

17. Innovative mechanisms to encourage the early integration of social science in the development of novel technologies

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17.1 CONTEXT

In recent years, we have seen many countries talking about industrial strategies and missions. Most developed nations recognise the role of the innovation, development and adoption of advanced technologies in developing a strong economy. At the same time, there is appreciation that we need to encourage interdisciplinary research in support of these ambitions. In 2017, the UK Industrial Strategy White Paper (BEIS, 2017), set out a future vision that would support a transformed economy, raise productivity and ensure high levels of employment. Central to this was significant investment in research and innovation spending around ‘Grand Challenges’ that ‘put the United Kingdom at the forefront of the industries of the future’ (BEIS, 2017).

Tackling ‘Grand Challenges’ affecting societies, industries and economies (including an ageing society, mobility, transforming manufacturing using digital, and clean energy) requires the mobilisation of researchers from a wide range of disciplines, including researchers from the social sciences. This chapter makes the case for the role of social science in such challenge-led research. It will then look at how UKRI has been innovative in its approach, ensuring the integration of social science research from the outset. Rather than presenting a big historical literature review of policy, this chapter looks at developments over the past five or six years in the UK and presents insights from people involved at the coal face.

The *Future Flight* and *Made Smarter Innovation* challenges are examples of programmes that have pioneered in bringing the voice of social science to technology challenges. The *Future Flight* challenge sets out to deliver the third revolution in aviation, looking at the systems needed for: the safe integration

and operation of drones; advanced air mobility and regional aircraft; advancements in electrification and autonomy. In the early days of the challenge, the majority of people involved came either from either an aerospace/aviation background or from a technology background. UKRI recognised the need to involve researchers from the social sciences. The new systems for aviation being discussed could transform how we transport goods and people. They also open up new business opportunities, challenge existing business models and disrupt the way we do things and potentially both displace and create jobs. UKRI, working with the Innovation Caucus, recognised the importance of investigating some of the social and economic challenges. This included looking at the wider innovation ecosystem and considering how the public might react, respond to and ultimately adopt or reject these new technologies and forms of aviation.

The second challenge, *Made Smarter Innovation*, aims to transform the UK's manufacturing capabilities through the development and adoption of industrial digital technologies. It sets out to deliver benefits in terms of increased productivity, less waste, more sustainable production and greater competitiveness for manufacturing firms and technology developers. There was early recognition of the need to involve social scientists. There are many human challenges for the businesses themselves adopting digital technology, not least around how to manage change. Some of the technologies, including artificial intelligence (AI), additive manufacturing, robotics, virtual reality (to name but a few), raise issues with the general public around the future of work, the economy and indeed how manufacturing will be organised. So, it is important to bring insights from the social sciences to the table, as well as understand public perception.

But how do we integrate social science into these challenge-led research programmes? There are many challenges to conducting interdisciplinary research, not least the different methodological approaches, cultures and norms, partners and stakeholders, outputs and funding. Depending on the work, there might be a large intellectual distance between partners (or not). This chapter looks at how the UK has been innovating in innovation policy through the way research council funds have been used to support the development of key industrial technologies. The chapter examines why it is important to encourage the integration of social science into technology development, what has been happening in the UK, the specific innovations and the impact that innovation has been having. Finally, the chapter suggests areas for further development or investigation.

17.2 UK CHALLENGE-LED INNOVATION POLICY

The focus of this chapter is how the UK has managed to integrate social science research into ‘mission-oriented’ or ‘challenge-led’ transformative innovation programmes (terms first popularised by the work of Mariana Mazzucato, 2017). It has been said that the UK has one of the best research and innovation systems globally, and it is clear that the UK government recognises the importance of investing in research and technology to create a stronger economy (for example BEIS 2017).

The thesis outlined in this chapter starts with the UK Industrial Strategy White Paper (BEIS, 2018) and the subsequent roll-out of ‘Grand Challenges’ supported by the UK Research Councils (now under one umbrella of UK Research and Innovation – UKRI). The White Paper identified five foundations of productivity: ideas, people, infrastructure, business environment and place. Around the same time, the UK government committed to raising its total R&D spending to 2.4 per cent of GDP by 2027. As part of this commitment, the Industrial Strategy Challenge Fund and the Strength in Places Fund were initiated. The Industrial Strategy Challenge Fund (ISCF) was designed in ‘waves’ to provide support for researchers and practitioners working on specific societal and industrial challenges. The Strength in Places Fund (SIPF) was intended to support research and innovation to spur regional growth and was led by UK Research and Innovation (UKRI). UKRI is today the primary agency for public investment in science, research and innovation in the UK.

UKRI is a non-departmental public body, created by the Higher Education and Research Act 2017. Its formation was stimulated by the Nurse Review (BEIS, 2015). UKRI’s purpose is to ‘invest in and facilitate research and innovation activities across the UK’ (BEIS, 2017 p.6). Whilst UKRI only formally came into being in April 2018, it brings together nine organisations with their own histories and cultures, including Innovate UK, Research England and seven Research Councils. The oldest of these, the Medical Research Council (MRC), dates back to 1913, and the Economic and Social Science Research Council was established in 1965. UKRI has spearheaded the UK’s challenge-led approach to research and innovation since the launch of the 2017 Industrial Strategy. This chapter focuses on what happened with the ISCF, and in particular the novel ways UKRI sought to integrate the social sciences.

The UKRI Industrial Strategy Challenge Fund (ISCF) aimed to bring together the best UK researchers and the UK’s best businesses ‘to transform how we live, work and move around’. It was initially backed by £2.6 billion of public money (April 2017–April 2025), with £3 billion in matched funding from the private sector. It was made up of 23 challenges, covering the four challenge themes: clean growth, ageing society, future of mobility, artificial

intelligence and data economy. Since then, 23 goal-oriented ‘challenges’ have been launched, each led by a ‘challenge director’ from the relevant industry. There were three waves: the first in April 2017, the second in April 2018 and the third in 2019. As pointed out by Make UK in their 2023 ‘Industrial Strategy’ document, the UK has gone through many changes around innovation policy in the last decade or so. ‘Significant political churn’, as they call it, has made life uncertain and full of ‘short-term fixes’. They point out that

over the last 15 years the government department responsible for managing industrial policy has been renamed and reorganised five times. In those same 15 years there have been 15 different Secretaries of State responsible for business and industrial strategy, including the various iterations of departments and remits now housed under the Business Secretary, and seven different plans for growth.

Whilst this story starts with the Industrial Strategy and the Industrial Strategy Challenge Fund, these terms are no longer used. However, both *Future Flight* and *Made Smarter Innovation* continue – rebranded without the ISCF name. The theme of looking to the future and solving big challenges still exists in the latest UKRI Strategy: ‘UKRI strategy 2022 to 2027: transforming tomorrow together’. In 2022, the UK had a new Innovation Strategy, a new Office for Science and Technology Strategy and a new National Science and Technology Council. This was followed by a new Department for Science, Innovation and Technology, and the Science and Technology Framework was published in March 2023. It identified five technologies on which the UK should be focusing: engineering biology, artificial intelligence, future telecommunications, semiconductors and quantum technologies.

17.3 THE IMPORTANCE OF INTEGRATING THE SOCIAL SCIENCES

There is no doubt that the social sciences are vital for the achievement of many of the aims of the industrial strategy. This is clearly argued in the Campaign for Social Science report, which points out that:

Good social science has helped to shape, define and diagnose the issues underpinning the industrial strategy and what may need to change in the future. For instance, it can also help in understanding and changing the wider social conditions – education, skills and social investments – within which any successful industrial strategy can be advanced. This includes not only understanding individual and social behavioural change associated with new technologies and industries, but also the changes in social institutions and infrastructure needed to promote adaptation and further cycles of innovation and growth. (Campaign for Social Science, 2019)

At the outset, there is a clearer business case for involving some areas of social science in technology research more than others. For example, areas of business such as marketing, innovation and entrepreneurship are essential to encourage discussion about the business models needed to accelerate technology diffusion and adoption. We have all seen examples of technological innovation that have failed due to a lack of consideration of the market and the business.

But other areas of social science might be equally crucial around public perception, ethics, social and economic impacts. Artificial Intelligence (AI) is a good example where there is a lot of current media attention. New technologies and systems can make people nervous. New technologies can be unsettling for consumers, employees and industry incumbents. There is often distrust of new things, especially those coming from science and technology. When the public start to ask questions and raise issues against new technology, often the backlash is escalated by the media – and we are seeing this in the media at the moment with headlines such as ‘AI will be the end of humanity’ (BBC News, 2023). Social scientists from areas such as sociology, ethics, psychology, anthropology, history and so on all have contributions to make to thinking about human behaviour. The principles of Responsible Research and Innovation tell us that in order to minimise such backlash, early dialogue is important, and we need to create spaces and processes to explore these aspects of innovation in an open and inclusive manner.

It might be that these technologies require new infrastructure and regulations. In some cases (for example AI, driverless cars, and drones), we are challenged to develop policies for technologies that are still being developed. Sometimes areas of social science, such as history and geography, can give us insights into other places or even times. And yet, history is littered with examples of failures when technology gets ahead of society (Khanna, 2018). When talking about challenge- or mission-led innovation policy, or even in any programme developing new technologies, the author would argue that we need to think about the human element and embed social sciences earlier. Indeed, we need to find ways to really integrate social sciences research with other science and technology disciplines. However, actually doing this is difficult for all sorts of reasons.

The UK has always supported social science research, with the Economic and Social Science Research Council (ESRC, now part of UKRI) being established in 1965. There are long-standing centres of excellence originally funded by ESRC that are recognised the world over, including the Science Policy Research Unit (SPRU) at the University of Sussex and the Institute for Innovation and Public Purpose (IIPP) at UCL. For many years, ESRC has run competitions to host social science research centres, for example the Enterprise Research Centre (ERC). Responsive mode research funding is

always open and there are specific calls. But most recently (since 2017) there has been considerable innovation and experimentation involving ESRC. Two notable innovations were the introduction of the Productivity Insights Network (which aimed to crack the productivity puzzle through new lenses) and the Innovation Caucus. Both of these played a critical role in some of the innovations discussed in the next section.

17.4 IMPLEMENTATION

The next section takes a very light touch ‘case study’ approach, drawing upon documentary evidence, ten interviews with UKRI staff, challenge leads, senior managers from research councils, and academics involved in the two challenges – *Future Flight* and *Made Smarter Innovation*. There is also an element of lived experience from the author, having first-hand involvement with both the Future Flight and Made Smarter Innovation challenges. Interviews sought to find answers to questions including: is there something innovative in what is happening in these programmes with respect to the involvement of social science? What are some of the enablers and challenges? What has changed? What worked and what didn’t? What can we learn? What still has to be done?

The Future Flight and Made Smarter Innovation teams took slightly different approaches to integrating social science into the challenge. These will be outlined in the following paragraphs before reporting on the interviews with key stakeholders.

With Future Flight, which was a ‘Wave 3’ ISCF Challenge, social science was built in right from the start. The Innovation Caucus played a role in ensuring this happened. In June 2019, they were tasked with identifying Caucus members to participate in a roundtable discussion to explore the potential role of the social sciences in the Future Flight topic area. This meeting took place at the end of July 2019 in Birmingham and included social scientists from the fields of innovation, politics, entrepreneurship, regional policy, law, transport policy and transport management. The author was herself one of the Caucus members who took part. Gary Cutts, the newly appointed Future Flight ISCF Challenge Director, and Ruth Mallors-Ray, one of the early co-creators of Future Flight, met with the team, along with two representatives from ESRC.

At the end of August, the Future Flight challenge was officially launched, and in September 2019, the first public briefing took place. The total UKRI funding was £125 million between 2019 and 2024, with the challenge expected to bring in significant additional private investment. In late 2019, the Innovation Caucus ran a number of events promoting social science and industry involvement in the ISCF challenges. One such event took place in Glasgow, hosted by the University of Strathclyde at their Technology and Innovation Centre. This event was co-organised by the Innovation Caucus and Strathclyde University

and delivered in partnership with the KTN and the Economic and Social Research Council (ESRC). Bringing together academics and industrial partners, the event provided information and insights to prepare for forthcoming calls under the Industrial Strategy Challenge Fund (ISCF). So, there was a real push to involve people from social science disciplines right from the outset.

The Future Flight Challenge team recognised that there was a place for social science within the programme, and to that end, they asked the author to convene a short working group to highlight some of the areas where social science could bring insights to the Future Flight programme. A team was assembled and met several times in 2020 (online due to COVID-19 restrictions) and produced a report in late 2020 that helped inform the challenge team. The author was also invited to join the Future Flight Advisory Board and contributed to a roadmapping exercise in late 2020, involving many key stakeholders. The Future Flight programme also commissioned PWC to carry out a study looking at the potential economic impact of the use cases. The report was published in January 2021. In March 2021, a call went out looking for an ESRC Research Director for Future Flight. This was advertised as a 12-month tenure. There was a town hall event in March to publicise and answer questions from potential candidates interested in applying. The call closed at the end of April, and in June 2021, the author chaired an interview panel. Professor Fern Elsdon-Baker was appointed to this role. The research director's role was to work with the Future Flight challenge team, identify areas where economic and social research could make a significant contribution to the Future Flight challenge and wider aviation sector to inform the direction of future flight research, and be a visible champion for economic and social research in the Future Flight challenge.

Made Smarter Innovation took a different route to embedding social science. In September 2020, they put out a pre-call announcement saying they would be looking for an ESRC Research Director for the then-named ISCF Manufacturing Made Smarter programme. The call officially opened in November 2020 and closed in January 2021. The author, along with Professor Jan Godsell, put in a successful bid to be co-directors. They were interviewed in March 2021 and were given almost five months to scope out the needs of a network to pull in the social sciences. At the end of this period, we were invited to submit a proposal for a funded network to run from November 2021 to December 2024, and were interviewed by a panel. And so the InterAct network was born, with £3.3 million over three years, passed through funding, early career scholarships, impact grants, network activities and three areas of core research: the future of manufacturing ecosystems, the future of manufacturing work and the future of the economy (linked to manufacturing).

17.5 IS THERE SOMETHING INNOVATIVE HAPPENING?

Everyone interviewed felt like they were part of something innovative and that they were seeing a shift towards integrating the social sciences in the challenge-led programmes. Something we heard a lot was people recognising the difference in approach when social science is integrated into the design of a large research programme and not just ‘an after-thought’. People felt that more of a ‘systems approach’ was being taken. And the benefits of this are starting to come through and influence innovation policy, hopefully resulting in more innovations in innovation policy. The following comments show the impact of integrating social science from the outset:

The Future Flight Challenge has worked with social scientists to understand public considerations (of Advanced Air Mobility Vehicles AAM or ‘air taxis’ and commercial drones) way upstream of conventional studies and with a system which has a much broader range of interwoven impacts which are still emerging. This is novel in its own right but the ambition is to influence the design of products and services to maximise public benefit and minimise negative impacts – putting the public inside the system design loop. First services could be as early as 2024. Both types of vehicles offer an enormous range of new services and benefits but have a wide range of potential societal impacts. (Gary Cutts, Director Future Flight)

I think there is an increasing realisation in policy makers, innovators and others of the need for a ‘systems’ or systemic approach to accelerate the rate of innovation and diffusion. In Made Smarter we were very aware of several aspects of social science that would make a significant impact. One was at the level of human centricity in the design of future technologies, and systems of work. Secondly, the foresighting aspect of the Interact programme looking at what the future could look like and then looking at how we can use social sciences disciplines to really understand how to build that better future – a better future of work, a better economy and a connected ecosystem. Part of the better future for manufacturing also comes back to telling a better story about it, ensuring we continue to inspire a rich and diverse talent pool into the sector. (Chris Courtney, Challenge Director, Made Smarter Innovation)

Whilst there were still some experiences where large projects had teams working in traditional disciplinary silos, we saw many more who recognised there was more integration due to how the challenge was designed. We also heard from a good number of people who have been trying to work in an interdisciplinary way for years but had been frustrated: ‘we have been putting in trans-disciplinary bids for years, but often they would go to an EPSRC panel or ESRC panel and get rejected because the topic fell through the cracks’. They welcomed the shift within UKRI to encourage more interdisciplinary working.

There was recognition that ‘a lot of work has been going on behind the scenes with a small group of social scientists and funders actively looking

to embed social science insights into a wider group of challenge areas'. The challenge directors of Future Flight and Made Smarter Innovation were particularly receptive to what social science had to offer. So, it looks as if there is a shift towards looking for ways to better integrate social sciences and adopt a 'systems' approach. It has not been an overnight change, but a lot of ground-work has been done over the past five or six years, with the Innovation Caucus being an important catalyst in this movement, which is gaining momentum.

17.6 ENABLERS AND CHALLENGES

Everyone we spoke to expressed a view on things that enabled the better integration of social science. There was general agreement that the two factors of the ISCF Challenges and the coming together of UKRI were pivotal: 'ISCF was a driver', 'ISCF was important', 'UKRI coming together, synergising, gave an opportunity'. Others referred to a growing movement, with more people visible who can work at the intersection of technology and social science. And the ESRC/Innovate UK Innovation Caucus was frequently mentioned as a catalyst. Certain people were also recognised as being influential: 'Mark Walport was influential in how to make social science accessible and digestible', as well as key people at ERSC, such as Mel Knetsch and Bruce Etherington, and academics pioneering the integration of social science such as Tim Vorley.

We heard that the Challenge Directors for Future Flight and Made Smarter Innovation were particularly receptive and became champions for social science. Although it was pointed out that for these challenges, the importance of human issues was clear from the outset:

Perhaps both the biggest challenge and associated enabler is recognising that for both of these challenge areas, technology was not the sole focus. In fact, the key to realising the advantages of future flight and manufacturing made smarter were a range of non-technical challenges. This includes understanding that the technologies are often people and user centric, appreciating the roles of standards and regulation, as well as understanding the business model challenge around the technology. (Tim Vorley, Innovation Caucus)

Another issue that came up was the different worldviews of many within the social sciences. Whilst some social scientists are much more used to working on industry problems, there is also value in involving the more critical school of management. Often, involving people from social science brings different perspectives. The author witnessed this first-hand when the Innovation Caucus first introduced some social scientists to the Future Flight team. Whilst the Future Flight team was very positive about drones and alternative flight modes, the social scientists asked lots of questions and perhaps came with a more critical view. 'It is different – social scientists don't tend to offer the

solution. They will ask more questions and then people will realise what they thought was the problem was really a symptom, and the problem is really a different, often deeper, one’.

Within both Future Flight and Made Smarter Innovation, there was clear intent to involve the social sciences from the outset. Future Flight appointed an ESRC Research Director, Professor Fern Elsdon-Baker, and made it clear in all the calls for funding that they wanted to see interdisciplinary approaches with a clear human element. Professor Elsdon-Baker also ran events and online seminars and workshops on social science issues. This quote from the Challenge Director highlights why this was important:

The social science research packages have been designed thoughtfully to address these issues with research selected appropriately. Different research packages are in place for different types of communities so that we are openly looking for differing views rather than an average perspective. One good example of the approach was in the Sciencewise dialogue in 2022 where physical artefacts and digital materials were created to allow the participants to envisage a world in which these technologies were being rolled out and get their views in that artificial world. Without this we would have been asking ‘what is your opinion of this technology that is hard to understand and which has impacts we don’t understand yet and which you may believe are actually unlikely to materialise. (Gary Cutts, Future Flight)

Made Smarter Innovation also emphasised the need for interdisciplinary teams in their EPSRC centres call, and they also appointed ESRC co-directors, this time funded through a Network Plus approach. Professor Jan Godsell and Professor Jill MacBryde became co-directors of the network, which was branded as the InterAct network (encouraging people to interact across disciplines). Within Made Smarter Innovation, the landscape was quite complex and fragmented, and not helped by a number of structural changes from the government during this period. Again, key people within UKRI were mentioned as enablers. ‘I had really good help from ESRC teams. They really wanted to engage and help shape how to bring it life. Finding critical allies was very important’ (Chris Courtney, Made Smarter Innovation).

At a practical level, people talked about the importance of being able to articulate the value of social science and even just explain what we mean when we refer to the social sciences. A good number of respondents talked about those outside of social science ‘not knowing what social science is’. The issue of language came up as a common challenge, with people talking about the need for the ‘opportunity to showcase what social science can bring but without using the terminology of social science’. The most successful approaches seemed to ground social science in the ‘human aspects’, ‘where there is people, there is social science’.

There is a growing literature around the challenges of interdisciplinary research. Whilst there are different ways of classifying the challenges, there is general agreement that additional challenges exist. These include challenges around culture, language, and research methods. Challenges around how research is measured and performance evaluated, the fact that it takes longer to get off the ground – for example framing the problem, building and recruiting the team, and often working with multiple non-academic stakeholders in co-creating and dissemination. We heard about these practical challenges coming from the wider environment in relation to interdisciplinary research. In our discussions, we heard people refer to many of these issues, with people saying that interdisciplinary working is ‘seen by many as career suicide’. We also heard more than once that in the social sciences, there is a ‘latent capacity issue’, whilst in Engineering there tends to be more research assistants in the system; in the social sciences, they are less available. This leads to issues with recruitment and delays in recruitment because of university systems and increasingly complex immigration. We also heard people talk about the lack of value of interdisciplinary research in academic terms, ‘many of the journals who take interdisciplinary work aren’t highly ranked and this is a problem’. Lattanzio et al. 2023 offer a good discussion around this literature. But we also heard people talk about people celebrating being interdisciplinary researchers: ‘We are seeing more and more people changing their job titles to indicate they work across disciplines.’

17.7 WHAT HAS CHANGED?

Future Flight and Made Smarter Innovation provide us with ‘good cases and examples of what social sciences can bring’ and it has also ‘helped ESRC and UKRI to understand how to talk about social science’. The fact that we have had some success means that the job of convincing people of the importance of social science is getting easier. We heard people talk about the fact that there is growing recognition of the added value of social science. And it was also noted that social science can be good value, with social science in the main not needing expensive equipment. Although ‘Social science has less “shiny new stuff” for people to shout about’.

From a UKRI perspective, ‘there are now more academics that UKRI are aware of in this space, making it easier to bring in new people’ and perspectives. Because we saw a broader range of social scientists getting involved in the Industrial Strategy Fund Challenges, we have also seen a new set of universities emerge as being important in bringing new perspectives and contributing particularly to interdisciplinary research. These quotes from interviews highlight this:

Look at the range of new ESRC IAA accounts – Strathclyde, Coventry, Stirling, Hertfordshire, Huddersfield. Well outside the traditional top funded social science universities. Before 2023 they only let the top ESRC winners apply for IAA.

This is quite a major innovation in innovation policy:

I think we are seeing a wider appreciation of the value that the social sciences bring. The magnitude of this shift should not be underestimated – not least because the social sciences span a huge amount of knowledge and insight with multiple domains of application. The fact that this has come to be recognised in multiple areas where it has previously been overlooked if recognised at all is a huge change.

In both the Future Flight and Made Smarter Innovation programmes, we saw more social scientists becoming involved in the challenges, for example through involvement in large projects or through involvement with network plus activities. So not only did we witness more social scientists being involved, but we also saw ‘the wider community of non-social scientists then becoming advocates for social science as much as they are the technology that underpins the challenge’.

17.8 WHAT WORKED AND WHAT DIDN’T WORK? WHAT CAN WE LEARN?

Everyone interviewed saw the value in taking an interdisciplinary approach that integrates social sciences from the outset, ‘what worked really well was putting the social science content right into the heart of our cohort discussions’. People talked about developing technologies that are more acceptable to the public and thinking about the human issues in the diffusion of technology. We heard about social sciences providing insights into social and economic challenges, thinking about the future and about how to develop supply chains to deliver the new technologies. There were also insights into the future of work in new and emerging sectors, and existing sectors adopting new technologies.

The experiences within the two challenges were different, so what did we learn? Within both challenges, we have seen a big increase in the number of people advocating for social sciences and working in an interdisciplinary manner. There are now many more people who can advocate the value of social science, and ‘this community shows the value creates momentum and converts’. But this was not always the case, with Future Flight having to change its approach: ‘the original intent of the full social science work package delivery mechanism has changed simply because we did not get bids of the right quality for everything. It is felt that there just aren’t enough researchers in the area’ (Gary Cutts, Future Flight). This was not the only person who was surprised to find a lack of social science academics who wanted to engage: ‘One surprising

thing (to me) was the lack of a sizable social science cohort who could join the challenge’.

Made Smarter Innovation had some success in ‘bringing people together as a cohort, not forcing things, but allowing things to evolve’. The InterAct network ran a summer school for early career researchers and held a three-day research sandpit for 36 academics. They also hold an annual conference. These activities were very successful at building community. The point about involving early career researchers was also noted by others: ‘early career academics are more open. Often, the big hitter academics won’t be motivated by small pots of money’.

There has been a growing recognition of the value of social science within the wider UKRI and researcher community: ‘Co-creation work has been helping people understand how social science is important and useful and brings different approaches’. And there is appreciation that ‘Social science is good value’, ‘you can do a lot with a small amount of money’. And also recognition that the impact from social science can be powerful and speedy: ‘the benefits of social science might diffuse quicker – although they might start slower’.

But it has taken a long time to get to this stage. ‘Getting to this stage has seen social scientists and funders having multiple conversations with different stakeholders inevitably saw some conversations not get traction around the value proposition of the social sciences’. The two ISCF challenges discussed in this chapter recognised that getting the non-technical aspects of the challenge right would augment and amplify the outcomes of the technical challenge the social sciences were embracing. ‘Where social scientists, stakeholders and challenge directors held discussions to identify and co-create priorities and associated programmes of work there were higher levels of engagement and commitment’. Summarising the learning from the programme directors and those close to the challenges discussed, there is value in: engaging early – working with stakeholders to identify opportunities; building awareness around the value added through social science insight; and co-creating solutions together.

17.9 WHAT STILL HAS TO BE DONE?

In the last five or six years, we have seen a lot of good groundwork and some innovation in approach. But this is laying the groundwork for more substantial innovation. One interviewee possibly summed it up, saying, ‘there has been a change but it is evolutionary rather than revolutionary’. We have moved the dial and started to see the real opportunity of involving social sciences early on, but there is still more to be done. There has been a shift in approach from UKRI, but there are still challenges elsewhere in the system. Academics talked about enjoying working on challenging interdisciplinary problems but pointed

to ‘barriers within the system such as promotions criteria, REF pressure’. There are growing levels of interdisciplinary work engaging people from the social sciences: ‘we are making progress but still have a lot of challenges’.

Another area where there is still work to be done is in enthusing social scientists to work on these interdisciplinary challenges. Many are still reticent, partly because of traditional performance measures that are important for career progression.

There is still a need to build capacity and capability among social scientists to work in this way. This is not something that we as social scientists learn from the ‘get go’ – but the knowledge of social scientists can span boundaries and connect stakeholders around grand challenges. This can often demand social scientists apply their experience laterally beyond their immediate areas of expertise and have the confidence to do this. (Tim Vorley, Innovation Caucus)

It is interesting that some people interviewed also pointed to some of the latest areas of technology development identified as being important for the UK: ‘engineering biology, quantum, AI – all have societal issues but it is not clear’.

17.10 CONCLUSION

It is clear that across the world we are seeing more focus on transformative innovation policies, more challenge-led or mission-led approaches to tackle the ‘grand challenges’ facing modern societies and economies. Examples include the United Nations Sustainable Development Goals (Borrás, 2019), the European Union Horizon 2020 research and development programme (Mazzucato, 2018), Germany’s Energiewende policy (Fagerberg, 2018) and the UK’s Industrial Strategy White Paper (BEIS, 2017). There is also a growing academic literature looking at these approaches from political, economic and capabilities perspectives (for example Borrás, 2019; Kattel and Mazzucato, 2018, OECD, 2017 and 2020). It is clear that these challenge-led approaches are valued by stakeholders across government, academia and industry. However, there remain some key challenges. Whilst there is also a growing body of academic literature around inter- multi- and trans-disciplinary working, there are many aspects that haven’t been fully discussed in the academic literature.

One such challenge is how to embed social science research into challenge-led programmes. This chapter has looked at how ‘innovations’ instigated by UKRI have helped to encourage the involvement of social sciences in the development of new technologies and in ISCF Challenge programmes. The chapter has also started to gain some insights through conversations with people working on a number of key challenges, capturing some of the coal-face innovation as it happens. The chapter does not claim to be a complete academic review or an empirical study of any scale. Rather, the chapter is written

by someone who feels there is a movement that is emerging and who is trying to capture, document and reflect on this as it unfolds. The aspiration is that this chapter will encourage discussion, debate and reflection.

There have been fundamental changes and innovations in the way that UKRI is encouraging the integration of social science into the development of future technologies. We are making strides in the right direction, and there is innovation that we have not seen before. But there is still a lot to do. Professor Helen Margetts, from the University of Oxford and the Turing Institute, sums it up well by concluding: ‘like it or not we are all in this complex socio-economic system together and we need to start acting together’ (Keynote speech at the Foundation for Science and Technology Conference in London, November 2023).

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Professor Tim Vorley, Director, Innovation Caucus

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