



Absorbing Global Innovations: Access, Anchor, Diffuse

Globalisation is changing. New economies and centres for innovation are emerging and capital, ideas, goods and people are moving more freely between them. The more connected a place is, the more successful it can become, enabling it to tap into new sources of innovation.

However, this requires the ability not only to create new knowledge, but also to access, absorb, spread and apply ideas and concepts generated elsewhere. NESTA has developed a model to capture how successfully places achieve this. This 'absorptive capacity' implies a different understanding of innovation; one that is sensitive to a place's unique features. Some UK regions, while weaker at producing new knowledge, are highly successful at exploiting ideas generated elsewhere.

One-size-fits-all innovation strategies are unlikely to match a locality's unique strengths, and innovation policy focused only on the production of new knowledge will miss an important source of competitive advantage. Inter-regional innovation strategies should also be considered where these would match the shape of economic and social realities.

The nature of globalisation has changed

The world economy is now dominated by global flows

The current global economic crisis has revealed the extent to which local economies are steered by global flows of financial resources. But worldwide movements of people, goods and ideas are equally important. These are channelled between places through physical networks such as fibre optic cables or airports; organisational networks such as multinational firms; and social and business networks, including inter-firm and interpersonal relationships. The rapid expansion of such networks has led to the emergence of a global hierarchy of cities and regions, based on their engagement with such networks.¹

New innovation hotspots are rapidly emerging

The world economy was, until recently, dominated by a relatively small network of cities and regions, leaving most other places peripheral.² The former are now growing in number rapidly, with new economic players from developing countries affecting the distribution of international networks and the nature of globalisation.³

Some of their cities and regions have become dynamic innovation hotspots. For instance, second-tier cities such as Ahmedabad, Pune and Chandigarh in India, or Chongqing, Chengdu and Xi'an in China, are becoming ambitious innovators.⁴ And such innovation extends beyond China and India: Brazil is an emerging leader in natural resources innovation;⁵ smaller nations like Dubai, Estonia and Singapore are becoming niche innovators.⁶ Singapore is now a magnet for international companies in ICT and Life Sciences, outpacing other Southeast Asian cities. With around 7,000 multinational companies,⁷ it now ranks alongside New York and London.⁸ Both Dubai and Estonia lead in e-government services. And Goldman Sachs has added countries such as Chile, Turkey, and Mexico to its list of up-and-coming nations.⁹

The more connected a place is, the greater is its access to new ideas

Cross-border links and alliances help transfer knowledge from the global to the local level.¹⁰ However, the extent to which local actors successfully draw on such networks depends on their ability to identify, interact, assimilate and exploit new sources of knowledge – in other words, their absorptive capacity.¹¹ The more connected a place is, the greater its ability to attract global ideas; and the greater its absorptive capacity, the greater its ability to reap the benefits at home.¹²

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The vast majority of innovations in the UK draw on knowledge and resources from overseas

The UK is a magnet for international investment in innovation

The UK is the world's fifth most attractive location for foreign-funded Research and Development (R&D),¹³ with 27 per cent of the UK's business R&D financed from abroad, compared to just 2 per cent in Germany and 10 per cent in France. The UK has the highest share of domestic inventions under foreign ownership among OECD countries, with overseas entities owning 39.5 per cent of UK patents.¹⁴

It is also a magnet for international talent

Thirty-eight per cent of the foreign-born labour force is classified as highly skilled by the Office of National Statistics.¹⁵ That proportion is even higher in newly arrived immigrants, where over half are classified as 'professional and managerial'.¹⁶

The UK labour market has a higher share of foreign-born highly skilled professionals (around 18.8 per cent of its highly skilled population) than most European Union countries, including France (14.1 per cent) and Germany (4.4 per cent).¹⁷ The UK also boasts a larger share of highly skilled migrants from outside the OECD (11.1 per cent) than most other EU countries.¹⁸ It is also attractive to international students despite increasing international competition: the number of non-EU international students more than doubled between 1996/97 and 2005/06.¹⁹

Global networks and international partnerships are central to innovation

Since no place has a monopoly on innovation, countries, cities and regions need to form interdependent networks to avoid stagnation.²⁰ Partnerships, collaborations and exchanges contribute significantly to the innovative capabilities of firms operating in a specific region, by exposing them to new ideas, enabling fast access to resources and enhancing the transfer of knowledge.²¹ Firms developing more radical or complex innovations are more likely to have such arrangements with external partners.²² In the Cambridge Technopole area or the Boston biotech cluster, for example, new knowledge is often acquired through inter-regional and international

strategic partnerships.²³ Local knowledge assets such as universities determine a place's ability to work within such networks.

However, not all places have the same ability to extract value from global and international networks

The largest gains are made by those best able to absorb and utilise knowledge developed by others. The wealthiest UK regions, London and South East England, have developed closer research and business links with international cities than with other UK cities, with more researchers leading in collaborative global networking, helped by broadband access twice as fast as in some other UK regions.²⁴

Innovation through the adoption and exploitation of external knowledge is a dominant form of innovation

A place's innovative capacity often depends on complementarities between internal and external sources of knowledge. If a place is to innovate it needs to combine both a capacity to absorb external knowledge and a capacity to develop this knowledge into new innovations.²⁵

NESTA has developed a model to assess absorptive capacity

Absorptive capacity (AC) allows a place to identify, value and assimilate new knowledge. The development capacity (DC) of a place allows it to develop and exploit knowledge. NESTA has created the 'AC/DC model' to evaluate and assess the ability of places to absorb and develop innovations.

There are five main components in a 'knowledge absorption' innovation system. Three of these form the 'absorptive capacity' components of the AC/DC model:

1. **Access capacity** – the capacity to link and connect to international networks of knowledge and innovation (through global academic, corporate or virtual networks).
2. **Anchor capacity** – the capacity to attract overseas people, investments and firms to establish themselves in a region. Anchoring activities both result from successful access to external networks and act as catalysts for more access to such networks.
3. **Knowledge diffusion capacity** – the spread of ideas, information and knowledge between people, firms and institutions in the local economy. Without diffusion, isolated islands of expertise would impact little on the local economy.

13. OECD (2007) 'Moving up the value chain: staying competitive in the global economy.' Paris: OECD.

14. Compared to 13.6 per cent in the US and 3.7 per cent in Japan. National Statistics (2007) 'UK Business Enterprise Research and Development 2006.' London: National Statistics.

15. Rendall, M. and Salt, J. (2005) 'Focus on People and Migration: The Foreign-born Population.' London: ONS.

16. 52.1 per cent. Ibid.

17. OECD (2005) 'Database on immigrants and expatriates.' Paris: OECD.

18. Ibid.

19. Universities UK (2007) 'Patterns of higher education institutions in the UK: Seventh report.' London: Universities UK.

20. Botazzi, L. and Peri, G. (2003) Innovation and spillovers in regions: evidence from European patent data. 'European Economic Review.' 47, pp.687-710.

21. Tether, B.S. (2002) Who cooperates for innovation and why? An empirical analysis. 'Research Policy.' 37 (2008), pp.1079-1095.

22. Ibid.

23. Library House (2007) 'The Cambridge Cluster Report 2007.' Cambridge: Library House.

24. NESTA (2008) 'Innovation by Adoption: Measuring and mapping absorptive capacity in UK nations and regions.' London: NESTA. Chapter 5.

25. Ibid. Chapter 2.

The two components of the 'development capacities' element of the AC/DC model are:

4. **Knowledge creation capacity** – the capacity available in a city or region to be a source of new ideas, discoveries and innovations (through university research, business R&D, and the training of new talent).
5. **Knowledge exploitation capacity** – the capacity to use knowledge commercially and extract value from it (through the creation of innovation enterprises or product innovations).

Absorptive and knowledge exploitation capacities are mutually reinforcing

There is a positive association between absorptive and development capacity. A city's or a region's generation of knowledge not only increases its stock of indigenous knowledge; it also increases its ability to acquire external knowledge. Likewise, the exploitation of knowledge is heavily reliant on a strong functioning absorptive capacity, allowing knowledge to be accessed, anchored and spread across a region.²⁶

The way places innovate varies across the UK

Different places draw on different capacities to innovate

Innovation in the UK is more subtle than traditional metrics suggest. Its drivers and channels will vary between regions. For example, one region might have better universities, while the other has easier access to venture capital. These absorptive capacity factors help us distinguish between the abilities of different regions to innovate, even when they share similar industrial structures.²⁷

Both the capacities to create and exploit knowledge remain a problem for most UK nations and regions

While the UK prides itself on being a world leader in knowledge creation, only three English regions (those of the Greater South East) and Scotland have an identifiably strong capacity to create new knowledge. This suggests strong geographical concentrations of knowledge creation in a context of general weakness. Similarly only four regions (London, South East, South West, and Yorkshire and the Humber) appear as having a strong capacity to exploit knowledge, confirming the widely held

perception that the UK commercialisation of knowledge is weak.²⁸

Traditional innovation policy has ignored the importance of external knowledge in developing local innovation capacity

Innovation policy has traditionally focused on innovation as a process of knowledge creation and exploitation

Policymakers have focused on the capacity of cities, regions, and nations to create new knowledge and exploit it locally. This focus was based on the view that innovation was a linear process, with scientific research at one end of an 'innovation pipeline' that pushed finished goods out for sale at the other end.²⁹ Knowledge creation capacity and knowledge exploitation were often understood as start and finish points, with knowledge being created in a university or company research department and then applied by a different department or firm. That pattern is changing. Today, an increasing number of firms rely less on internal knowledge creation and more on open innovation collaborations with external partners, including consumers.³⁰

Government has focused on knowledge transfer between local partners

There has also been too simplistic a view of knowledge transfer, with a policy focus on domestic and local knowledge creation and exploitation rather than international networks. As a result, innovation policy has often focused on knowledge transfer networks at the local level. The Sainsbury Review placed a premium on knowledge transfer between local universities and businesses.³¹ The Higher Education Innovation Fund often pushes for universities to transfer knowledge into industry and society at the local level.³² But both Russell Group universities and successful Cambridge firms draw on external and international networks more than they do on local ones.³³

Regional and local policymakers have supported the development of networks that were seen as innovation enablers. However, the vast majority of these networks were not outward-looking.

26. Ibid. Chapter 1.

27. Ibid.

28. Ibid. Chapters 3 and 4.

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

30. OECD (2008) 'Global innovation in open networks.' Paris: OECD.

31. HM Treasury (2007) 'The Race to the Top: A Review of Government's Science and Innovation Policies.' London: HM Treasury.

32. HEFCE (2008) 'Higher Education Innovation Fund round four institutional strategies.' London: HEFCE.

33. Simmie J., Carpenter, J., Chadwick, A. and Martin, R. (2008) 'History Matters: Path dependence and innovation in British city-regions.' London: NESTA.

Government needs to support places' abilities to draw on external knowledge

Using the AC/DC model to adopt regionally tailored innovation policies

The AC/DC model could help policymakers set clearer priorities and develop strategies that match their region's unique characteristics. Indeed, the model provides a way to capture not only disparities in regional innovation performance, but also the different means by which regions innovate. One-size-fits-all regional strategies do not efficiently provide solutions to regions' needs.

Regions have generally been classified according to their innovation performance: leading, lagging or catching up.³⁴ Classifying regions in terms of their innovation performance might be too broad a criterion to allow targeted interventions. With NESTA's model, regions can be classified by how they innovate. This allows policymakers to design interventions based on regional comparative advantage in generating new innovations and new economic value.

Developing access channels

Access channels include: universities (which attract international students and staff and allow international collaborations to take place); firms with global office networks and strong export-oriented portfolios (because they have access to information on the global competition and on foreign markets' needs in general); and local immigrant and expatriate populations (which act as important links to their countries of origin, and as a source of transnational entrepreneurial activity).

Regional policymakers should identify the access channels to external knowledge that are most relevant to their regions, providing the tools necessary to develop them successfully. The best access channel might be a regional neighbour or a close partner within a network. Innovation strategies should consider possible complementarities and synergies within neighbourhoods and networks.

Supporting regions' anchoring agents

Anchoring agents are regional actors who can tie the networks and channels of innovation to a given place. They include 'niche' start-ups, (which are often buzzing with new ideas), foreign firms and institutes, and talented foreign individuals. Attracting them helps create a local community of users who can harness external knowledge for the benefit of the region.

Policymakers should create and help establish anchoring agents who can import and deploy knowledge developed predominantly outside the local area. This will require an understanding of a region's specific strengths as well as a sensitivity to its needs. Anchoring agents should be selected carefully and created strategically.

Boost knowledge diffusion

Knowledge diffusion provides increasing returns to innovation through imitation and further innovation. This is not merely copying: it involves improvements and 'innovating around' the first innovator's design. The transfer of information and knowledge between firms and between firms and universities – through formal collaboration, open innovation or staff mobility – is vital if existing stocks of knowledge in the local economy are to be fully exploited. Incentives and rewards should be created to encourage open forms of knowledge exchange and employee mobility between various types of organisations and across space, sectors and industries.

Creating inter-regional innovation strategies based around regional strengths and weaknesses

UK nations and regions should do more to align their strategies to avoid duplication, given their relatively small size, in general. In England, neighbouring RDAs could develop inter-regional innovation strategies. In Scotland, the two Enterprise agencies should work closely together to take advantage of regional differences in biotechnology, financial services or renewable energy technology, and to create broader innovation strategies. Both in Scotland and Wales innovation strategies should also seek to bridge the urban-rural divide. Northern Ireland could benefit from its geographic and cultural position to strengthen its access, anchor, and diffusion activities with the rest of the UK, the Republic of Ireland, Europe and the US. Cities might also develop cross city-regional innovation strategies, building on the example of Manchester: Knowledge Capital.

Alignment is not only a regional and territorial issue; it is also an issue for sectors. There is a great need to integrate innovation strategy with local strategies for transport, housing, skills and planning. All are closely linked to innovation. Transport, for example, can boost 'accessibility', housing quality of life and workers' mobility, and skills can improve almost everything else related to innovation, including the ability to attract and spread new ideas.

34. For example, see the European Regional Innovation Scoreboard.