



The Global Competition for Talent

Why is mobility of talent important for innovation?

Which countries attract the highly skilled?

What is the impact of international mobility?

How to attract and retain highly skilled workers in science and technology?

What should future mobility policy look like?

Where do we go from here?

For further information

For further reading

Where to contact us?

Introduction

A knowledge-based society relies on a highly qualified labour force, not only for high-technology sectors and research, but increasingly in all sectors of the economy and society. The growing intensity of knowledge means that all countries have a greater need for highly skilled workers who are able to access, understand and use knowledge for technological and economic development. The global competition for this talent pool is on the rise.

The international mobility of labour is not a new phenomenon – people have always moved to other countries, and historically, the diffusion of technologies has owed much to human mobility. More recently, however, the movement of people has intensified as economic activity has become more globalised. Alongside sustained growth in foreign direct investment (FDI), in trade and in the internationalisation of research and development (R-D), mobility of human resources in science and technology (HRST) has become a central aspect of globalisation. Migration of talent plays an important role in shaping skilled labour forces throughout the OECD area, and most OECD countries are net beneficiaries of highly skilled migration.

Various factors contribute to the flows of human resources in science and technology (HRST). In addition to economic incentives, such as opportunities for better pay and career advancement and access to better research funding, mobile talent also looks for higher quality research infrastructure, the opportunity to work with “star” scientists and more freedom to debate. Policies regarding research, ethics and intellectual property also influence their choices. Less amenable to potential government policy, but still important, are family or personal ties that draw the highly skilled to certain locations. Against this backdrop, competition for the highly skilled is now shaping innovation policy initiatives across the OECD area. This *Policy Brief* looks at the global competition for talent, notably HRST, and its implications for government policy. ■

Why is mobility of talent important for innovation?

Mobility is not just about meeting demand for professional workers. Its importance for innovation stems from its contribution to creating and diffusing knowledge. Once in another country, people transmit their know-how and skills. In the workplace, knowledge spreads to colleagues, especially those in close contact. Knowledge also spills over to people and organisations nearby and can contribute to the emergence of local concentrations of activity. Mobile talent also act as a vital complement to the transfer of knowledge through flows of goods and capital across borders.

For sending countries, work on the effects of emigration has often focused on migrant remittances and brain drain, with particular emphasis on the impact on developing countries. For these countries, the main concerns about brain drain centre on the loss of productive labour and its associated output, the cost of educating workers who then move abroad, and the potential impact on much-needed institutional development and structural change. However, these concerns must be balanced against the question of whether these people could have found productive employment at home.

Emigration of skilled workers, such as researchers and scientists, can be beneficial for creating and diffusing knowledge in their country of origin. In particular, emigration possibilities may encourage the development of skills. In addition, when skilled individuals move to larger and “denser” economies they can benefit the sending country by producing “better” knowledge than they could at home, accumulating human capital faster and improving their productivity, thereby increasing the potential return flows of knowledge. This can increase the global stock of knowledge.

“Brain circulation” can stimulate knowledge transfer to sending countries. This may mean the return of skilled migrants to their home country after a period abroad, or a pattern of temporary and circular migration between home and abroad. Professionals diffuse the knowledge they acquire to their home country and maintain networks, thereby facilitating continuing knowledge exchange. To make the most of brain circulation, the home country needs to have sufficient absorptive capacity and returning talent need to be able to re-enter local labour markets at a level that is appropriate for their skills and knowledge.

The existence of a diaspora (i.e. a group of nationals living overseas) further enhances the transfer of knowledge. A stock of skilled science and technology workers abroad can act as a conduit for flows of knowledge and information back to the home country. Social and other links increase the probability that knowledge will continue to flow back. In some emerging economies, diaspora networks play a vital role in developing science and technology capacity.

Taken together, these effects suggest that knowledge flows associated with the emigration of researchers and scientists can provide benefits to sending countries. The mobility of researchers therefore is not necessarily a zero-sum game in which receiving countries gain and sending countries lose. ■

Which countries attract the highly skilled?

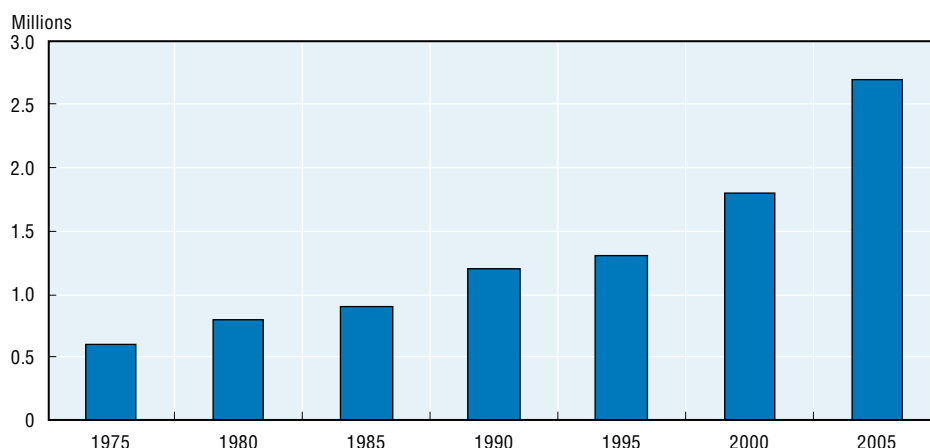
Most OECD countries are net beneficiaries of international mobility of HRST, with inflows exceeding outflows. The United States, Canada, Australia and France, in particular, have experienced strongly positive net inflows of tertiary-educated migrants.

However, a more detailed picture reveals that, in relative terms, New Zealand and Ireland have experienced large outflows (more than 15%) of their highly skilled population to other OECD countries while the United States, Spain and Japan have seen less than 5% of their highly skilled population go abroad. In absolute terms, the United Kingdom and Germany have the highest number of skilled expatriates, while Luxembourg, Norway and the Slovak Republic have the lowest. For some countries, intra-OECD flows add substantially to the stock of highly skilled individuals: in Australia, Ireland, Luxembourg, New Zealand and Switzerland, highly skilled migrants from other OECD countries are equivalent to more than 15% of the native-born highly skilled population. For other OECD countries, non-OECD migrants play a more important role: for example, they significantly exceed intra-OECD migrants in Canada, France, Portugal and the United States. The main sources of non-OECD migrants are Asian, led by China, India and the Philippines.

Students are also increasingly inclined to go abroad to study. OECD countries benefit from the inflow of students and scholars; benefits also occur when domestic students study abroad and gain knowledge and experience in another country. The number of students enrolled outside their country of citizenship has risen sharply since 1995 (Figure 1). Most enrol in the OECD area, especially in Australia, France, Germany, the United Kingdom and the United States. Two-thirds of foreign students overall are from non-OECD countries. China and India are the largest sources, followed by Morocco and Malaysia. Non-OECD countries such as China and South Africa are also increasingly attracting foreign students.

Return flows of migrants add to the mobility picture. Data from various countries show a tendency for many “permanent” or long-term migrants to return to their country of origin. Return rates appear to be higher for skilled workers and for those from countries at a greater cultural, economic and geographic distance from the host country. This trend is consistent with the notion of a globalising labour market in which the mobility of skilled workers is affected by changes in relative labour market conditions. The decision to return is driven strongly by lifestyle and family considerations and the availability of attractive employment opportunities at home. For students,

Figure 1.
NUMBER OF STUDENTS
ENROLLED OUTSIDE THEIR
COUNTRY OF CITIZENSHIP,
1975-2005



Source: OECD (2007b), p. 303.

the considerations are similar – perceptions of the labour market in the host country, perceptions of one’s adjustment and integration in the host country, and family ties. Return rates differ between subjects and countries of origin – US data show that students in computer science and electrical engineering and students from India and China were less likely to return home at the end of their studies than students in other areas and from other countries. ■

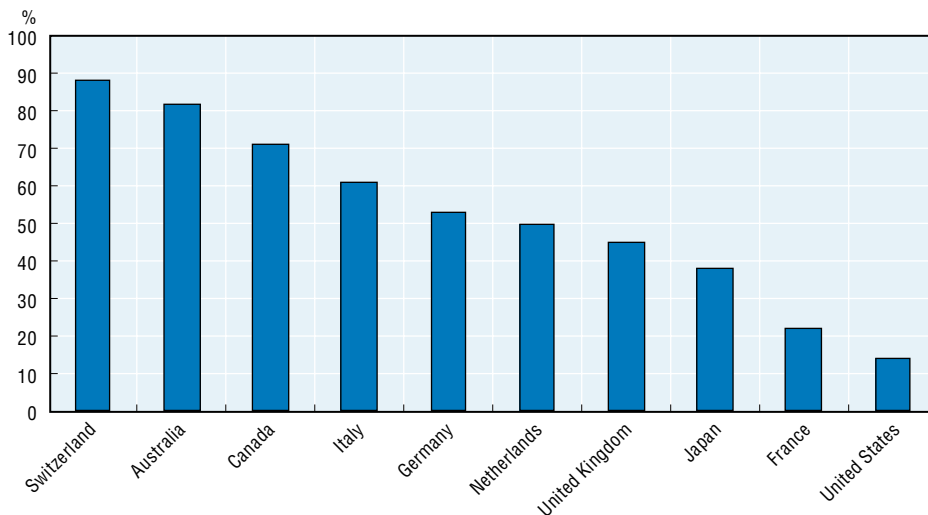
What is the impact of international mobility?

Quantitative evidence on the impact of mobility patterns is not readily available. Many variables and factors influence science and technology outcomes and are hard to disentangle. Nevertheless, using the information available we can build a picture and establish some links between mobility and broader science and innovation outcomes.

Clearly the highly-skilled labour market is becoming increasingly international. Both private industry and academia seek foreign staff for their specific knowledge or abilities, their language skills and their knowledge of foreign markets. Academic staff recruited from overseas are now a significant element of the university workforce in some countries and there is some evidence that their mobility is associated with higher-quality output (Figure 2). Mobility may lead to better international connections and collaborative research and overcome local constraints on research work.

The links between mobility and innovation are less clear, although some evidence suggests that immigrants contribute strongly to patent applications and creation of technology firms. US data, for instance, show that the proportion of patent applications filed with the US office of the World Intellectual Property Organization which name foreign nationals as inventors or co-inventors increased from 7.6% to more than 25% between 1998 and 2006. More broadly, the world share of patents involving international co-invention increased from 4% in 1991-93 to 7% in 2001-03, with small and less developed economies particularly active (Figure 3).

Figure 2.
SHARE OF HIGHLY CITED RESEARCHERS WITH RESEARCH EXPERIENCE OUTSIDE OF THEIR HOME COUNTRY
 By country of current institution



Note: Based on a sample of 494 researchers from the ISI Highly Cited database (1985-2004).
 Source: Evidence (2005), p. 25.

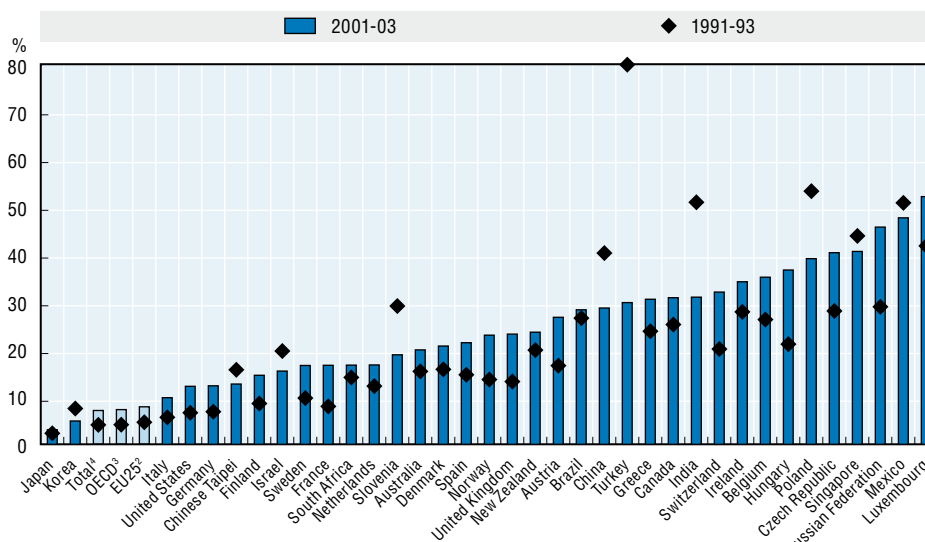
The increased mobility of HRST is paralleled by an increase in collaborative research. For example, from 1995 to 2004 Finland's joint publications with researchers from other EU countries rose by 85%. Specific patterns of collaboration are likely to be influenced by countries' relative capacity in various research fields as well as by geographic proximity, a common language and institutional linkages. Evidence from the United States points to links between the number of doctorates received by foreign students in the US and the number of internationally co-authored articles involving the United States and the students' home countries.

In the broader context of R-D and innovation activity, many countries, including newly emerging economies, have greatly improved their ability to exploit and perform research and innovation over the past decade. This is one factor helping to change the geographical spread and intensity of research and scientific activity. The growing sums spent on R-D in non-OECD countries and their human capital resources, coupled with the increasingly internationalised activities of technology firms, all suggest that the opportunities for HRST mobility will continue to grow. This, then, is the backdrop for mobility policies. ■

How to attract and retain highly skilled workers in science and technology?

Countries take differing approaches to attracting and keeping skilled science and technology staff. Most OECD countries see it as important in a context of retaining and attracting HRST talent and have policies to encourage and assist mobility. These range from economic incentives to encourage inflows, immigration-oriented assistance, procedures for recognising foreign qualifications, social and cultural support, and support for research

Figure 3.
PATENTS WITH FOREIGN CO-INVENTORS,¹ 2001-03



Note: Patent counts are based on the priority date, the inventor's country of residence, using simple counts.
 1. Share of patent applications to the European Patent Office (EPO) with at least one foreign co-inventors in total patents invented domestically. This graph only covers countries/economies with more than 200 EPO applications over 2001-2003.
 2. The EU is treated as one country; intra-EU co-operation is excluded.
 3. Patents of OECD residents that involve international co-operation.
 4. All EPO patents that involve international co-operation.

Source: OECD Science, Technology and Industry Scoreboard 2007, p 167.

abroad. Each of these policy areas utilises a range of mechanisms, including scholarships, fellowships, grants, facilitated procedures, institutional arrangements and service centres. Some countries focus on just a few policy mechanisms, while others offer “something for everyone”.

Only a few countries have an explicit mobility strategy. For those in which policies are not part of such a strategy, there is a greater risk of incoherence among policies on inflows, outflows and the diaspora. Ideally, mobility policies should be part of a wider strategy that contributes to the country’s objectives for science, technology and innovation and sets out the rationale for intervention in mobility issues. Few countries have specific strategies to maintain contact with their diaspora, although many use economic incentives to attract people back. There is generally more support for inflows of researchers and other HRST than for outflows, perhaps because countries judge outward mobility to be adequate or because they are reluctant to encourage outward mobility.

National policies appear generally to target the same population, with little orientation towards national scientific and technological interests. Since many countries offer support for mobility, as opposed to permanent migration, researchers may use these policies to work in a number of countries. It is difficult to know if the similarity of mobility policies represents a move towards best practice, as few policies have been evaluated.

In most cases, national policies do not place restrictions on the country of origin (inward mobility) or of destination (outward mobility). Nevertheless, a geographic tendency may emerge as a result of individuals’ decisions (e.g. they may be more aware of opportunities close to home or prefer to move shorter distances) or as a result of the efficacy of countries’ marketing approaches.

At an institutional level, information provided by some countries suggests that the most common mobility assistance is social support related to language, housing, visas, insurance and similar issues. Student exchange policies are also popular, as are travel grants for research abroad. The policies and programmes offered at institutional level complement those offered at national level, particularly with their greater focus on information provision and practical social/cultural assistance. Institutional mobility initiatives also tend to provide support for short-term visits, which are less frequently available at national level. ■

What should future mobility policy look like?

OECD countries already have a wide selection of policy tools at their disposal to promote the mobility of talent. But what is the role for international mobility policy in the future?

A key first step in designing future mobility policies is to identify a rationale for intervention and to establish clear objectives. The obstacles to mobility commonly cited by policy makers and academics include legal and administrative barriers, lack of funding, personal issues and language. The question is, which obstacles stem from a market failure that governments can remedy through policy? This is not easily answered and there is no general agreement, even within countries, about the nature of obstacles to mobility.

Policy makers also need to consider how obstacles may change in the future and the extent to which issues are specific to HRST and thus warrant a specific approach.

Few policies have been evaluated, so it is difficult to point to best practices. However, some lessons can be drawn from evaluation material provided by countries in response to an OECD questionnaire, including the importance of setting appropriate funding levels and programme durations for the target population. Some interesting points emerged with respect to recipients' personal objectives versus programme objectives, and, in particular, whether the long-term goals of programmes will be achieved if personal and programme objectives differ. The evaluation material showed the importance of good data collection, planned from the outset, to enable an assessment of the efficiency and effectiveness of a programme. More work on evaluation would be valuable. ■

Where do we go from here?

Given differences among countries, it is not possible to identify a “recipe” for what governments should do more of, what they should do less of, and what should stay the same. One promising avenue, however, is removal of barriers to short-term and circular mobility of HRST. Shorter periods abroad may avoid some of the obstacles that currently hinder mobility, and would support knowledge flows associated with brain circulation and the diaspora.

Moreover, policy coherence is important, not only for mobility policies but also to ensure that the broader environment for innovation and scientific endeavour is sound and fits with other government policy priorities, such as development and aid. In particular simply increasing the number of people moving is not enough to boost innovation; they must also operate in a system that enables them to use, create and disseminate knowledge. Coherence is a challenge, but clear goals and a good understanding of policy impacts can help policy makers progress in this area, particularly in terms of designing mobility policies that are beneficial for both developed and developing countries.

While recent years have seen major efforts to improve data on international stocks and flows of the highly skilled, difficulties remain. Further work is needed if countries are to better understand patterns and changes in stocks and flows of scientists, engineers and researchers and the broader category of the highly skilled. Better data collection may also allow a more thorough exploration of mobility across sectors and within the private sector.

Finally, an important message is that the global competition for talent is growing. Many OECD countries and a growing range of non-member economies aim to attract the same pool of highly skilled researchers and scientists. Relying extensively on international flows and mobility policies to fill existing or future gaps in the supply of HRST may therefore entail risks. Policy will also need to focus on addressing shortcomings in national policies that may limit the supply of HRST. ■

For further information

For more information on the OECD's work on the international mobility of the highly skilled, please contact:

Sarah Box, tel.: +33 1 45 24 18 69, e-mail: sarah.box@oecd.org,

Ester Basri, tel.: +33 1 45 24 96 24, e-mail: ester.basri@oecd.org.



For further reading

OECD (2008), **The Global Competition for Talent: Mobility of the Highly Skilled.**

OECD (2008), **Open Innovation in Global Networks.**

OECD (2008), **The Internationalisation of Business R-D: Evidence, Impacts and Implications.**

OECD (2008), **A Profile of Immigrant Population in the 21st Century: Data from OECD Countries.**

OECD (2007a), **OECD Science, Technology and Industry Scoreboard 2007: Innovation and Performance in the Global Economy**, OECD, Paris.

OECD (2007b), **Education at a Glance 2007**, OECD, Paris.

Evidence (2007), "Patterns of international collaboration for the UK and leading partners: Summary report", Report commissioned by the UK Office of Science and Innovation, Evidence: Jonathan Adams, Karen Gurney and Stuart Marshall, June, Leeds.

Regets, M. (2007), "Research issues in the international migration of highly skilled workers: A perspective with data from the United States", National Science Foundation Working Paper SRS 07-203, June.

OECD publications can be purchased from our online bookshop:

www.oecd.org/bookshop

OECD publications and statistical databases are also available via our online library:

www.SourceOECD.org

Where to contact us?

OECD HEADQUARTERS

2, rue André-Pascal
75775 PARIS Cedex 16
Tel.: (33) 01 45 24 81 67
Fax: (33) 01 45 24 19 50
E-mail: sales@oecd.org
Internet: www.oecd.org

GERMANY

OECD Berlin Centre
Schumannstrasse 10
D-10117 BERLIN
Tel.: (49-30) 288 8353
Fax: (49-30) 288 83545
E-mail:
berlin.centre@oecd.org
Internet:
www.oecd.org/berlin

JAPAN

OECD Tokyo Centre
Nippon Press Center Bldg
2-2-1 Uchisaiwaicho,
Chiyoda-ku
TOKYO 100-0011
Tel.: (81-3) 5532 0021
Fax: (81-3) 5532 0035
E-mail: center@oecdtokyo.org
Internet: www.oecdtokyo.org

MEXICO

OECD Mexico Centre
Av. Presidente Mazaryk 526
Colonia: Polanco
C.P. 11560 MEXICO, D.F.
Tel.: (00.52.55) 9138 6233
Fax: (00.52.55) 5280 0480
E-mail:
mexico.contact@oecd.org
Internet:
www.oecd.org/centrodemexico

UNITED STATES

OECD Washington Center
2001 L Street N.W., Suite 650
WASHINGTON DC. 20036-4922
Tel.: (1-202) 785 6323
Fax: (1-202) 785 0350
E-mail:
washington.contact@oecd.org
Internet: www.oecdwash.org
Toll free: (1-800) 456 6323

The OECD Policy Briefs are prepared by the Public Affairs Division, Public Affairs and Communications Directorate. They are published under the responsibility of the Secretary-General.