

## Skills

### Why are skills and education important for innovation?

As policy makers try to restore growth and overcome the global economic and financial crisis, they pay specific attention to the development and use of skills that fuel innovation. Indeed the lack of qualified personal is consistently the second top critical hampering factor to innovation. However there is no simple recipe as innovation in different sectors requires different sets of skills and relies on different modes of learning that, for example, can be driven by science, entrepreneurship, practice and even users. The broad mix of skills for innovation also depends on the type of innovation sought; it can be looked at from different perspectives when considered at the macro or individual level.

### How can the education system foster skills for innovation?

While they only undertake part of people's education and training, formal education systems have a clear mission to empower people to innovate and equip students with skills for innovation. Increasingly they try to rebalance the emphasis between content knowledge and other skills such as creativity, communication, teamwork, and so on. This is true from primary school to university. The following aspects of the education system affect students' acquisition of innovation skills.

- **Disciplines.** How to foster skills for innovation depends on the disciplines taught. But all disciplines are expected to try to develop simultaneously the three categories of skills that matter for innovation: technical skills, skills in thinking and creativity, and behavioural and social skills. Although not a formal discipline, entrepreneurship education programmes are also increasingly considered as a means to develop an entrepreneurial culture among students.
- **Pedagogies.** Beyond specific disciplines, what matters most to develop skills is pedagogy. So-called active pedagogies such as problem-based learning, cooperative learning, metacognitive learning, sometimes enhanced by information and communication technology, are important sources of inspiration to reach better outcomes in disciplinary teaching for the development of skills for innovation. Interdisciplinary approaches or new approaches focusing on innovation such as design thinking are also promising to foster skills for innovation. Implementing these pedagogies sometimes requires a reorganisation of curriculum and organisational practices.
- **Assessment.** The ways education is assessed are often not conducive to the development of higher order skills and the valuation of risk. Assessments need to be aligned with the goal of developing skills for innovation. New assessment instruments are being developed to assess creativity and other habits of mind—to focus on competences rather than mere knowledge.
- **International mobility.** One important way to foster skills for innovation in the globalised economy lies in the mobility of students, faculty, programmes and institutions. This internationalizing of ideas and tacit knowledge is a major trend in higher education in the OECD area and worldwide.

### How are skills for innovation fostered and used in the economy?

Formal education is a major engine for skills development, but these skills can only lead to actual innovation if companies and other organizations make appropriate use of these innovation skills.

Moreover, innovation understood as “creative destruction” (Schumpeter, 1942), requires people to be lifelong learners and raises the question of the supply of continuous education and training.

- **Work organisation.** Some ways how work is organised are more associated with innovation than others, and their prevalence within countries has little to do with their economic specialisation. Some policy programmes that encourage the development of learning organisations have already been implemented. Collaboration with external stakeholders such as educational institutions, but also consumers or users, is another way to develop skills in a specific area of innovation within and outside the company.
- **Human resources management policies.** A series of HRM policies have come to be associated with more innovation and more staff contribution to the innovation process. The provision of formal training is both a source and a consequence of innovation, but other organisational practices can also foster more informal on-the-job training. Staff mobility, domestically and internationally, is another important source of innovation.
- **Lifelong learning policy.** People who are unemployed or inactive also need to access some forms of training, either to be in a position to access the labour market or to use some of the innovations developed. Lifelong learning policies thus have to also take into account all those who cannot benefit from company training.

### What key indicators measure the availability of skills for innovation?

- **Educational attainment.** The level of educational attainment of the population gives a rough indication of the share and number of people with low and high level of education in the economy.
- **Supply of graduates.** While educational attainment depends on the mobility of people, education systems supply a certain number of graduates each year, which partly determines countries’ mix of skills for innovation. We have data on graduates by level of education and field of study.
- **Participation in lifelong learning.** In addition to the traditional indicators of participation in formal and informal learning, the OECD survey on adult skills will provide new measures of participation in lifelong learning and literacy skills levels across countries.
- **Quality of education for innovation.** While quantity of graduates matters, quality is even more important. International surveys such as the Program for International Student Assessment (PISA) provide an indication of how countries perform in terms of fostering technical skills in different subjects at different ages (or in different grades). In higher education, some international surveys ask students to assess their foreign language skills and the skills that they have most developed as an outcome of their tertiary studies.

### What are the main approaches to policy in support of skills for innovation?

Approaches to policy in support of skills for innovation include the following dimensions:

- Education policy
- Lifelong learning policy

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- Incentives to develop innovation-friendly organisations
  - Facilitation of people mobility

### **What conditions and actors impact the availability of and access to skills for innovation?**

Conditions and actors affecting the availability of and access to skills for innovation include:

- [Universities](#) [1] . Universities play a key role in people's education and training, and have a clear mission to empower people to innovate, equip students with skills for innovation and produce R&D-related (see [Production of R&D-related skills by universities and PRIs](#) [2]). Universities and Public research institutes (see [Public research institutes](#) [3]) also provide firms' access to skills for innovation through consulting and extension services (see [Consulting and extension services by universities and PRIs](#) [4])
- [Skilled labour](#) [5] is critical for innovation. Entrepreneurial capabilities are particularly important (see [Entrepreneurial capabilities and culture](#) [6]).
- [Migration](#) [7]. Costs of hiring and firing (see [Costs of hiring and firing](#) [8]) substantially affect firms' access to labour for innovation (see [Firms' access to labour for innovation](#) [9]).
- [Firms' access to knowledge for innovation](#) [10] also determine firms' ability to tap into knowledge and skills from outside the company to support innovation processes but also to strengthen capacities.

### **References**

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