

## A new context for innovation

The context for innovation has changed over the past decade: OECD economies are increasingly dependent on innovation to remain competitive; the innovation process is more open and increasingly involves collaborations within and across borders; ICTs have become a key driver of innovation in all industries; and new global players have emerged. In this context, a major challenge for governments is to tap into and exploit global networks to access new knowledge and markets while generating value locally.

### What is the new context for innovation?

Factors that contribute to a new context for innovation include the following:

- **Economies are more dependent on innovation.** The OECD economies are more strongly dependent on the production, distribution and use of knowledge than ever before. Sustained competitive advantage is increasingly based on innovation, which in turn is driven by investments in different types of knowledge-based capital (KBC) (More information in [Knowledge-based capital and intangible assets](#) [1]).
- **ICTs connect actors.** ICTs have played an increasing role in connecting actors. Recent ICT developments—the rise of high-speed broadband, the geographic expansion of broadband access networks, the development of “big data”, the rise of cloud computing—significantly shape today’s innovation landscape. Over the past few years, tablet PCs and smart phones have made computers ubiquitous, while cloud computing and mobile Internet are enabling “everything/everywhere” data access, thus paving the way for new services and applications. The recent improvement of data collection, storage and processing, leading to the generation and use of huge volumes of data (commonly referred to as “big data”) is opening new opportunities for innovation in all industries. The emerging Internet connectivity is expected to foster innovation in many sectors by providing a way to introduce new functionality to objects that were typically not associated with communication capabilities. More generally, the developments and progress of ICTs substantially affect innovation by improving information exchange, collaboration, and knowledge diffusion incurred in the production of innovations, by reducing production costs and increasing productivity, by extending the geographic reach of the market and by providing opportunities to develop new products and services, new processes and new business models. (More information in [Impacts of ICTs](#) [2])
- **The innovation process is more open.** Confronted with increasing global competition, rising costs, the growing integration of different technologies, shorter life cycle, and increased pace of innovation, many companies collaborate with external partners, whether suppliers, customers or universities. These collaborations help them to stay abreast of developments, expand their market reach, tap into a larger base of ideas and technology, find complementary expertise, access specific skills and competences, and get new products or services to market before their competitors (More information in [Innovation Networks and Clusters](#) [3]).
- **Companies rely on external sources of knowledge.** An OECD cross-country study of innovation at the firm level showed that collaboration is an important part of the innovation process (OECD, 2009a). Companies source external knowledge in various ways: (1) partnerships with external parties (alliances, consortia, joint ventures, joint development, among others) and (2) acquisition or sale of knowledge (contract R&D, purchasing, licensing). Companies also increasingly use venturing to find external partners for commercialising innovations that are not used internally (divestment, spin-out, spin-off). Results from the

European Community Innovation Survey (CIS, 2006) and other national innovation surveys show that, in most countries, suppliers of equipment, materials and components or software are the most sought-after innovation partners, followed by clients or customers. While universities and government research institutes are considered a valuable source of knowledge for companies' innovation activities, especially in more upstream research and exploration activities, they represent only a small share of collaborations on innovation.

- **New global players have emerged.** Global patterns of R&D, science performance and innovation are changing and new players have emerged. Rapid growth in China has been accompanied by a dramatic increase in expenditure and employment in R&D. In terms of intramural R&D expenditures, the United States, with nearly USD 400 billion of intramural R&D expenditures in 2008, is followed by China with nearly one-third of that value (in current purchasing power parity terms). The combined European Union is equivalent to nearly three-quarters of the U.S. R&D total (OECD, 2011).
- **Scientific capacity is rapidly growing.** The strong growth of scientific capacity in emerging economies is demonstrated by the increase in publication of scientific articles from the BRIICS (Brazil, Russian Federation, India, Indonesia, China and South Africa). Over 1996–2007 publications more than tripled, while those from Latin America doubled. Growth has also been strong in Korea and Turkey, with output more than tripling. While the publication of scientific articles remains concentrated in a few countries, the global share of scientific publications has fallen in Japan, the EU27 and the United States (OECD, 2010).
- **International collaboration and R&D are globalising.** Evidence of this globalisation through many channels suggests that international collaboration has increased over time, in terms of scientific collaboration as well as of international knowledge flows. And in most countries collaboration across institutions has become a more pervasive feature of research activities (More information in [International Linkages](#) [4]).

Continued internationalisation of R&D is occurring at a much faster pace and spreading more widely. Until recently, the R&D capabilities of firms have been less globalised than activities such as marketing and production. Firms now increasingly offshore R&D to other countries to link R&D to markets but also to source technological capabilities, tap into centres of increasingly multidisciplinary knowledge, lower R&D costs and access highly skilled human capital (OECD, 2008). R&D sourced from abroad (from private business, public institutions or international organisations) represented around 10% of total business enterprise R&D in the EU27 in 2006. In most OECD countries, the share of foreign affiliates in industry R&D is growing as foreign firms acquire local R&D-performing firms (e.g. through mergers and acquisitions) or establish new subsidiaries. For countries for which data are available, around two-thirds of funding from business sources abroad is intra-company funding (OECD, 2009b).

### What are the policy implications of the new context for innovation?

The challenge for governments is to tap into and exploit global networks to access new knowledge and markets while generating value locally. Given the fluidity with which people and firms can move, this is increasingly difficult. People and firms are attracted or deterred mainly by local factors. For innovative firms the most important factor is gaining access to markets and human capital. For people it is the availability of opportunities: jobs, education and high quality of life. Policy makers are seeking ways to help anchor local investment. Among possible starting points are local services, which are a growing and critical component of the bundle of activities that constitutes the innovation system. Services close to users are increasingly essential for maintaining an innovative edge and allowing “mature” industries like footwear or steel to stay competitive. The new challenges have also led to a wave of “new industrial policies”.

Institutions of higher learning can play an important role by both producing and attracting the human capital needed for innovation. They can act as essential bridging institutions between players—businesses, governments and countries—in more open and broad systems of innovation. They also provide an important dimension of quality of life that can attract the highly skilled from

around the globe. They can be the anchor for clusters of innovative activity that participate in global networks, while rooting value locally. The policy challenge is to encourage a view of universities as essential cogs in the innovation machine and possessed of independence, a competitive and entrepreneurial spirit, and flexibility.

## References

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- [2] <https://innovationpolicyplatform.org/content/impacts-icts?topic-filters=8886>
- [3] <http://innovationpolicyplatform.org/content/innovation-networks-and-clusters>
- [4] <https://innovationpolicyplatform.org/content/international-linkages?topic-filters=8833>