OECD Science, Technology and Innovation Outlook 2016

Policy Profile

Labour market policies for the highly skilled

Rationale and objectives

The effective use of a skilled workforce is necessary for a well-functioning science, technology and innovation (STI) system. The policy challenges in ensuring an adequate mix of skills for innovation are likely to vary by country. First, the range of skills for innovation ranges from S&T capabilities to skills such as management, communication and entrepreneurship. Second, the type of skills required varies widely across industries and firm size (Toner, 2009). Third, the optimal mix of skills varies over time – in many countries computerisation and globalisation have contributed to large changes in labour demand, for instance in professions that require more abstract, cognitive skills (OECD, 2010a). Lifelong learning is therefore an essential part of both reacting to and fostering innovation. While education policies mainly support the supply of skills for innovation (see the policy profile on "Strengthening education and skills for innovation"), labour market policies aim to raise the level of knowledge and skills effectively used by the labour force.

However, advanced skills do not automatically translate into higher prosperity and sustained growth (OECD, 2015). While university graduates enjoy close to full employment in Iceland, Norway or Sweden, their employment rates are substantially lower in Greece and Turkey (Figure 1). Indeed, evidence from the Programme for the International Assessment of Adult Competencies (PIAAC) suggests there is considerable skills mismatch (i.e. a mismatch between the skills of workers and the skills required to perform job tasks) in many OECD countries (Adalet McGowan and Andrews, 2015). Governments therefore have a role to play in monitoring potential skills shortages and helping labour markets and the skills-formation system align objectives and capacities. Many countries are particularly concerned by better matching the demand for and supply of skills in science and engineering disciplines and careers (see the policy profile on "Research careers").

The participation of women in science, innovation and entrepreneurship may require particular policy attention to avoid the underutilisation of women's skills. Employment rates show that despite often accounting for a higher share of tertiary studies than men, women are underrepresented in skilled employment (Figure 1), although they often account for a higher share of tertiary studies. This is a common issue in all countries, though the gender gap is particularly striking in Japan, Korea and Turkey. While participation may reflect many factors, barriers to female participation in science such as gender stereotypes and insufficiently family-friendly workplace practices may persist. In many countries female scientists are concentrated in certain fields, such as biology, and the proportion of female scientists tends to fall as seniority rises (OECD, 2015b). The unbalanced participation of minorities in scientific and technological (S&T) occupations has also been widely documented (NSB, 2014) (see also the *STI Outlook Policy Profiles on Innovation for development and inclusive growth and Research careers*). Concerning entrepreneurship, in OECD countries, two and a half times as many men as women are self-employed with paid employees (OECD, 2015a).

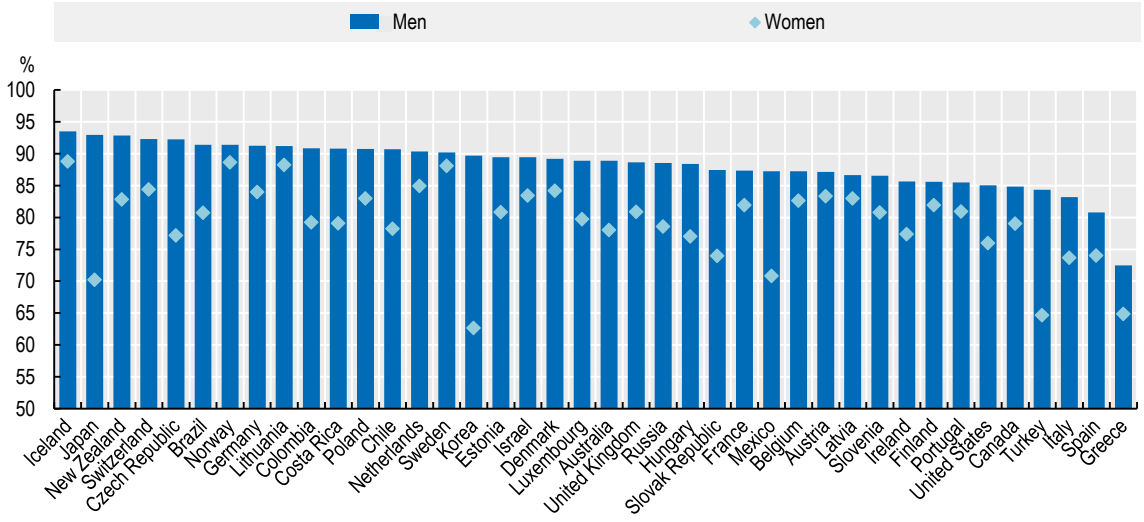
The under-employment or mis-employment of the highly skilled, whether women or minorities or otherwise, raises several issues related to the loss of competences for the market, the risk of skills erosion in the long run, and low return on public and private investments on education.

The effective use of skills in the innovation system also requires modern human resource practices within firms and public organisations. A recent OECD survey on Strategic Human Resource Management practices in government (OECD, 2016) indicates that innovation is among the highest priorities for HR reform across OECD countries and 20 OECD countries report being actively involved in reforming HRM systems with a view to encourage more innovation in the civil services. Many countries are developing learning and training

programmes for civil servants and civil service leaders, or include innovation-related concepts in their competency frameworks. However while research on skills and competencies for innovation seem of growing importance, no common understanding exists of what competencies are necessary to support innovation in a public sector environment. Further OECD work in that respect is ongoing.

Figure 1. Employment rate of university graduates by gender, 2014

Number of university graduates in employment as a % of the population of university graduates aged 25 to 64



Note: University graduates include graduates at tertiary-level and from advanced research programmes, according to the International Standard Classification of Education (ISCED 2011). A redefinition of education at the tertiary level now includes Short-cycle tertiary, Bachelor and equivalent, Master and equivalent; and Doctoral and equivalent. Tertiary education is defined as builds on secondary education, providing learning activities in specialised fields of education. It aims at learning at a high level of complexity and specialisation, includes academic as well as advanced vocational or professional education and content is more complex and advanced than in the lower ISCED levels. For more details please refer to the Annex 3 of Education at a glance 2015 : http://www.oecd.org/edu/education-at-a-glance-19991487.htm. Data for Brazil, Chile, France and Russia refer to 2013.

Source: OECD (2015), *Education at a Glance 2015: OECD Indicators*, OECD Publishing, Paris, http://www.oecd.org/edu/eag.htm.

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Major aspects and instruments

Governments 'pull' demand by supporting businesses that recruit highly skilled workers, especially the small firms that typically face difficulties in attracting skills. Government policies can also help improve the attractiveness of STI careers and steer supply by attracting foreign talent and boosting enrolment in science, technology, engineering and mathematics (STEM) subjects. Labour policies also encompass vocational training and mobility schemes that upgrade and replenish adults' skills after schooling or university.

Demand-side employment policies help to reduce the costs for firms of hiring highly skilled workers (e.g. tax incentives for R&D expenditure, including wages, or payroll withholding tax for the highly skilled) (see the policy profile on "Tax incentives for R&D and innovation"). They may also cover the recruitment of young researchers (e.g. industrial PhD grants, postdoc fellowships). Other initiatives promote innovation in workplaces (e.g. adoption of new technologies and working methods) to help employers make the most of available skills.

Academia and public administration are major destinations of the highly skilled. The creation of research chairs in academia or high-level positions in public administration help steer demand for talent and support public-sector research and innovation processes, while generating career opportunities. Reforming the career path for young researchers in public research organisations is another policy option.

Table 1. Labour policies for the highly skilled: typology and country examples

Key policy features		Key policy instruments	Some country examples
Demand-pull	**Targeting firms (*)**	Tax incentives (e.g. tax relief on social contributions for researchers and new hired PhD holders), industrial PhD programmes, workplace development projects, learning networks	Japan (financial support for distinguished young researchers);
	Targeting academia and public administration	Job creation (e.g through the establishment of new academic Chairs or special positions at universities), new Centres of Excellence.	Czech Republic (Junior Grants); Turkey (Career Development Program)
Supply-push	**Improving training and life-long learning opportunities**	Financial support (e.g. scholarship, freeze tuition fees), development of national qualifications framework, etc.	Norway (national skills strategy); Portugal (professional technical superior courses)
	Encouraging mobility (sectoral and/or international)	Regulatory reforms to allow pension portability, research grants portability etc.; creation of job positions in secondment / fiscal incentives for the recruitment of secondees, development of national qualifications framework, etc. Reform of immigration laws, reform of universities and public employment law, fiscal incentives, mobility support services (e.g. housing)	Colombia (Time to Come Back); Turkey (Postdoctoral Reintegration Fellowship Program); Belgium (Innovatiestages)
	Targeting researchers (*)	Financial incentives (e.g. tax incentives on personal income, new scholarships etc.), improved working and research conditions (e.g. administrative and/or research support, research facilities/labs, research autonomy/freedom etc.), work-family balance (e.g. parental leave, part-time arrangements etc.), reform of public employment law (e.g. tenure track, recuitment and promotion systems)	Austria (University Act); Ireland (Innovation 2020); Czech Republic (Operational Programme for Research, Development and Education)
	Targeting inactive/ underrepresented population (e.g. women, minorities etc.)	Targeted measures to reduce gender/minorities gap, e.g. aiming to increase their presence and visibility in doctoral studies, academia or research councils (e.g. senior positions, role models, mentorship, peer reviews panels), networking programmes, financial incentives (e.g. special awards, fellowships) etc.	Korea (Third Women S&E Promotion Basic Plan); Norway (Committee for Gender Balance and Diversity in Research); Netherlands (Aspasia programme)
Matching demand and supply	**Monitoring and forecasting gaps**	Data collection and surveys on current and forecasted market needs and education enrolment and graduation trends.	Ireland (quantitative and qualitative research); Croatia
	Information system and skills frameworks (connecting labour markets and skills-formation system)	Information plaftorms on job opportunities, provision of guidance to job seekers/ firms, development of national qualifications framework, recognition of informal and on-the-job learning in national qualifications frameworks etc.	Spain (Employability Map); Peru (online careers platform)
	Skills policy governance	Joint participation in the design of skills policy agenda, and the implementation of STI policy (e.g. business participation in universities' boards)	UK (National Colleges)

(*) See also the policy profiles on "Strengthening education and skills for innovation", "Public research missions and orientation", "Commercialisation of public research results" and "Tax incentives for R&D and innovation".

Source: This table draws upon recent analytical works on the innovation policy mix carried out for the OECD STI Outlook under the aegis of the OECD Committee for Scientific and Technological Policy (Kergroach et al., 2016 forthcoming). Country information is drawn from the EC/OECD International Science, Technology and Innovation Policy (STIP) Database, edition 2016, https://www.innovationpolicyplatform.org/topic-menu/sti-policy-database.

Other employment policies aim to develop and upgrade the supply of skills. Acquisition of skills is an on-going process; it does not end with formal education (OECD, 2010a). Various financial instruments (e.g. frozen tuition fees, scholarships) or working arrangements (e.g. sabbaticals) promote adult education and on-the-job training. Some incentives are directed to firms (e.g. regulations and taxation for professional training).

Mobility during one's career also provides learning opportunities. Measures to encourage intersectoral mobility aim to reduce regulatory barriers between institutions (e.g. portability of pensions or research grants) and to create opportunities for interaction between industry and science (see the policy profiles on

"Public research missions and orientation" and "Commercialisation of public research results"). Policy initiatives to encourage international mobility include changes in laws on immigration or public employment (e.g. at universities), simplification of residence and work permit procedures, financial incentives to attract foreign or national highly skilled workers from abroad (e.g. stipends, tax incentives for highly skilled foreign workers, social security net), or provision of mobility services and networking facilities (e.g. one-stop shop, website, housing assistance).

Labour policies for innovation are particularly targeted at researchers. They aim to improve the attractiveness of research careers by increasing remuneration (e.g. new research funding, premiums on research output, including publications, academic spin-offs, teaching), improving employment conditions (e.g. reforms of recruitment and promotion systems, tenure career paths, work-family balance arrangements including parental leave and part-time work), and improving research conditions (e.g. increased autonomy for research, support staff, world-class research facilities). Targeted measures may support researchers at different stages of their careers.

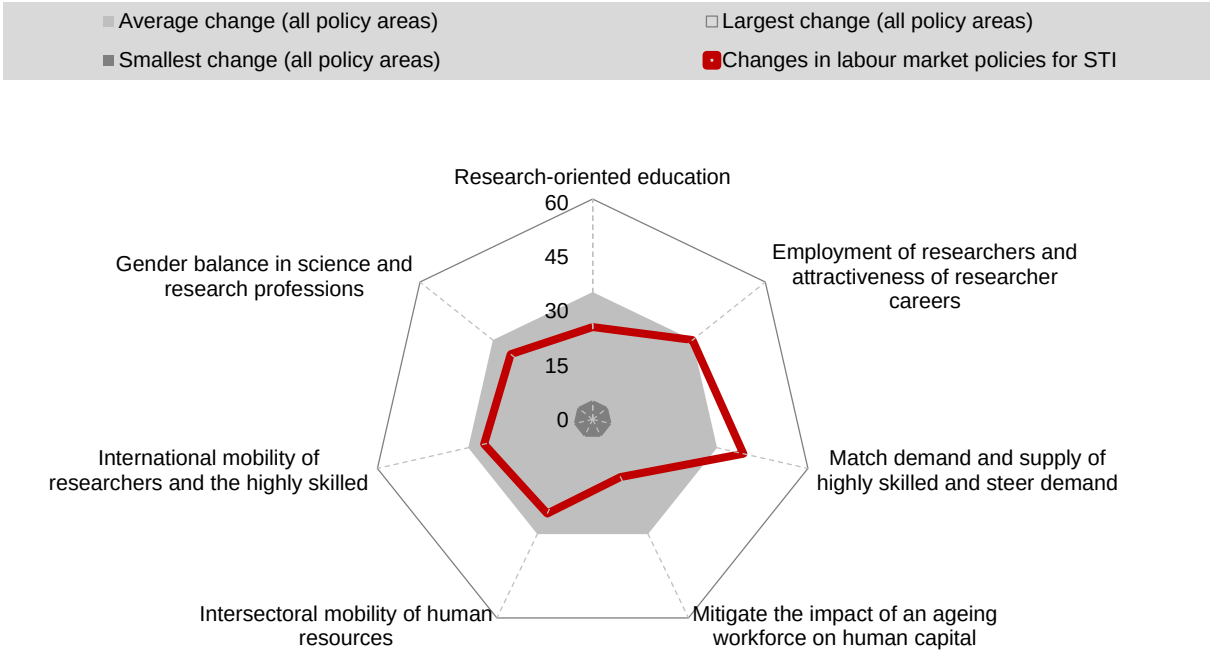
Women and minorities are an untapped or underexploited talent pool that has attracted particular policy attention. Policy can try to ensure that barriers to women's participation in science, innovation and entrepreneurship are removed. There are initiatives to enhance their presence and visibility in senior positions (e.g. appointment to executive boards or peer-review panels) or to serve as role models in schools and higher education institutions. Financial incentives (e.g. targeted awards or research grants) encourage them to pursue S&T careers and conduct research. Targeted research grants can also help offset the obstacles they may encounter in obtaining research funding through general competitive processes.

Matching demand for and supply of skills requires maintaining an information system to monitor changes in labour demand and education capacities (e.g. firm surveys, forecasting analysis), providing job seekers and firms with platforms to meet, and establishing a skills or qualification framework to support recruitment and enable mobility and lifelong learning (e.g. recognition of informal learning). Co-ordination exercises between government, the business sector and education providers are essential, as is the participation of business-sector representatives in the design of the skills policy agenda (e.g. consultative processes), and the delivery of skills policy (e.g. executive boards at institutional level).

Recent policy trends

Figure 2. Labour market policies for the highly skilled among other areas of STI policy change, 2014-16

Percentage of policy initiatives that have been newly introduced, revised or repealed over the period



Note: The EC/OECD STI Policy survey 2016 aims to review major changes in national policy portfolio and governance arrangements for STI. The survey builds on the conceptual work carried on under the aegis of the OECD Committee for Scientific and Technological Policy (CSTP) for mapping the policy mix for innovation and therefore covers a broad range of policy areas (Kergroach et al., forthcoming-a). 52 economies participated in 2016, including OECD countries, key emerging economies (e.g. Argentina, Brazil, the People's Republic of China, Colombia, Costa Rica, Egypt, India, Indonesia, Malaysia, Peru, the Russian Federation, South Africa and Thailand), non-OECD EU Member States, and the European Commission. Taken together, the countries covered in the STIP survey 2016 account for an estimated 98% of global R&D. The responses are provided by CSTP Delegates and European Research and Innovation Committee (ERAC) Delegates for EU non-OECD countries.

This is an experimental indicator that accounts for the number of major policy initiatives implemented, repealed or substantially revised during 2014-16 as a share of total policy initiatives active at the beginning of the period. Although simple counts do not account for the magnitude and impact of policy changes, this ratio reflects STI policy focus and activity in specific policy areas and over specific periods of time.

Source: Based on EC/OECD (forthcoming), *International Database on STI Policies (STIP);* and Kergroach *et al.* (forthcoming-b).

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Efforts have been made to build knowledge around future skills needs and to strengthen institutional capacity to monitor skills shortages (Figure 2). A number of countries have introduced new mechanisms to better match supply and demand in scientific, and wider, labour markets. In 2015 Croatia initiated a model for forecasting future labour market needs up to 2030, while Ireland has conducted quantitative and qualitative research of employers needs via an employer survey. At the regional level, Spain's Employability Map aims to help the autonomous communities provide information to better match supply and demand. In 2015 Peru implemented an online platform targeted at young people providing information on training

supply and labour demand. In 2016 Latvia expects to renew a programme where customised employer training is organised in partnership with sector associations, with a planned budget for 2016-2020 of EUR 24.9 million. The German research ministry has set up a national online portal for people who have discontinued their studies, aiming to encourage them to continue vocational training and seek labour market advice from German states (Länder).

Women's participation in science remains an area of STI policy attention. Korea's Third Women S&E Promotion Basic Plan (2014-18) sets the target of increasing the portion of female scientists and engineers in new recruitments to 30% by 2018, and increasing the proportion of female members serving on the S&T related government committees to 40%. Norway's Ministry of Education and Research appoints a Committee for Gender Balance and Diversity in Research is on 4-year terms (budget NOK 5 million in 2016). Ireland launched the HEA Review of Gender Equality in Higher Education in 2015. Science policy is also affected by wider government plans, e.g. Finland's 2016 Government Action Plan for Gender Equality and Spain's Action Plan for Equal Opportunities in the Information Society (2014-2017).

In addition, a small number of countries implement policies dedicated to catering for and mitigating the impact of an ageing workforce on the availability of skills for research and innovation. For example, Korea has implemented new policies to match retired highly-qualified scientists and engineers with jobs at small- and medium-sized firms.

A number of countries have also made recent strides in reforming the governance of labour market policies for the highly skilled, as well as reforms to vocational and technical education systems:

- To address gaps in the high-level skills needed by employers, the UK is creating five new National Colleges in the areas of digital skills, high speed rail, onshore oil and gas, creative and cultural industries, and nuclear. The first Colleges will open in September 2016 with the network of Colleges operational by September 2017.

- In 2015 Norway appointed an expert committee to give recommendations for a system for life long career guidance in Norway. It is also expected to develop a national skills strategy in 2016, following on from an OECD Skills Strategy Review (OECD, 2014b).

- Portugal introduced professional technical superior courses in 2014 to focus on economic sectors experiencing skills shortages.

- Turkey introduced a training scheme for vocational and technical education teachers in 2015 in topics such as industrial communication and robotics, industrial automation technologies and flexible manufacturing systems.

- The Department for Business, Innovation and Skills (BIS) in the United Kingdom has published a 2015-16 evaluation strategy which includes a skills audit on evaluation techniques to identify training needs.

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