

Making the Most of Open Innovation in Post-crisis Era

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Why Is Innovation Important?

Innovation & growth

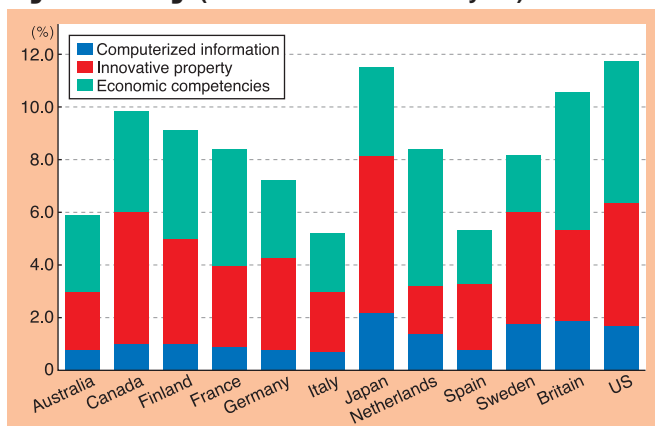
Innovation – the introduction of a new or significantly improved product (good or service), process or method – has long been viewed as central to economic performance and social welfare, and recent empirical evidence has confirmed the links between innovation and growth.

Innovation entails investment aimed at producing new knowledge. It results from the interaction of a range of complementary assets which include R&D, but also software, human capital and new organizational structures – many of which are essential for reaping productivity gains and efficiencies from new technologies. These “intangible” assets have become strategic factors for value creation by firms. Their role in the economy has become as important as that of tangible assets, accounting for 5% to 12% of GDP (*Chart 1*).

Better accounting of the intangible capital that drives innovation is important in furthering our understanding of the patterns and sources of economic growth. Adding it to the standard growth accounting framework significantly changes the analysis. Estimates for several OECD countries show that intangible investment accounts for around 20% to 25% of labor productivity growth. The OECD is

CHART 1

Intangible investment as share of GDP by country (2005 or latest available year)



Notes: 1) Computerized information includes databases and software. Innovative property includes scientific R&D; mineral exploration; copyright and license costs; and other product development, design and research. Economic competencies include brand equity; firm-specific human capital; and organizational structure.

2) Estimates refer to the total economy for Canada, Japan, the Netherlands and Sweden; the market sector for Australia, France, Germany, Italy, Spain and Britain; the non-financial business sector for Finland; and the non-farm business sector for the United States.

Sources: “Investments in Intangible Assets and Australia’s Productivity Growth” (Barnes and McClure), Productivity Commission Staff Working Paper, March 2009, Table 6.1., based on national estimates and “How Much does Sweden Invest in Intangible Assets” (Harald Edquist), IFN Working Paper No. 785, 2009, for Sweden

working with the international research and statistical community to produce a better measure of investment in innovation and its impact at the macroeconomic level.

Innovation to address global challenges

Second, innovation is critical to addressing global challenges. Just as globalization has made the world a “smaller” place, there is an increasing realization that many of today’s pressing challenges know no borders and cannot be tackled by a single country – global challenges require collective responses. The ability to address increasingly urgent issues such as climate change, health, food security and poverty depends on stronger innovation and new forms of international collaboration. Effective enabling mechanisms are needed, and the OECD is working to identify policies, frameworks and governance mechanisms that can accelerate scientific and technological progress and diffuse innovation as widely as possible.

Opening of Innovation

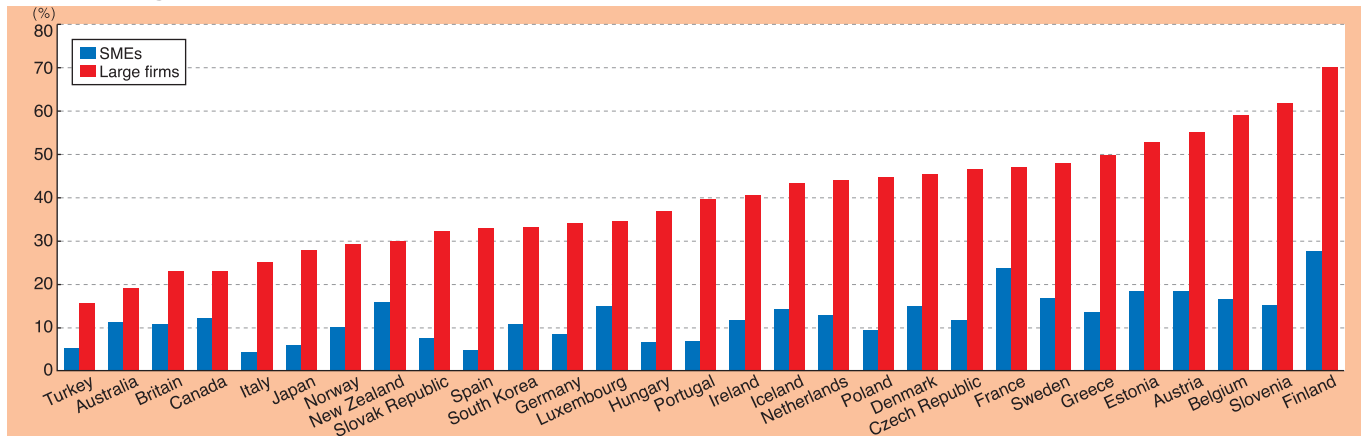
Thanks to decades of trade and investment liberalization, markets have become more globalized, opening new opportunities, as well as intensifying the level of competition. Product life cycles have also shortened or are under pressure – owing to more intense and global competition and continued technological progress. This is forcing companies to innovate more quickly and develop goods and services more efficiently.

Innovators themselves have also narrowed their focus to those elements where they believe they have a competitive advantage. Confronted with intense global competition and rising R&D costs, companies are increasingly collaborating with external partners, notably suppliers and customers, but also public research organizations. The aim is to stay abreast of developments, expand their market reach, tap into a larger base of ideas and technology, and get new goods or services to market before their competitors. These networks and ecosystems are increasingly global and involve both public and private research actors. Yet while the networks are increasingly global, they are built on local clusters of expertise. Making the most of knowledge depends on tapping into this expertise.

A range of countries have launched initiatives to link the public research base with foreign sources of knowledge, including via the internationalization of higher education and public research organizations, allowing foreign firms and research institutions to participate in national research programs under certain conditions. This raises the importance of ensuring regulations and enforcement of intellectual property rights (IPRs) in the context of international R&D partnerships.

As this practice of more collaborative innovation has spread, new forms of knowledge sharing and exchange between firms, individuals

Companies collaborating in innovation activities by size¹⁾ (2004-06)²⁾ (As percentage of all firms)



Notes: 1) SMEs: 10-249 employees for European countries, Australia and Japan (persons employed); 10-99 for New Zealand, 10-299 for South Korea, 20-249 for Canada
2) Or nearest available years

Sources: OECD based on Eurostat, CIS-2006 (April 2009) and national data sources

and institutions have grown. These collaborations are giving rise to knowledge networks and markets. Using a number of different mechanisms and platforms, users and suppliers can pool or trade data, information, contacts and know-how. Innovative markets are still under development (patent auctions, funds, etc.) and policy may help address the lack of information on transactions and prices, ensure competition in markets that are often highly concentrated, and support the development of standards that can help improve the valuation of intellectual property (IP).

While open innovation is not totally new, the organization of innovative activities (technological as well as non-technological) across corporate boundaries, with more balance between internal and external sources of innovation, is clearly on the increase. Other terms have also been used to describe this trend, and all stress to some extent the openness of innovation activities: open source, open standard, open research, user-driven innovation, etc. The fact that the term “open” is usually thought of as cost-free creates confusion; however, in contrast to open source, for example, open innovation typically implies the payment of license fees as well as other financial arrangements. In this context, therefore, “open” does not mean “free.”

Recent trends in open innovation

The OECD recently released a publication titled “*Open Innovation in Global Networks*” (2008). Evidence on global innovation networks based on case studies as well as on large-scale data sets shows that:

- The main reason for locating research and/or development facilities abroad is the proximity of large and growing markets. Other important factors are the availability of engineers and researchers, and the proximity to other activities (production, sales) of the company.
- Suppliers and customers are the most sought-after innovation partners. While universities and public research institutes are generally considered an important source of knowledge for companies’ innovation activities, especially in more upstream research and exploration activities, they represent only a small share of innovation collaborations.
- Larger firms innovate more openly than small firms. Innovation survey data indicate that large companies are four times more likely than small and medium-sized enterprises (SMEs) to collaborate on innovation.
- Geographical proximity matters in global innovation networks. Companies seem to prefer innovation partners that are geo-

graphically close. As the only information available concerns the number of collaborations, however, the fact may be masked that companies may enter collaborations with more distant partners only if they are strongly motivated by the pursuit of market demand or excellence.

- Differences among industries are significant. Collaboration on innovation is important in manufacturing as well as in services, notwithstanding some differences among countries. Industries such as chemicals, pharmaceuticals and information and communication technology (ICT) typically show high levels of open innovation.

The degree of openness in innovation models differs, depending on factors such as the importance of the technology, the strategy of the firm, the characteristics of the industry, etc. Companies traditionally seek to retain their core capabilities and determine what to outsource or with whom to collaborate. Their core competencies (in technology and markets) are developed internally to the greatest extent possible, but open innovation may be a faster, less risky alternative to internal development in order to diversify (in terms of technology and/or markets).

In industries characterized by rather short technology life cycles, e.g. the ICT, electronics and telecommunications sector, companies have sought external partners in order to keep up with new developments in and around their industry. In industries characterized by rather long technology life cycles and strong protection of IPRs (e.g. the pharmaceutical, chemical and materials industries), companies mainly look outside to keep up with research. In industries in which patents are important but can be more easily circumvented (e.g. the transport equipment industry and the fast-moving consumer goods industry), companies set up collaborations to keep pace with new developments. They seek technologies or products that have proven their market potential, which they can improve, scale up and commercialize.

The largest benefit of open innovation is a much larger base of ideas and technologies. Companies source external knowledge in various ways: partnerships with external parties (alliances, joint ventures, joint development, etc.); or acquisition or sale of knowledge (contract R&D, purchasing, licensing). In addition to these common modes, open innovation is increasingly realized through corporate venturing (equity investments in university spin-offs or in venture capital investment funds).

Open innovation is not only about sourcing external knowledge

“outside-in”) as companies look for ways to generate additional revenue from in-house innovations (“inside-out”) especially when the technology has future potential but is not part of the firm’s core strategy. Companies also increasingly use venturing to find external partners for commercializing innovations that are not used internally (divestment, spin-out, spin-off).

Theft of IP is seen as the most important risk to global innovation networks. Unique knowledge may be revealed to external partners that may later become competitors. Working closely with external partners can create uncertainty about the appropriation of the benefits of technology collaboration. When collaborating with larger companies, SMEs especially may face larger risks because they typically have fewer resources and limited expertise in IPR issues. The effective management of IP is crucial for identifying useful external knowledge and particularly for capturing the value of a firm’s own IPRs.

Successful open innovation also depends on the open character of the business model. As knowledge has become a key corporate resource, open innovation needs to be embedded in an overall business strategy that explicitly acknowledges the potential use of external ideas, knowledge and technology in value creation. Owing to the integration of different technologies, industry borders are shifting or even disappearing, necessitating new business models and organizational structures, including the effective management of human capital (open culture, diversity, etc.).

Global innovation networks significantly influence national and regional innovation systems. The ecosystems or networks of innovation of multinational enterprises (MNEs) create cross-border nodes between regional/national systems of innovation. MNEs also link science/technology actors in different countries, and their ecosystems often span clusters and industrial districts in specific industries across countries. In this context, geographical proximity permits localized learning.

Science/technology and innovation policies can no longer be designed solely in a national context. As a country’s attractiveness as a location for R&D and innovation activity becomes a priority, framework conditions that affect the location of production as well as costs (production, labor, tax) become critical. Appropriate structural policies, such as labor market and competition policies, as well as the public infrastructure for innovation and a highly skilled workforce are essential.

Policy implications of open innovation

In addition, global innovation networks have some more specific policy implications:

- Universities and public research organizations increasingly play a significant role in the open innovation strategies of firms both as a source of basic knowledge and as potential partners. Support for basic research must therefore continue. Given the scarcity of public resources and competition to attract R&D-related foreign direct investment (FDI), countries must balance their research efforts and investments in specific fields with the need to be open and develop sufficient absorptive capacity in a range of fields.
- World-class clusters and networks remain important, but integration across fields and borders may require different interfaces and competencies. The potential for innovation depends on how well knowledge flows and how well the system is connected: policies to foster or enable the development of world-class clusters and networks.
- Sharing IP may require different kinds of management tools in

firms and public research organizations. Companies participating in national R&D programs may need to share IP with foreign subsidiaries/partners or seek to commercialize it in foreign markets but may be constrained by national regulations.

- Investing in people and fostering cross-functionality and mobility and a “culture of innovation” are crucial, as open innovation implies that people must be able to work in networks, across borders and sectors, and at the interface of converging technologies. It also requires openness to a geographically mobile workforce.
- Open innovation stresses the broad characteristics of innovation. Much public support for innovation still focuses on R&D and technological innovation and less on non-technological innovation or other forms of user-driven innovation. While open innovation involves service firms, much public support for innovation still targets manufacturing firms. Policy attention focuses more on the supply side of innovation and less on building market demand for innovation (e.g. through public procurement).
- National R&D programs need to be more open while ensuring benefits via reciprocity and cost-sharing agreements. Also arising from open innovation is the question of capturing national benefits from cross-border spillovers of the ecosystems of innovative firms. Potential national benefits must be communicated and demonstrated to public stakeholders.
- Building a strong knowledge base is necessary to develop next-generation innovation policies and best practices. A strong knowledge base will be necessary to identify policy implications and develop next-generation innovation policies and best practices. OECD work over the coming years will seek to address these issues.

Box 1. Nokia: open source software

Nokia has taken steps towards greater openness with its 770 Internet Tablet based on the Linux operating system. It is the first open source (OS), Linux-based consumer handheld from Nokia, and it allows everyone to share the code. This is Nokia’s first major attempt to connect a commercial company and noncommercial communities via a handset. On the market, the product is situated between cellular phones and notebooks.

Historically, Nokia has relied on Symbian for the operating system for smartphones, and it has now used a Linux-based operating system for a browser-type device. Nokia has developed the company’s main products (smartphones) in house using Symbian because the market in smartphones is mature with strict operator and server requirements. The new Tablet is placed on new markets. By using Linux as an operating system, Nokia has chosen a flexible and mature technology that gives access to PC technologies, such as Internet Protocol. To speed the development of this OS product, Nokia published an open development platform, which is a Linux software toolset available to developers. The new development platform is targeted to OS developers and innovation houses to ensure the most effective development of a product and its applications. The idea is that developers have an opportunity to develop and share their own applications for Nokia 770 (enable application and technology development for the OS software and the commercial community). The company’s goal is to work closely with technology experts and the OS community. These actions signal that Nokia is actively embracing the OS movement and the Linux operating system for future non-phone products. The 770 is not Nokia’s first use of OS, but it had limited its OS efforts to its server-based networking products and internal development tools. In the handset market, this is its first major use of OS.

Experiences with open innovation

Companies may also use joint ventures and other forms of collaboration agreements to explore new technology domains as an alternative to spinning in. Alliances with strong partners (in technologies that may or may not be new to the company) may be an important source of information. A specific mode of collaboration applied by some companies in the case studies is open source software, which allows sharing and benefiting from software code developed by others. In some cases, commercial companies are able to develop proprietary products that are based on and complementary to open source products. Linux is the best known example of open source and has been a major competitor to proprietary products for a long period.

Some companies use IT tools, such as innovation portals or online technology intermediaries, to enhance the use of external sources of innovation. Others have developed an open source model to connect to user communities so as to tap into users' knowledge and get feedback from them. User communities help to develop the software, which is thus developed better and faster.

Companies may engage in strategic partnerships, frequent non-strategic partnerships, and ad hoc partnerships. Criteria used to assess the value of partnerships are complementary skills and reputation. Other companies organize days with universities to present their competencies and long-term strategies. This helps to create valuable partnerships with universities. Most companies in the case studies collaborate with universities on particular projects.

New Policy Agenda for Innovation

Society today is facing a set of unprecedented and diverse challenges. The effects of the economic downturn will be felt around the globe for years to come. Lagging productivity growth was already a serious threat to prosperity and competitiveness in many countries, and the economic crisis has only imposed a stronger imperative on countries to find new, greener and more sustainable sources of growth. Effective policies to harness innovation and channel it for human progress are urgently needed.

In addition, the ability to address increasingly urgent issues such as climate change, health, food security and poverty depends on stronger innovation and new forms of international collaboration. Global challenges require collective and innovation-driven responses.

There have been huge strides in broadening the benefits of innovation. A new medical treatment or vaccine that saves millions of lives, a new smartphone that makes doing business less costly and staying in touch with family easier, the widespread use of existing technologies for new purposes – all these breakthroughs should ultimately improve the well-being of people. What is more, today people can access, exchange and amplify knowledge on an unprecedented scale through the Internet. And that knowledge is developed and deployed in new ways in the workplace, and by consumers themselves, who can influence the direction of innovation.

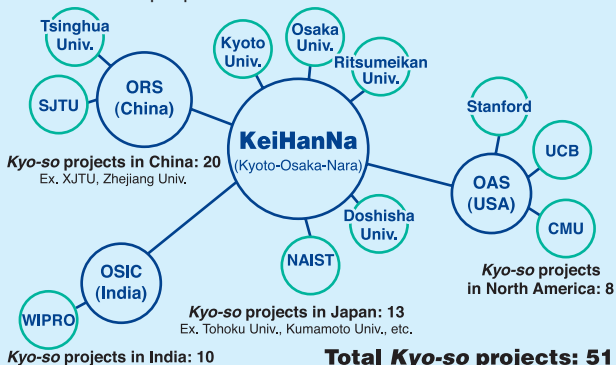
Yet the policy frameworks for innovation have not kept sufficient pace with changes in the global economy and the transformation of innovation processes. The origin of the current crisis – financial sector innovation where systemic risk went largely unchecked – is only one case in point. In the aftermath of the crisis, society – including business – is looking to governments to create policy mechanisms that encourage experimentation but provide safety nets for failure. Policy must help channel innovation towards uses that make life better for individuals, businesses and society at large.

Against this backdrop of transformation, the challenge is therefore to adjust the way innovation policies are designed and implemented to ensure they respond to the new landscape. Changes in the way we innovate, including open innovation; the pace of innovation; the need for better risk management tools; the pressures of globalization, both organisational and in governance; and the growing expectations of civil society, beg the question: Are the public policy instruments in use today “right” for the job? And how can approaches be tailored to country specificities: the level of economic development, economic structure and institutional setting? A systemic but flexible strategy is needed to enable governments, firms and individuals to harness innovation for better economic and social outcomes.

The OECD is working to help countries around the world meet their key challenges through innovation. The OECD Innovation Strategy, a comprehensive policy strategy to harness innovation for stronger and more sustainable growth and development, and to address the key social challenges of the 21st century, will be launched in spring 2010. Focusing on five priorities – empowering people to innovate; anchoring the foundations for innovation; investing in innovation and reaping its returns; applying innovation to address global challenges; and improving the governance of policies for innovation – the Innovation Strategy will provide cutting-edge analysis and policy guidance and inform the policy, research and measurement agendas for innovation in the years to come. **JS**

Box 2. Omron: Kyo-So

Omron has organized its global R&D in Kyo-So (collaborative innovation) networks in Japan, China, India and the United States using its local subsidiaries as a hub. Most human resources are employed locally. The Kyo-So area is an innovation-incubating area located next to Omron's research laboratories. The partners for collaboration from outside (including from abroad) are invited to have their own pilot offices in the Kyo-So area. This facilitates an open and creative atmosphere. Special promenades are installed in the office building as cross-over/encounter/fusion zones to allow people with various functions to meet.



Further reading:

- “2009 Interim Report on the OECD Innovation Strategy: An Agenda for Policy Action on Innovation,” OECD, Paris, 2009.
- “Fostering Innovation for Sustainable Growth,” OECD, Paris, 2009.
- “Open Innovation in Global Networks,” OECD, Paris, 2008.

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