INNOVATION FOR UK GROWTH
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EVIDENCE ON THE ROLES OF RESEARCH, BUSINESS, NETWORKS AND POLICY

Innovation is essential for the growth of the UK economy. But where are the best opportunities for sustained improvement in the national capacity for innovation? In the private sector or publicly funded research-intensive universities; in manufacturing or services; in large multinationals or small firms; within organisations or across networks and other kinds of collaboration? And what can policy-makers and practitioners do to raise the innovative performance of researchers, businesses and the economy as a whole?

These questions have been at the heart of a programme of work by the UK Innovation Research Centre (UK-IRC), a joint venture between the Centre for Business Research at the University of Cambridge and Imperial College Business School to further research and knowledge exchange on innovation policy and practice. A team of researchers from a range of institutions and disciplines has focused on several key themes in innovation research, including innovation in services; open innovation; networks of innovation; the links between universities and business; and innovation policy. Key findings are summarised in what follows and explored in more detail in the accompanying reports.
THE STATE OF UK INNOVATION

How does the UK’s innovation system perform compared with other advanced economies? Relative to its GDP, the UK invests less in research and development (R&D) and other investment inputs to support innovation. Business R&D expenditure is dominated by a handful of large firms and over a half is carried out by foreign controlled businesses. And overseas funding for UK R&D is an order of magnitude greater than in any other major economy.

The UK’s innovation output also lags behind that of many of its major international competitors. Such measures as levels of patenting and employment in knowledge-intensive activities and fast-growing firms suggest that there is considerable ground to be made up.
THE IMPORTANCE OF SERVICE INNOVATION

The service sector spans a diverse range of activities, including financial and business services, transport and communications, health, education, social care, retail, hotels and catering. Together, these industries constitute more than three quarters of UK output and employment, so it is vital to understand how service innovation happens. Until recently, this area has been relatively unexplored compared with how to innovate physical products, production processes and the organisation of production.

Manufacturing firms also engage in the provision of services through so-called ‘servitisation’ strategies, in which they shift from ‘making and selling products’ to providing combinations of products and services. Almost all manufacturers provide at least some services to their customers – the most common being delivery of products, followed by provision of spare parts and consumables, a customer helpline or support desk, and product or systems training.

Business and professional service providers are important service sector innovators, often pioneering new forms of innovation by acting as ‘brokers’ of knowledge, ideas and people’s skills. For many of these organisations – which dominate such industries as law, accountancy, management consulting, design, architecture and engineering consulting – there are tight and overlapping external relationships with clients, suppliers and other professionals. In these environments, projects typically span different organisations to achieve specific tasks.

There is no single mode of innovation in services, but organisational changes are relatively more important than in standard manufacturing. This is partly because many manufacturers have developed service functions, while some services are structured around ‘products’ and are more akin to manufacturers.
THE POTENTIAL OF OPEN INNOVATION

Growing numbers of UK firms are adopting the strategy of open innovation as a way of getting access to new skills and new technologies and enhancing their capacity for innovation. "Inbound" practices involve searching for knowledge outside the firm through engagement with customers and suppliers, the research base, consultants and public information sources. "Outbound" activities involve both bringing innovative products and services to market and external transfers of knowledge and technology through collaborative projects and the like.

Both inbound and outbound practices are associated with superior firm growth and innovation performance. But there is no single optimal form of openness for all firms. For example, manufacturing and business service firms differ considerably in their use of open innovation practices. The latter are more active open innovators; they are more engaged in informal relative to formal open innovation practices; and they attach more importance to scientific and technical knowledge than to market knowledge.

Despite the growing popularity of open innovation, companies should be careful about jumping onto the bandwagon. Instead, managers need to formulate strategies in accordance with their firm’s resources and strategic needs, taking account of their external environment. For example, the degree of competition within their sector and the nature of the intellectual property regime.

Collaborations also require effective management. Not only do managers need to build capabilities in absorbing external knowledge and technologies in pursuit of innovation, but they must also learn how to appropriate value from these collaborations. In many cases there is a paradox of openness: the creation of innovation often requires openness, but the commercialisation of innovations requires protection. This tension in appropriating value from open innovation is particularly evident in collaborations between smaller and larger firms.
Universities have been increasingly seen as a key source of the innovative ideas that will promote growth in ‘knowledge-driven economies’. In the UK, they have been constantly urged to engage more with the private sector, notably through the commercialisation of science by licensing their discoveries and inventions to existing businesses or establishing start-up companies.

But while such ‘technology transfer’ is an important element of ‘knowledge exchange’ between universities and wider society, there is much more to it than that. Such interactions are by no means limited to the science, engineering and technology-based disciplines. Nor are they limited to the creation and management of intellectual property via patents, licenses and spin-outs; or to ‘high-tech’ industries or the private sector in general.

Knowledge exchange involves academics from the arts, humanities and social sciences as well as natural scientists. It is a wide and varied process, including many people-based, problem-solving and community-driven activities as well as those surrounding the commercialisation of knowledge. And universities are engaged with a broad range of partners – in manufacturing, in high-tech, in the service sector, in the public sector and in the ‘third sector’ of charities, voluntary organisations and social enterprises.

It is also important to remember that while universities can make many important contributions to businesses and the wider economy, their primary role in society has always been to attract and educate talented people. Narrow considerations of the business utility or ‘impact’ of universities may also risk ignoring the part they play in their local communities. Most importantly, increased focus on their contribution to innovation and growth should not divert from the foundations of scholarship, on which the substantial past success and social legitimacy of universities have been built.
THE TECHNOLOGIES OF NETWORK INNOVATION

New information and communication technologies, such as computers, smartphones and the internet, have made possible new forms of interactive innovation across a wide range of industries. The growth of open source software has also contributed to the increasing prevalence of distributed forms of innovation encompassing a range of different endeavours – from crowdsourcing to knowledge exchange hubs.

‘Social networks’ play a significant role in this form of innovation as means for individuals and organisations to get access to information, resources and support. Who people know, who they collaborate with and how they ‘broker’ connections between other people and projects – their ‘network position’ or ‘social capital’ – all have an important influence on their decision-making and professional outcomes. So too does the global nature of a given network – the extent to which it is a ‘small world’ in which everyone is connected by fewer than ‘six degrees of separation’.

What are the implications of this new world of innovation for management? First, if people are better at identifying opportunities when they are in certain network positions, identifying those individuals is clearly important for enhancing an organisation’s ability to choose the best projects in which to invest resources.

Second, the performance of potential employees depends not only on their personal characteristics but also on their propensity to build networks both within and outside the organisation. Adopting a ‘follow the money’ approach in staff recruitment – looking at what someone successful does next – could be effective. But there should be a health warning: in uncertain environments with high failure rates, such as software development, past success is not necessarily a guarantee of future success.

INNOVATION POLICY

The internationalisation of the UK’s innovation system and its dependence on foreign direct investment in increasingly vertically integrated value chains set the context for policy. Innovation policy should be strategically based on ‘choosing races and placing bets’ in areas where the UK has distinctive scientific and technological competence with global market potential.

This means first assessing whether the UK possesses outstanding competence in a particular area, then analysing market potential and national capability to deliver: Foresight and mapping have a key role to play. There also needs to be an evaluation of the wider social implications of placing a particular bet and a risk assessment of policy failure. Only when all this is done should policy-makers turn to consider intervention.
IN SUMMARY

The UK-IRC has aimed to provide solid research-based evidence to help understand a variety of aspects of innovation, and for our findings to contribute to innovation policy-making in the UK. In addition, we have engaged with various audiences – academics, policy-makers and businesses – in a range of activities, including seminars, conferences, newsletters and surveys through our Knowledge Hub.

The UK-IRC would like to thank all our supporters and collaborators, including our funders – the Economic and Social Research Council (ESRC), the Department of Business, Innovation and Skills (BIS), the Technology Strategy Board (TSB) and the National Endowment for Science, Technology and the Arts (Nesta) – and the many companies and public institutions that have worked with us to advance our evidence-based research findings and engagement with decision-makers in the public, private and third sectors.
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FURTHER READING

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