



Innovation in services

Services are increasingly important to the UK economy, generating over 75 per cent of value-added. But until recently, our understanding of how they innovate has been poor and policy has neglected innovation in services.

NESTA's new research sheds light on innovation in the services sectors. It shows how innovation happens in services businesses and how policy can help overcome the barriers they face. Traditional research and development spending is less important than having highly skilled workers, ICT and strong relationships with other businesses (particularly those within the supply chain).

If government is to take services seriously, it should invest in high-level skills and knowledge transfer beyond science and technology. It should also develop an Innovation Advisory Service comparable in scope and scale to the Manufacturing Advisory Service. Finally, behind all this, policy needs to be informed by indicators that capture the full extent of innovation in services.

Innovation in services is critical for the UK's economy

Services play a vital role in the UK economy

Since the early 1960s, every industrialised economy has seen services grow while low-value parts of manufacturing decline.¹ In 1970, manufacturing accounted for 32 per cent of UK output; by 2004 this had more than halved to 14 per cent.²

Today's UK economy is comprised of a diverse range of services sectors, including retailing, financial and business services, insurance, and community, social and personal services. In 2002, 40.5 per cent of UK Gross Value Added (GVA) came from knowledge-based activities: 6.2 per cent in high technology manufacturing and 34.3 per cent in knowledge services.³ In 2007, the UK exported about £75 billion worth of 'knowledge services', 170 per cent more than a decade earlier.⁴

Increasing innovation in services could play a crucial role in closing the UK's productivity gap

The size of the UK's services sectors means that increasing their performance would substantially narrow the UK's productivity gap with other leading nations. Output per worker per hour is 16 per cent higher in France, 12 per cent higher in Germany, and 14 per cent higher in the United States than in the UK.⁵ Despite much policy attention, this gap has only been closing slowly.⁶

Boosting services sector productivity would not only raise aggregate productivity,⁷ it would also benefit other firms and sectors. The new ideas and know-how generated could be applied in other parts of the UK economy.⁸

Historically, innovation policy has neglected services

Innovation policy emerged from science policy

During the 1940s and 1950s, military concerns incited governments to undertake large-scale, resource-intensive, 'big science' projects. These were characterised by enormous budgets, large numbers of staff and investment in hi-tech machinery.⁹ Over time, science and formal Research and Development (R&D) became analogous to innovation.¹⁰

In the private sector, innovation involved both product innovation driven by design teams and R&D laboratories, and new process technologies internally engineered or sourced from external capital goods suppliers.¹¹

Innovation policies have therefore been developed for the manufacturing sector

This 'linear model' postulated that innovation started with scientific discovery and basic research; it passed through applied research, engineering, and manufacturing activities; and

1. Coutts, K., Glyn, A. and Rowthorn, B. (2007) 'Structural Change Under New Labour.' *Cambridge Journal of Economics*, 31, pp.845-861.

2. Office for National Statistics (2006) 'United Kingdom Input-Output Analyses.' London: ONS. p.23.

3. HM Treasury (2007) 'The Race to the Top: A Review of Government's Science and Innovation Policies.' London: HM Treasury. pp.16-17.

4. The Work Foundation (2007) 'Trading in Ideas and Knowledge.' London: The Work Foundation. p.3.

5. HM Treasury and BERR (2007) 'Productivity in the UK: Securing Long-term Prosperity.' London: HM Treasury. p.16.

6. BERR (2008) 'The 2007 Productivity & Competitiveness Indicators.' London: BERR.

7. Empirical analysis of the fourth UK Community Innovation Survey (CIS4) data shows that labour productivity is higher in service businesses that innovate. Results of the CIS4 are available on the BERR website.

8. HM Treasury and BERR (2007) 'Productivity in the UK: Securing Long-term Prosperity.' London: HM Treasury.

9. Hughes, J. (2003) 'The Manhattan Project: Big Science and the Atom Bomb.' Princeton: Princeton University Press.

10. This has been formalised by the codification of the OECD's definition of R&D in the Frascati Manual: any project to resolve 'scientific or technological uncertainty.' OECD (2002) 'Frascati Manual 2002 - Proposed Standard Practice for Surveys on Research and Experimental Development.' Paris: OECD.

11. NESTA (2006) 'The Innovation Gap.' London: NESTA.

12. Bush, V. (July, 1945) 'Science The Endless Frontier: A Report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development.' Washington: United States Government Printing Office.

13. Leadbeater, C. (2006) 'The Ten Habits of Mass Innovation.' London: NESTA.

14. R&D statistics first emerged in the 1930s in countries such as the UK, the US, and Canada, but their subsequent development and adoption internationally owes much to the OECD, in particular the 'Frascati Manual' (2002) which established a standard methodology for data collection. See Godin, B. (2002) 'The Number Makers: Fifty Years of Official Statistics on Science and Technology.' *Minerva*, 40 (4), pp.375-397.

15. OECD (1997) 'Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data.' Paris: OECD.

16. See BERR website.

17. NESTA (2007) 'Hidden Innovation.' London: NESTA.

18. NESTA used data from the fourth UK Community Innovation Survey (CIS4). The CIS4 is a UK-wide survey of 16,000 SMEs and large enterprises that was conducted between 2002 and 2004. This survey is the largest of its kind ever conducted for the UK, and covers most of the services sector. In its research, NESTA has identified three sub-samples: (1) high-technology: research and development, and computer and related sectors; (2) medium-technology: financial and business services; and (3) low-technology: wholesale and retail trade, hotel and restaurants, real estate and renting of machinery, transport, post and telecommunications. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA.

19. The CIS4 defines product innovation as "the market introduction of a new good or service or a significantly improved good or service with respect to its capabilities, such as quality, user friendliness, software or subsystems".

20. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA. p.18.

21. The CIS4 defines process innovation as "the use of new or significantly improved methods for the production or supply of goods and services".

22. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA. p.20.

23. Ibid.

it ended with the production and diffusion of a new product or process.¹²

The mechanisms designed by policymakers to stimulate and support innovation in the economy became rooted in this 'pipeline' view of innovation.¹³ In the UK, flagship policies included support for R&D through tax credits, the promotion of knowledge exchange between academia and businesses, and collaborative technology research programmes.

Services are not captured as potential innovators

Policymakers also measured innovation using instruments reflecting this 'linear model'.¹⁴ Current internationally-agreed innovation indicators include R&D expenditure, patent production and numbers of science and technology graduates.¹⁵ The European Community Innovation Survey (CIS) still reflects a focus on technology-producing innovation, despite recent efforts to record 'wider' types of innovation.¹⁶

Innovations in the services sectors are not well represented in traditional indicators.¹⁷ The predominance of traditional scientific and technological innovation metrics has been at least partially responsible for the neglect of the services sector in innovation policy.

Services do innovate, but unevenly

NESTA's research shows that services businesses innovate, but they do so unevenly.¹⁸ Innovation in services varies widely in extent and form between sectors.

Some services sectors are highly innovative

In some services sectors, innovation is more common than in the manufacturing sector. The average level of 'product innovation' (the introduction of a new manufactured good or a service)¹⁹ is higher in sectors such as research and development services, and computer services, than in the manufacturing sector. Sixty per cent of the computer services and 47 per cent of the research and development services sector report the recent introduction of new or improved products.²⁰

Services also innovate in how they do things. The rate of process innovation²¹ is higher in some services sectors than in manufacturing. Computer services, research and development, financial intermediation and business services are particularly likely to change their processes regularly.

But overall innovation performance is mixed

However, some services sectors – including the retail trade, hotels and restaurants – introduce fewer innovative products than

manufacturing businesses. Overall, only 24 per cent of services firms innovate in new products or services, compared to more than a third of manufacturing firms (36 per cent).²² For instance, only 16 per cent of retail firms innovate in new products or services, and retail firms are less likely than manufacturing firms to launch innovative services (11 per cent compared to 14 per cent).²³

Services businesses innovate differently from manufacturers

Innovation in services rarely depends on R&D

Innovative services firms do not focus on putting new technologies into the hands of their customers; rather, they seek new, sometimes technological, solutions to their customers' problems or needs. For this reason, innovation in services is not primarily based on formal R&D, making traditional protection methods such as patents relatively unimportant for most services businesses.²⁴

Skilled workers are crucial to innovation in services

High value-added services businesses are more likely to innovate when they employ graduates, since their innovation relies heavily on higher-level skills and knowledge. Graduates from both science-based and non-science-based disciplines make a difference.²⁵

The quality of in-house expertise is important. Considerable effort and resources are put into recruiting the best experts, and in ensuring that they get challenging and exciting projects.²⁶

Businesses draw heavily on suppliers and external expertise

There is a strong relationship between collaborative behaviour by firms and their innovation performance. Services businesses tend to collaborate closely with other firms in their vertical supply chains.²⁷ Suppliers are particularly important in helping firms in low- and medium-technology sectors to develop innovative services products, whereas the same is true for customers with high-technology sector firms.²⁸ For instance, external knowledge is fundamental to innovation in computer services, which often use external consultants, open source systems and strategic alliances with other 'solution providers'.

Organisational change drives innovation in services

Some forms of innovation are often overlooked, including new business structures, management techniques, and especially new corporate strategies. Yet these can be vital in stimulating innovation in products and processes.²⁹ Their use allows services firms to gain a competitive

advantage by capturing and responding to their customers' needs. They can also drive the development of new products and services, or the ability to exploit new technologies and develop improved services for customers.³⁰

ICT triggers innovation

Information and communications technology (ICT) use is a major determinant of the growth in the services economy as a whole.³¹ ICT provides services sectors with a technology that can be widely applied and used as the basis for future innovative activities. By increasing productivity in technology-using sectors, ICT is playing a similar role to the steam engine or electricity in manufacturing.

Unlike the traditional manufacturing product cycle,³² services firms may initially adopt new ICT to improve efficiency, use it later to improve the quality or delivery of existing products, and finally go on to develop innovative services.³³

Services face specific and significant barriers to innovation

Services firms struggle with a lack of expertise, resources and support

Unsurprisingly, many services firms are concerned about the risk (48 per cent) and uncertainty (39 per cent) associated with innovating. But they also report more specific issues: a lack of skilled labour (38 per cent), a lack of information on technology (22 per cent), and the need to meet regulations (32 per cent). Moreover, a third of all services firms say that they find it too expensive to innovate; they struggle to access suitable finance to support innovation.³⁴

Although firms may recognise the need to train their staff, they often under-invest in training.³⁵ Employers know that workers can easily leave for other firms, taking their valuable new skills with them. Yet this circulation of talent and expertise is an important mechanism of 'knowledge exchange', the sharing of ideas that is more important for services than the transfer of technology from the science research base. But under-investment in training weakens the innovative capacity of individual firms and the economy as a whole.

Government has made an important step towards a 'services aware' innovation policy

BERR/NESTA Innovation in Services project

There has been increased research across various sectors of the economy, including

services. NESTA has investigated the 'hidden innovation' that takes place in sectors as different as construction and retail banking.³⁶ The research revealed that these sectors do indeed innovate, but that their innovation is often in under-recognised and under-reported forms.

The findings have encouraged increasing interest in services innovation amongst policymakers. The former Department of Trade and Industry commissioned research papers on innovation in services, and one of its successors, the Department for Business, Enterprise and Regulatory Reform (BERR), established the Innovation in Services project in partnership with NESTA to assess the scope for effective government intervention to stimulate and support innovation in services sectors.³⁷

BERR/NESTA research sheds light on the services sectors' specific needs

The approach has been driven through business-led Sector Innovation Groups (SIGs).³⁸ Five sectors, together accounting for 25 per cent of GVA, were chosen: retail, logistics, construction, environmental services, and Internet-delivered content services.³⁹

Some core messages emerged from this research, highlighting businesses' specific requirements:

1. A more 'bottom-up' understanding of their needs: Businesses wanted to see government's approach better informed by market conditions and move beyond its current 'top-down' approach to innovation policy.
2. Greater openness and flexibility of markets: According to businesses, government should promote openness of markets, not only in relation to tariffs, but also by encouraging the development of international standards in relation to commercialising and disseminating technology, against which new entrants can match their services and products.
3. Greater leadership, coherence and co-ordination of government policy: Businesses feel that government needs to exercise stronger leadership in areas where it controls important levers, and demonstrate greater policy coherence. For instance, government is well-positioned to shift social and business attitudes towards waste management or to promote an 'information society'.
4. Support in developing the set of skills necessary for innovation: With innovation being as much organisational as technical, services businesses need a combination of high-level management skills. Businesses

24. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA. pp.21-25.

25. Ibid, p.32.

26. Ibid.

27. Ibid.

28. Ibid.

29. NESTA (2007) 'Hidden Innovation.' London: NESTA.

30. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA. p.33.

31. OECD (2000) 'A New Economy? - The Role of Innovation and Information Technology in Recent OECD Economic Growth.' Paris: OECD.

32. Abernathy, W. and Utterback, J. (1978) Patterns of Innovation in Technology. 'Technology Review.' 80, pp.40-47.

33. Barras, R. (1986) Towards a Theory of Innovation in Services. 'Research Policy.' 15 (4), pp.161-73; Barras, R. (1990) Interactive Innovation in Financial and Business Services: The Vanguard of the Services Revolution. 'Research Policy.' 19, pp.215-237.

34. Fourth UK Community Innovation Survey (CIS4).

35. NESTA (2008) 'Taking Services Seriously – How policy can stimulate the 'hidden innovation' in the UK's services economy.' London: NESTA. p.36.

36. NESTA (2006) 'Hidden Innovation.' London: NESTA. pp.35-46.

37. DTI (2007) 'Innovation in Services.' Occasional Paper no.9. London: DTI.

38. The Sector Innovation Groups have included six to 12 companies.

39. The selection criteria for these sectors were: the size and importance of the sector to the economy; linkage between the sectors to help our understanding of value chains; the potential for government intervention; and the quality of government's contact with sectors.

believe that these skills are lacking in much of the business community, and that government does not adequately support their development.

5. Outward-looking networks: Businesses stressed the importance of networks as an important mechanism not only for disseminating new ideas and good practice, but also in helping them to identify new commercial partners to create new services.
6. Finance for start-ups: SIG members regretted that there was insufficient knowledge and understanding of the potential for new, innovative approaches in new markets; and their impact was not widely understood, making it harder to raise start-up capital.

BERR Enterprise strategy and the DIUS White Paper highlight the need to develop innovation knowledge

BERR's Enterprise strategy, published in March 2008, recognises the importance of innovation to an enterprise economy.⁴⁰ The Department for Innovation, Universities and Skills' (DIUS) White Paper also sets a strong intellectual lead for moving innovation policy beyond the 'linear model'.⁴¹ In particular, the White Paper highlights hidden innovation and innovation in services, presenting a real opportunity to take innovation in services seriously.

Taking services seriously

Developing innovation metrics that measure innovation in services, not just advanced manufacturing

The measurement of innovation in services has been grafted onto a framework that was originally developed for traditional manufacturing industries. Surveys measuring innovation should recognise the importance of changes in organisational structure and advanced management techniques. For instance, in the CIS these forms of innovation should be recorded directly alongside and in the same manner as technology-producing innovation, so that policymakers can more accurately compare the importance of 'traditional' and hidden innovation.

Supporting innovative people, not just businesses

Government should assess the impact of introducing a Learning Tax Credit for small firms that find it hard to find sufficient time and resources to train their staff. In the first instance this support could focus on higher-level skills for the management of innovation, typically amongst senior staff. This is currently neglected in most public initiatives for better workforce skills, which focus on improving basic and intermediate skills.⁴² So a new tax

credit might initially focus on improving higher-level skills for the management of innovation amongst senior staff. Universities should be encouraged to develop courses for these firms that combine business and management breadth with technical expertise.

Recognising that innovative firms integrate, not just invent, technology

Services firms that want to innovate need access to better advice and expertise, particularly in how to make the most of ICT. While manufacturing firms can access the Manufacturing Advisory Service,⁴³ which delivers hands-on advice and assistance from experts in a wide range of manufacturing disciplines, no equivalent exists for services firms.

In the context of the ongoing Business Support Simplification Programme (BSSP), an Innovation Advisory Service should be established within the brokerage networks already offered across the UK as a widely recognised brand for regionally-delivered advice (some of which already exist). One of its areas of expertise should be acting as a brokerage service for advice and expertise on the effective exploitation of technology for innovation.

Stimulating innovation in existing sectors, not just emerging sectors and technologies

Greater attention to conditions in existing sectors could inform more innovation-friendly policies towards services. By definition, these policies will tend to be sector-specific. The BERR/NESTA Innovation in Services project has demonstrated the value of working closely with firms and trade associations in five services sectors to review performance and produce specific and practical recommendations as to where policy and regulation can be improved. Similar time-limited, industry-led review groups should be established for five more sectors of the UK's services economy.

Widen knowledge transfer between universities and firms to include the arts and social sciences, not just science and engineering

The current focus on science and engineering neglects the important contributions that the social sciences and humanities make to the innovative performance of services businesses (for instance, psychology can be important in designing customer environment). Most services firms are unlikely to want or need to engage in long-term technology transfer with universities. So, universities should identify how their research and knowledge could benefit services firms over shorter timescales. The planned mini Knowledge Transfer Partnerships⁴⁴ for shorter-term projects between universities and firms should include disciplines relevant to services firms.

40. BERR (2008) 'Enterprise: Unlocking the UK's Talent.' London: BERR.

41. DIUS (2008) 'Innovation Nation.' London: DIUS.

42. As part of UK Government's Skills Strategy, under the Leadership and Management Programme up to £1,000 was made available to managers in firms employing between 20 and 250 people to further develop their leadership and management skills (now extended to firms employing ten or more people following the Leitch Review of Skills). However, this still represents a relatively small investment of £30 million per year, compared to around £600 million for the R&D tax credit.

43. See the Manufacturing Advisory Service website.

44. A Knowledge Transfer Partnership (KTP) is a relationship formed between a company and an academic institution. The latter facilitates the transfer of knowledge, technology and skills through the employment of a graduate for 12 to 36 months. The government is currently developing a standard nationwide mini KTP scheme that will vary in length from three to 12 months. DIUS (2008) 'Implementing "The Race to the Top".' London: DIUS.