written for major science journals, reports for research councils and other research funders such as the European Commission, the everyday interactions in blogging and social media, as well as social science journals. In the course of engaging this way, STS academics have also modified and developed their own accounts of ways of making research social.

For instance, British policy initiatives allied to the Universal Ethical Code include sponsorship of public engagement activities and 'upstream engagement' around emerging technologies (most prominently, the *GM Nation?* public dialogue on whether to commercialize genetically modified crops) and guidelines for greater transparency in development and use of scientific advice in government (initially developed by Sir Robert May after the BSE crisis of the late 1990s and subsequently revised). The European Commission context has also sought to promote a 'science and society' agenda, participatory technology assessment, and most recently, an agenda of 'responsible research and innovation" (RRI) within its research funding programmes.

On the surface, these policy initiatives seem to bear the stamp of STS research calling for science and scientific advisory institutions to engage with a wide range of social actors in order that tacit assumptions, both factual and value-based, might be opened up for scrutiny and deliberation not just around 'post-normal' scientific domains of high uncertainty/high

states (Funtowicz and Ravetz 1993) but more broadly where the stakes are not always evident at the outset. For example, both Jasanoff (2003) and Wynne (2002) have highlighted the importance of looking at how questions for societal/public engagement are *framed* – often, engagement is framed in terms of seeking public attitudes to technological risks in the face of apparently neutral scientific information, ignoring how (potentially contestable) values have shaped this knowledge or the fact that public concerns may not be about risk at all. As Irwin and Michael (2003) observe, some public engagement and science/society initiatives explicitly credit STS thinking, but in fact, exist in significant tension with it (see also Wynne 2005).

For example, from a science policy perspective, greater openness and transparency has meant making Big Data available to all parties (e.g., Royal Society 2012) or putting a 'lay' representative on science advisory committees, responses which do not get to core STS concerns about epistemic or technological politics (Raman, in press). However, these tensions have in turn invited further rethinking and re-statements of STS and STS-influenced philosophies of science/society engagement and government. These include: anticipatory governance (Guston 2008), responsible innovation (Stilgoe et al 2013), and proposals for making explicit the public value of science by infusing "the culture and practice of science with a new set of social possibilities" (Wilsdon, Wynne and Stilgoe 2005, cover page). On changes in expert advisory arrangements, Stilgoe, Irwin and Jones (2006) highlight the limited way in which openness is being conceived of with the question:

> "Are we opening up expertise to new questions and perspectives, or are we just letting people see the experts at work?" (Stilgoe et al 2006, p.19)

In reports for European scientific and governing bodies, Felt and colleagues (Felt et al 2013) critique the recurrent tendency to assume that society/publics are simply to be enrolled onto pre-determined scientific and technological futures (see also Felt and Wynne 2007). They too highlight the need to keep the future open to different possibilities and to make a place for engagement between diverse value judgments, including those in fundamental conflict. Benneworth (2013) notes the irony of research policies being framed in terms of "grand societal challenges" while simultaneously defining these challenges as amenable to technical solutions alone.

In sum, recent science policy initiatives do not quite go far enough in terms of making research social. In this context, we want to explore the extent to which a social licence perspective might be developed to clarify the issues at stake. Given that the Universal Ethical Code for scientists already invokes the notion of a social licence to operate, we ask what could be learned if we were to take this seriously.

What might a social licence for research involve?

As we have noted, the notion of a social licence (and the parallel device of a social contract) helps to open up a question that is not normally part of expectations of good scientific research. Good science is normally defined in terms of criteria stipulated by the academic research community within which the work is located. By appealing to the familiar language of a licence, the 'social licence' helps clarify the legitimacy of asking that these boundaries be extended. The social licence may lack the formal frameworks created by scientific

licences (e.g., credential-systems) or legal licences (e.g., regulatory approval where required), but is no less important. But why and how? We now turn to this question.

Calls to extend the boundaries of the licence to research must first engage with instances where boundaries are already being extended, notably around the 'impact agenda'. For example, Research Councils UK (RCUK) requires research applicants to demonstrate how they might do not only 'excellent' research but achieve 'excellence with impact'. Impact is also a formal requirement in evaluations of academic research by the Higher Education Funding Council (HEFCE) and associated bodies under the Research Excellence Framework (REF). Just as in the US (Guston 2001), these represent the demise of an old social contract based on scientific autonomy, though the precise reach and scope of this contract may be in doubt (e.g., following Edgerton 2009). These developments have been heavily criticised across different scientific communities including the social sciences for the limited way in which research is valued (for economic benefit) and for failing to consider the non-linear ways in which research in fact makes a difference beyond the academy. One of the more colourful protests against the hegemony of impact in funding councils involved a group of scientists attempting to deliver a coffin to the Houses of Parliament as a symbol of the 'death of British science'.[4]

So, is the social licence simply another add-on to the impact agenda conceived of narrowly as publicly funded research for private profit and economic growth (in the hope that benefits will eventually trickle down across society)? Clearly it is possible for the term to be interpreted thus, but we would argue that the concept in fact provides an opening for substantially re-articulating the relationship between science and society in ways that include the possibility that *understandings of research impact are also opened up to wider scrutiny* much as has been said for research itself. In what follows, we use the idea of social licence to operate as has been proposed in the corporate world as a reference point to develop our re-articulation. Following Hughes' (1959) terminology, even where the social licence of particular activities is not in question or there is a claim that it has been secured (in the sense that it reflects current material, economic and legal norms, so there is no particular doubt on such grounds to doubt or block the work in question), their *mandate* (which covers broader cultural norms including views not currently reflected in economic systems, etc) may still be more contentious.

Individual/Community consent, capture or co-construction?

At first, looking only at arguments considered so far for 'broadening' or 'extending' the licence to research to the polity (e.g., Guston 2000), it might appear that science does not *need* to secure a relationship with *specific* communities in the way that a mining company does. Yet, there are two very direct parallels between seeking a social licence to operate in a mining community and the need for something similar in the case of various forms of biomedical and biological research. Where science requires biological materials or human subjects, the need for a licence has been made important following controversies over an era in which the securing of such raw materials was taken for granted. Second, since such research activities often involve academic scientists working together with industrial

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[4] http://www.bbc.co.uk/news/science-environment-18063913 Accessed 25.11.13

partners, the parallel with mining is even clearer as we are talking about the role of private enterprises just as in the case of mining.

What does the process of seeking a social licence to use biological and other materials for research involve? Is it a process of 'capturing' people on to a pre-defined agenda – or does it need to allow for the agenda itself to be reshaped? These have been perennial questions even as researchers, research policymakers and industrial partners have tried to respond to controversy – the issue always is, how far does the response allow the tacit institutional, epistemic and normative commitments of research agendas (Wynne 2006) to be opened up for debate? Industrial or economic impact may be one of those implicit commitments, but neither the promise to create such impact nor the delivery of it necessarily secures a social licence – indeed, either may be the *cause* of social demands articulated by those challenging particular institutional research practices.

For example, the story has been told of Henrietta Lacks, an African-American woman who died in 1951 after a series of problematic medical encounters shaped by systematic racism (Littlefield and Pollock 2011). Lacks' healthy and cancerous cells were harvested, unbeknownst to her, to subsequently transmute into the famous HeLa cell line that has been used extensively by scientists worldwide. Elsewhere, Reardon (2001) examines the difficulties that the Human Genome Diversity Project (HGDP) encountered in its quest to collect tissue from 'genetically distinct' populations across the world. It is not hard to see the parallels with mining and, indeed, this is even made explicit in the language of 'bio-data mining' or 'tissue mining' sometimes used to describe such research activities.

For the most part, such controversies have been handled through frameworks in bioethics that emphasize individual rights and the need to obtain 'informed consent' from the people from whom research materials are sought. However, the assumptions entailed in such procedures of individuals being able to act as autonomous subjects in fraught medical situations and being required to take responsibility for making decisions in the context of unspecified futures have been widely critiqued (e.g., see Tutton and Corrigan 2004). Commenting on the HeLa case, STS scholars Littlefield and Pollock remind us that "biomedicine and its subjects do not enter the process of informed consent on equal footing" (2011, p.617). The institutionalization of informed consent procedures – including most recently in social science research – might therefore be accused of being geared more towards 'protecting' researchers in the event of being questioned about their work rather than human subjects as such.

Nor are the newer frameworks of group or community consent and benefit-sharing any less problematic in efforts to gain a social licence for research. For example, attempts to seek group consent in the Human Genome Diversity Project ran into controversy over how to define a genetically distinct group in the first place and determine who has the right to speak on the group's behalf (Reardon 2001). In the case of bioprospecting research in Mexico, Hayden (2003, 2007) highlights the way in which arrangements for benefit-sharing with 'indigenous' communities from whom plants or other biological materials are sought for drug development effectively create and delimit a certain kind of neoliberal collective with rights to a share of newly privatized property – as opposed to the wider publics that campaign groups imagined would own and manage the resources in and for the 'collective good'. Hayden (2007) gives other examples of alternative benefit-sharing models in biomedical research

that might be based on fiduciary rather than private property-based relationships between tissue donors and biomedical research institutions – e.g., where common resources are held and managed by a custodian-style trust acting in the public good.

For similar reasons, Littlefield and Pollock argue that "positing the need for change *only within science* (2011, p. 617, emphasis added) is inadequate. In the HeLa case, it "takes for granted the context of expropriation that extends far beyond scientific laboratories or the immediate descendants of Henrietta Lacks" (Littlefield and Pollock 2011, p.617) to encompass problems of embedded racism and failures to provide universal health-care in the United States. Extending this line of argument, a social licence for research in such contexts obtained, for example, by providing financial rewards to specific affected persons, will necessarily be a limited one that is subject to challenge for the way in which it legitimizes, inadvertently or otherwise, existing power relations – *unless*, it can actually help open these up. Likewise, in Reardon's (2001) research, securing a social licence for research in the HGDP necessarily involved a wide range of apparently non-science issues – North/South conflicts, for one – that permeate but also extend beyond individual communities. Following Jasanoff's (2004) influential development of the idea that science and social orders are co-produced, Reardon (2001) argues that such controversies do not necessarily mean that research in such fraught contexts is impossible, but rather that they highlight the need to co-construct appropriate social and institutional arrangements together with scientific protocols – the former cannot be separated from the latter.

There is a lesson here for social licensing research and activities around British science policy as well as in other domains including mining. The point is obviously not that individual or community consent is unimportant or irrelevant. Rather, a key issue is how 'privatized' ways of obtaining a licence through seeking consent – and in some cases, consent granted in exchange for financial reward – can reinforce existing inequalities and obscure alternative and more challenging ways of creating licences. Gaining a social licence is not then just a matter of creating community acceptance for certain activities, but potentially engaging with these fundamental challenges that may well arise as they have in the cases of biological research discussed above – e.g., should mining operations be permitted to extract local resources for private benefit elsewhere in the world even if communities get a share? How was the community decision reached? How were minority voices dealt with in the process of creating a licence? Are there ways in which to co-construct ways of doing business in communities that radically alter the status quo in which researchers, industry or research-industry partnerships position themselves?

Returning to Gunningham et al (2004), the emergence of awareness and consciousness of the *need* for a social licence is clearly linked to ways in which social demands are articulated. But how this is then followed up by those seeking a licence is more open to question. We now examine this in the case of British science policy initiatives which are framed in terms of 'public' consent rather than individual or community consent.

Public consent, capture or co-construction?

Of the science/society initiatives in Britain over the past 10-15 years, efforts to engage the public in dialogue around areas of research associated with emerging technologies have been particularly prominent, at least to followers of policy developments in this domain. On

the face of it, these represent efforts to secure a social licence for research from 'the public' in a democratic polity, which is characteristically even more diffuse and harder to pin down than 'the community'. At the outset the construction of the public that is to be engaged with (or captured) is questionable in that the public is typically taken in these dialogues to be a cross-section of the British population, yet, research funded by councils in Britain may well have very concrete impacts elsewhere in the world, so who grants 'consent' for these? As we have found, even the modes in which the British public has been engaged with and represented for research policy purposes have been problematic.

For example, we conducted an evaluation of a major British public dialogue on stem cell research (the SCD) held in 2008 with sponsorship from the Biotechnological and Biological Sciences Research Council (BBSRC), Medical Research Council (MRC) and Sciencewise, results from which we reported elsewhere (Mohr and Raman 2012). Hardly unusual for reporting of this kind of dialogue, the official press release that emerged afterwards proclaimed that the SCD had found 'high levels of public support' for stem cell research. This was possible in part because the dialogue events recruited a broadly representative sample of the population of different cities in which the events were held. Yet this kind of summational reporting merely reinforced the misleading idea of public engagement as simply yet another method of gathering data on public attitudes. This is contrary to the very meaning of public dialogue as deliberative interaction which is meant to bring together different parties to reflect on matters of shared relevance.

Public engagement activities should be evaluated in terms of their capacity to *articulate* diverse social and cultural perspectives rather than to provide a statistical sample of individual opinions in the population (Brown 2009; Burgess and Chilvers 2006). For an exercise that was geared towards trying to secure a social licence in the sense of getting public acceptance for stem cell research (for which, incidentally, a clear mandate had already been expressed in the UK Stem Cell Initiative's terms of reference), it was not surprising that such philosophies did not have much impact on the process (Mohr and Raman 2012). In Hughes' (1959) terms, the social licence of stem cell research is not so much in doubt given a climate of general interest in new therapies; rather it is the manner in which a 'public' mandate for this work has been sought that is the issue. If the mandate relates to the broader social/cultural/economic norms that a profession reinforces or sometimes challenges, then there might be fundamental questions to raise here about investment in stem cell research vis-à-vis other health-care challenges – similar questions to those Littlefield and Pollock (2011) raise around the case of HeLa and the extent to which the attempt to correct historical injustice goes far enough. Stem cell research does engage with a social challenge (health) but in a 'thin' way without getting to grips with broader questions around health, illness and the role of technology.

By contrast, the domain of bioenergy research we have been investigating (Raman and Mohr 2013) offers a glimmer of a scenario for imagining what a co-construction of research agendas by science and society might look like as opposed to a one-sided 'capture' of the public. Biofuels, particularly those derived from food crops, have recently been described by environmental and development organizations as a crime against humanity (BBC 2007) and a big green con (Farrar 2010) for diverting biomass from food to fuel, damage to biodiversity and increases in greenhouse gas emissions despite being positioned as a sustainable alternative to fossil fuels. But the field of bioenergy research that originated around the oil

shocks of the late 1970s to early 1990s emerged from collaborative engagement with social pressures emerging around the problems of oil. This international community was grounded in connections with a key social system (agriculture) on which bioenergy depends as well as the system of energy. By contrast to the present, where a large part of the biofuels controversy arises from the nature of global North/South linkages with the poorer South serving as supplier of raw materials for consumption in the richer North, this earlier tradition of work envisaged a strongly territorial system (countries weaning from their dependence on oil imports with domestic biomass as an alternative source of energy) except where poorer countries might actually be in a position to export higher value-added products (Raman and Mohr 2013) rather than just raw materials in a way that perpetuates the 'resource curse' as it has come to be known in development circles.

Bioenergy pioneer David O Hall (1991) explicitly wrote about the need to avoid a technocratic approach: where biomass projects have failed, this has been due to a technocratic approach which first prioritises the need for energy rather than a 'multi-uses' approach which asks "how land can best be used for sustainable development", he argued (Hall, 1991: 733). Another major figure, Amulya Reddy, helped pioneer the sustainable energy paradigm together with colleagues, stressing equity alongside rising concerns about the environmental impacts of fossil fuels and nuclear power (Jewitt and Raman, in press). This paradigm suggested a focus on energy services, rather than magnitude of energy consumption, to facilitate a wider range of technological options for energy as an instrument of "need-oriented, self-reliant and environmentally sound development" (Goldemberg et al., 2001:330). It was also recognised that focusing on technologies in isolation from institutions and culture was inadequate. Their engagement with the social was 'thicker' and deeper than in the stem cell case. Researchers working on bioenergy in the 1980s-90s might be seen as attempting to co-construct a social licence through the manner in which they combined political, social and environmental concerns together with their technical commitments.

Conclusion

The notion of a social licence is helpful for thinking through reasons why research requires more than internal-scientific or formal-institutional licences to pursue scientific inquiry. It can be used to clarify the relevance of social demands on science, though these may not necessarily be explicitly articulated and recognized at particular times as the story of the famous cell line derived from Henrietta Lacks shows. In this paper, we have begun to outline some key expectations for the process of seeking a social licence, lessons that are relevant for corporate contexts such as mining as well as scientific research. Indeed, the two domains are not always distinct to begin with insofar as some forms of research are linked to corporate partnerships. In either case, seeking a social licence is not the same as trying to create public or community acceptance for a project which has already been defined before a process of engagement has started. Such attempts to 'capture' the public could be 'successful' from time to time but may still raise questions about the legitimacy of the licence or mandate if it turns out that key challenges or alternative futures were not engaged with sufficiently as in the stem cell dialogue case. Co-constructing a licence, by contrast, suggests a more reciprocal relationship between the social and the scientific.

Co-construction does not mean, as some have feared, that science and science-related decisionmaking would be done by referendum. The early history of bioenergy research suggests a different model where researchers engaged substantively with social and public issues as well as technical ones from the very start. The stem cell scientist, Giuseppe Testa (2008) suggests that research materials and agendas could also become modified through the course of interaction with societal debate, in this case, the search for less controversial forms of human embryonic stem cells. Frameworks such as constructive technology assessment and anticipatory governance potentially offer a systematic basis for developing such possibilities in a variety of domains.

Returning to the framework of 'rigour, respect and responsibility' specified in the UK Government's Universal Ethical Code for scientists, does it reflect expectations of co-construction outlined here? The code as it stands seems to presume a somewhat one-sided approach to seeking a social licence that centres on demonstrating the integrity of scientific practice. To this is added the dimensions of 'listening' to public aspirations and concerns, and 'explaining' without misleading, both of which are still one-sided. Perhaps the code is a useful starting point for initiating discussion on social licence matters, but co-construction suggests a willingness to rethink existing arrangements and agendas. This requires taking seriously the idea of research as a system which means assumptions of individual responsibility embedded in codes of conduct are not enough (Stilgoe 2013). A social licence for research poses obligations for public and private institutions that shape and are shaped by science, rather than just science alone.

Acknowledgements

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