

# By focusing on outputs, rather than people, we misunderstand the real impact of research.

*Arguing that science policy remains shaped by enduring ideas of linear knowledge transfer from research to society, **Paul Nightingale** and **Rebecca Vine**, propose that research impact in contemporary service economies lies predominantly within the application of human expertise to complex problems. By focusing on researchers, rather than research, they suggest research systems would be better positioned to appreciate the multifaceted ways in which fields of research, such as the social sciences, impact society.*

Increases in funding for research come with a growing expectation that researchers will do more to [improve social welfare, economic prosperity](#) and more broadly foster innovation. It is widely accepted that innovation is a key driver of long-term economic growth and that public funding for research complements private investment. What is more contested is how research delivers impact. Whether it comes from the kinds of linear processes of knowledge transfer from researcher to user, [sought for](#) and often [narrated](#) in REF impact case studies. Or, if the indirect effects of research such as expertise, networks, instrumentation, methods and trained students, are as important as the discoveries.

## Innovation and the long 1950s

Many of the frameworks we use to think about how research can deliver impact emerged in 1950s America. A time when scientific discoveries were being successfully commercialised to create new industries. The science policy community recognised innovation depended on downstream spending by firms but saw low levels of public spending as the main constraint on growth. The subsequent increase in federal research funding coincided with a long period of economic growth, so that a model of innovation driven by basic research became dominant. The legacy of this era can still be felt in funding initiatives, such as the UK's [Advanced Research and Invention Agency](#) (ARIA) modelled on the US's Advanced Research Agency (ARPA) launched in 1958.

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However, this period when new products could enter global markets with only limited competition was atypical. By the early 1970s, as global competition intensified, firms developed complex models of innovation emphasising the importance of addressing customers' needs and managing internal processes and external relationships. US firms drew heavily on new investment in social science and particularly management research. This funding is often overlooked because it was supported by non-federal funders. For example, the Ford Foundation's spending on [behavioural sciences](#) between 1951 and 1957 was more than the National Science Foundation (NSF) spent on *all the sciences put together*. From 1963 to 1966 the Foundation spent \$35m on management research – about \$310 million today. Only looking at government funded research distorts our understanding of the US economy and fundamentally misses how different kinds of STEM and social science knowledge complement and enhance each other.



The ‘transfer from science’ linear model still works in some high-tech manufacturing sectors, such as chemicals, pharmaceutical and electronics, but the economic size (but not necessarily importance) of high-tech manufacturing has declined to only 3% of the UK economy. Most of the other 97% are services that are typically consumed as they are produced. Sustained service delivery requires innovations in the underlying processes and infrastructure. For example, paying bills on a phone app requires a data-intensive network connecting banks, mobile networks, customers, and their accounts. Although service sector innovations rarely draw directly from R&D, this doesn’t mean research isn’t important. On the contrary, the growing importance of research to these sectors is possibly the most important issue for current science policy.

### **If research isn’t valuable for generating transferable discoveries, why is it so valuable in an information-intensive service economy?**

One reason research is so important, is that as the economy has changed and demand for experts has increased. As we noted in a [Treasury report](#) over 20 years ago, often the most valuable output of research is ‘talent, not technology’. The ‘[post-graduate premium](#)’ that having a Masters qualification adds to starting salaries is evidence of this. But why is expertise so valuable? Experts don’t just know more than novices, they understand things differently, drawing on more abstract, ‘deeper’ representations. Research on chess-grandmasters, for example, shows that they understand chess piece configurations by seeing patterns. They can see a Sicilian defence, while novices just see a selection of chess pieces. Their expertise enables them to configure chess positions more effectively and solve problems more rapidly. They draw different conclusions than novices, typically starting closer to more robust solutions, finding solutions faster, and exploring fewer dead-ends.

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In our current economy, problems require service innovation, and it is unlikely that pre-existing ‘answers’ exist waiting to be found in the academic literature. Firms need to undertake formal and informal research, which is why firm-level downstream investment is so important. Sometimes experimentation draws on academic work, through academic consultancy, but increasingly organisations collaborate with academics to co-produce research. Here researchers with field expertise work alongside in-house experts to collectively solve problems and deepen understanding on both sides. Rather than a linear model of knowledge transfer, it creates impact through collective learning where the research process enables organisations to solve problems more ambitiously.

The contribution from this approach is very different to the impact-model sought after in REF impact case studies. It doesn't situate the value of research in academic papers and their communication. Its contribution is often indirect, but hugely valuable and "generative" because it adds to the distributed stock of expertise that can be applied again in new settings. Indeed in this co-produced way of working, academic papers typically come after the impact has been generated, not before.

## Generating impact from expertise?

Research is extremely important because innovation requires more diverse and deeper stocks of knowledge. Academics with field expertise and highly developed research skills can play a valuable and important role co-producing research and creating impact. These observations are drawn from our ESRC-funded research collaboration with the UK government – known as Project X. Within a year Project X became the mechanism to coordinate the Cabinet Office's [areas of research interest](#) (ARIs) for government major project delivery. This required a sophisticated governance structure and the careful coordination of a mixed portfolio of practice-focused and theoretical research.

The short-term outcome of Project X is impressive, a three year £1.1m ERSC investment and £400k from professional bodies led to 31 new strategic collaborations, 111 formal engagement activities, 43 awards for excellence – and also 78 publications. This success was the result of prioritising the development of a [new generation of researchers](#) and an environment that encouraged [reflexive learning between academics and professional practitioners](#).

Project X demonstrates a major departure from the traditional view that impact flows from the application of research 'discoveries', to a model of impact generation when co-produced research creates complementary expertise. This non-linear impact model deserves more attention in the science policy literature. Although this form of impact is much harder to manage, it is damaging to continue to overlook it. It is now time to move away from an outdated model of innovation and think in terms of expertise and its role in a modern information-based economy. This will help us to appreciate the growing importance of research and the diverse ways it can enhance economic and social outcomes.

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*Readers can find more information about Project X on the project the [website](#). This blogpost is also the first of two, the second of which will focus on how Project X has generated impact and expertise. Some of these ideas were explored in a piece written for UKRI – ESRC staff in January 2022.*

*Both authors were investigators on **Project X**, an ESRC funded programme of research undertaken with the UK Government to generate unique insights into the performance of major projects and inspire improvements in their performance.*

*Note: This article gives the views of the author, and not the position of the Impact of Social Science blog, nor of the London School of Economics. Please review our [Comments Policy](#) if you have any concerns on posting a comment below.*

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