

Mutual learning exercise (MLE) on national practices in widening participation and strengthening synergies

Challenge Paper:
Attracting qualified R&D staff in the
public and private sectors
(Topic 1 Widening)



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MLE Widening participation and strengthening synergies: Challenge Paper: Attracting qualified R&D staff in the public and private sectors (Topic 1 Widening)

European Commission
Directorate-General for Research and Innovation

Directorate A Policy Development and Coordination
Unit A.4 – Analysis and monitoring of national research and innovation policies
Contact Marta Truco Calbet
E-mail marta.truco.calbet@ec.europa.eu

Directorate B Open Innovation and Open Science
Unit B.5 – Spreading Excellence and Widening Participatoin
Contact Dionysia Lagiou
E-mail dionysia.lagiou@ec.europa.eu

RTD-PUBLICATIONS@ec.europa.eu

European Commission
B-1049 Brussels

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Challenge Paper:

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Prepared by the independent expert: Claire Nauwelaers

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1 Introduction

Developing and implementing EU-wide partnerships and proposals to be funded by the Framework Programme (FP) are challenging tasks. One of the most frequent obstacles mentioned in particular by those countries with low R&D intensity, is the lack of human resources to participate in such very competitive partnerships. Attracting highly skilled staff from abroad is one avenue to reinforce national research and innovation systems in view of widening national participation to FP. Several arguments are deployed to justify governmental efforts to support the attraction of foreign talent: they bring new expertise and skills which are not present nationally; they help create and maintain research and business relationships with their home country; they overcome labour shortages and boost entrepreneurship in knowledge-based sectors in the host country. According to a recent study more than half (56%) of the researchers working in the HEI sector have been (or are currently) internationally mobile, while this is the case for 41% of industrial researchers. Both types of mobile researchers are important resources for national research and innovation systems.

Promoting international mobility of researchers is on the policy agenda both at EU and national levels. At EU level, one of the ERA pillars consists in the creation of an open labour market for researchers, a challenge that involves in particular the promotion of researchers' mobility across the EU. This is seen as the "fifth freedom" (free movement of knowledge) and EU incentives are provided notably under the famous Marie Skłodowska-Curie actions and Research Fellowship Programme. Promoting researcher mobility internationally is also on national agendas, within ERA Action Plans as well as in research internationalisation strategies within national programmes.

While the focus of many national initiatives is placed on *incoming* researcher mobility, it should be noted that, for national authorities, promoting mobility of researchers does not only involve attracting foreign talent to the home country. *Outgoing* mobility of national researchers is also a good way to stimulate the participation of national research performing actors in transnational research partnerships since mobile researchers are good vehicles to connect their original home institutions with foreign institutions. *Brain circulation*, which involves both incoming and outgoing mobility of researchers is arguably a most relevant target for policies aiming at reinforcing human resources in a national research system. And the scope covers mobility between Member States (MS), Associated countries (AC) and third countries.

The focus of this paper is on national initiatives aimed at fostering brain circulation, in particular by attracting foreign-based qualified R&D workforce in national public and private sectors.

The paper serves as a background document for the February 2018 workshop organised under the EU Policy Support Facility Mutual Learning Exercise (MLE) devoted to widening participation to FP and enhancing synergies between FP and ESIF. The present topic had been identified as a priority issue when the MLE was designed by the participating countries. During the workshop, representatives from Member States and Associated Countries will present and share their good practices aiming at attracting qualified R&D staff in the business public and private sectors.

The scope of the "Attracting qualified R&D staff in the public and private sectors" topic is detailed in section 2. An overview of the landscape of existing practices under the topic is presented in section 3. Lessons learned from evidence on existing practice are exposed in section 4. The final 5th section identifies main challenges that should be addressed in the MLE exercise and proposes issues to be debated at the workshop.

2 Scope

2.1 Definition of the topic

Many conditions are necessary for a country to become an attractive magnet for researchers: the presence of high level academic, public research institutions and innovative companies with excellent levels of research and a top-quality infrastructure; adequate and easily accessible funding for public and private research activities; attractive salary levels, working conditions and career paths for researchers; good interconnections between research carried out in the public and private sectors; suitable support to entrepreneurship; adequate IPR regimes; an attractive living environment; a welcoming culture for foreigners; an immigration policy that is adequate for highly qualified researchers¹; and the efficient external promotion of national assets in public and private research. A recent study² confirms that those countries with stronger research systems are also, generally, those that experience the highest (inward and outward) mobility levels.

The above are all important conditions concerning not only the *attraction* but also the *retention* of (national and foreign) researchers. The MLE does not cover all the above issues (some of them are located under policy domains other than R&D, such as immigration policy, and are not specific to researchers) but rather focuses on specific types of national public actions within the R&D policy sphere that aim directly and explicitly at increasing the international mobility of researchers.

It should be pointed out that the strategies of individual public research organisations can act as important facilitators or barriers for this international mobility (e.g. bilateral agreements between large research institutions in different countries, involving the exchange of scientists). Universities and PROs have developed their own mobility schemes (often oriented towards student mobility). Internal strategies within multinational companies are obviously key determinants of researcher mobility within the private sector. Despite the relevance of the latter, the focus here is on actions and initiatives that involve governmental action.

While the Member States and Associated Countries of the European Union are the natural focus of this MLE exercise, the exchange of experiences covers both intra-EU and extra-EU mobility, since both are important potential contributors to national research and innovation systems (and it is in practice quite common to find schemes and incentives that are open to all nationalities, EU and non-EU).

To sum up, the topic focuses on **national-level strategies, initiatives, programmes and schemes aimed at attracting qualified R&D staff working abroad (within or outside the EU) to work in national research performing organisations from the public and private research sectors, namely PROs/HEIs and R&D-active companies. The topic also includes coverage of outgoing mobility schemes for national researchers.**

¹ This is notably one of the main barriers cited by non-EU nationals in the enquiry carried out in the study: IDEA CONSULT (2008), *Evidence on the main factors inhibiting mobility and career development of researchers*, report for DG Research.

² Fernandez-Zubieta, A. and K. Guy (2010), *Developing the ERA: improving knowledge flows via researcher mobility*, *JRC scientific and technical reports*.

<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC58917/Ifna24511enn.pdf>

This report also presents country-specific data on researcher mobility, showing the wide imbalances between EU countries, some and in particular the UK being net beneficiaries of researcher inflows, and others such as most of the EU-13 Member States being characterised by net outflows of researchers. The IDEA CONSULT (2008) study depicts a huge concentration of mobile researchers within the 'EU5' (UK, FR, DE, IT, ES).

The topic does *not* cover the following initiatives:

- International mobility schemes targeting *students*³⁴ or focusing on joint educational initiatives (joint courses and degrees, etc.). It focuses on R&D workers and highly-skilled talent.
- *General R&D funding programmes*, which have a wider focus but include aspects linked to international mobility as incidental or implicit features. Typically, this covers: 1) university or PROs funding schemes, which may support international mobility of public researchers within their broader goals of promoting research excellence and impact; and 2) general schemes to support the hiring of R&D or innovation staff in companies⁵. These types of schemes are considered under the present topic only if they include a specific focus or strand targeting the attraction of foreign researchers or the outgoing mobility of national researchers.
- *EU initiatives* such as the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers; the scientific visa directive; the directive on conditions of entry and residence of third-country nationals for the purposes of research, studies, and training; the Marie Skłodowska-Curie actions under H2020, the ERA-Chairs programme under H2020, or the EURAXESS Service Centres (including the Science4Refugees action) which provide free and personalised assistance on challenges that are faced by researchers and their families when relocating. The present topic focuses on national initiatives (but their articulation with EU level initiatives is an important point of attention).

In the scoping and kick-off workshops, participants to this MLE mentioned issues that they want to consider under this topic. As a result, the topic is defined along two strands, each including different types of schemes and initiatives.

1) International mobility schemes for researchers in the public sector

Three types of **dedicated mobility schemes** can be distinguished (programmes can include all or some of these types). Such programmes are either designed for *longer term* mobility (one year or more) or for *short-term* mobility, with the latter sometimes referred to as 'visiting fellowship' schemes:

1. Incoming attraction schemes: incentives for attracting foreign researchers to national PROs/HEIs;
2. Outgoing schemes: incentives for nationals to work in foreign PROs/HEIs;
3. Return schemes: incentives for attracting national researchers working abroad back to national PROs/HEIs (bringing back the 'scientific diaspora').

In addition, measures to ensure **portability of research grants** ('Money follows research' schemes) facilitate researcher mobility since they make it possible to continue research projects in institutions in countries other than the country in which the research grant was initially allocated: this involves the possibility of transferring the grant from one institution to another foreign institution. The aim is to avoid project disruption due to cross-border researcher mobility.

³ Doctorate students have a status assimilated to that of researchers in some countries and of students in other. Hence they can be targeted together with researchers in some incentive programmes, in which cases they are included under this topic.

⁴ It is interesting to note, though, that student mobility increases the subsequent probability of researchers becoming mobile later in their careers, as found by IDEA (2010), op. cit.

⁵ Examples are: the Danish Innovation Assistant Programme (VP Programme).

Finally, schemes supporting more **flexible concepts of mobility** complement the above traditional schemes aiming at fostering physical mobility. Some schemes promote virtual mobility through enhancing the connection with national researchers abroad (connecting the 'scientific diaspora'). Other schemes promote part-time 'shuttle' or 'circular mobility'⁶: instead of staying abroad during a single period researchers could have a number of micro-stays combined with intense on-line interactions.

2) International mobility schemes for researchers in the private sector

This includes national strategies and schemes for attracting highly-skilled workers from abroad to work in the private sector in the host country.

Dedicated company-oriented schemes for hiring foreign researchers in national firms constitute one type of initiative covered under the present topic.

Migration policies targeting skilled migrants have been adopted in many countries, including the EU:

"Recognizing the importance of skilled migration for the economy, OECD countries have adopted a wide range of measures to attract skilled migrants, including scholarships and financial support, simplification of visa procedures, legislation regarding recognition of foreign professional qualifications, and acquisition of social welfare entitlements by foreign researchers" (OECD, 2012)⁷.

2.2 Complementarity with other topics covered by this MLE

The challenge of enhancing participation to FP will not be met solely by the provision of solutions to support 'brain circulation'. Other significant routes will be addressed in some of the other 'widening' topics covered in this MLE, specifically:

- **Topic 2: improving science – industry relationships and cooperation:** this includes, notably, the issue of inter-sectoral mobility of researchers, which is complementary to the present topic of international and cross-border mobility.
- **Topic 3: improving networking at EU level:** participation in European-wide projects and partnerships is a good way for researchers to get acquainted with other research actors in other countries, and this can act as a stepping stone for physical mobility decisions.

Discussions relevant to the theme of synergies between the use of European Structural and Investment Funds (ESIF) and FP funds (Topics 5, 6 and 7 of this MLE), at both strategic and operational levels, are also complementary to the present topic. Promoting researcher mobility is a suitable objective for ESIF strategies aimed at reinforcing national research and innovation systems, and the role played by the European Social Fund (ESF) is also relevant.

⁶ The ERA expert group report on "*Realising a single labour market for researchers*" (2008) promoted the concept of 'shuttle stays' as a relevant solution for resource weak countries or those with family commitments.

⁷ OECD (2012), *International Migration Outlook 2012*, OECD Publishing, Paris.

3 Landscape

3.1 International mobility schemes for researchers in the public sector

Both increasing the attractiveness of national research systems to foreign highly qualified researchers and raising the international profile of national researchers are objectives that feature prominently in the national research strategies of EU Member States. As a consequence, most countries have established incentives to attract researchers to their PROs/HEIs, frequently in the form of schemes supporting **incoming and/or outgoing and/or returnee researchers for a long-term period**. These schemes differ according to: target groups (from young early career researchers to well-established professionals); cost coverage (from salary costs and travel costs only to wider coverage that can include project funding, infrastructure, equipment or even full research teams); and type of funding (subsidy or tax incentives). According to Fernandez-Zubieta and Van Bavel (2011)⁸, countries with less-developed research systems tend to concentrate more on incoming schemes – due to a fear that brain drain problems would be worsened by outgoing schemes – and on return schemes, since the weak attractiveness of their national system is seen as a factor preventing incoming schemes targeting foreigners from being successful⁹.

Some examples illustrating the diversity of this landscape of mobility schemes targeting public sector researchers are listed below.

Programmes encompassing all three types of schemes:

- In **Croatia**, the International Fellowship Mobility Programme for Experienced Researchers (NEWFELPRO – [full description of the scheme in annex](#))¹⁰ 2013-2017, is a programme of the Government of the Republic of Croatia and the Ministry of Science, Education and Sports (MSES). Its total budget is €7 million, out of which 60% is financed from national sources. It offers three types of schemes: incoming attraction schemes for foreigners; outgoing schemes for Croatian researchers (including a return phase) and return schemes for Croatian researchers working abroad.

Programmes focusing on some of the three types:

- The **Austrian** Science Fund (FWF) manages two mobility schemes: the outgoing Erwin Schrödinger Programme¹¹, which provides grants for research stays in excellent research institutions abroad (with an optional return phase) and the incoming Lise-Meitner-Programme¹², financing long-term stays of foreign (or returning Austrian) researchers at an Austrian research organisation.
- In **Hungary**, the Momentum programme managed by the Hungarian Academy of Sciences is a return programme for outstanding Hungarian researchers working abroad. It provides personal allowances of two to three years for projects carried out in Hungary in the field of their specialty. The programme invites researchers to take part in scientific/development programmes in Hungary.
- In **Poland**, 're-integration grants', managed by the Foundation for Polish Science, aim to attract Polish researchers working abroad to return to the country's HEIs.

⁸ Fernandez-Zubieta, A. and R. Van Bavel (2011), Making Research Careers More Attractive and Promoting Mobility, JRC scientific and technical reports. Luxembourg: Publications Office of the European Union.

⁹ This difference was already highlighted in CREST (2007), Internationalisation of R&D – Facing the Challenge of Globalisation: Approaches to a Proactive International Policy in S&T: Policy Approaches towards S&T Cooperation with Third Countries, CREST report.

¹⁰ www.newfelpro.hr

¹¹ <https://www.fwf.ac.at/en/research-funding/fwf-programmes/schroedinger-programme/>

¹² <https://www.fwf.ac.at/en/research-funding/fwf-programmes/meitner-programme/>

- In the **Netherlands**, Rubicon – an outgoing scheme managed by the national funding agency NWO – supports young doctorate holders from a Dutch university or PRO to acquire research experience abroad for a period of 1 to 2 years. Tax rebates are provided for a period of 10 years for qualified foreign (EU and non-EU) researchers coming to work in Dutch HEIs, subject to the condition that no equivalent profiles are available domestically.
- In **France**, the international postdoctoral fellowship programmes AgreenSkills and Agreenskills+¹³ offer fellowships of two types (incoming and outgoing) to young and senior researchers. The duration is 1 year up to 3 years for incoming fellowships and 6 months to 24 months for outgoing fellowships.

Programmes that try to attract foreign-based 'star' scientists in order to create strong research teams around them are quite popular. Frequently they provide long-term funding extending beyond the salary of the mobile researcher:

- The **German** Alexander von Humboldt Foundation¹⁴ promotes academic cooperation between excellent scientists and scholars from abroad and from Germany. It offers both incoming and outgoing research fellowships and research awards. The Alexander von Humboldt Professorship International Award for Research aims to recruit foreign excellent researchers who will remain in Germany on a long-term basis, reinforcing the country as a research location and helping universities and research institutions to define or refine their strategic development as well as strengthening the connections between researchers in Germany and the international research landscape. The fellowship includes an allowance for research costs that can cover financing equipment, research assistance and administrative costs. The sums involved can amount to €5 million for academics in experimental disciplines and €3.5 million for researchers in theoretical disciplines, and fellowships are granted for a period of five years. Additional benefits are available for an incoming researcher's family ([see description in annex](#)). The Heisenberg programme (developed by the Deutsche Forschungsgemeinschaft (DFG)) targets early career researchers.
- In the **Czech Republic**, the J. E. Purkyně Fellowship¹⁵ is a return scheme for young outstanding Czech scientists working abroad for a long-time period and an incoming scheme for top foreign scientists coming to work at the Czech Academy of Sciences. Applications for the J. E. Purkyně Fellowship are submitted by the directors of the Institutes of the CAS. The funding is awarded for 5 years.
- In **Flanders**, the Odysseus programme¹⁶ is a brain gain initiative which provides funds for outstanding researchers working abroad to come to Flanders to establish a research group at a university. These can either be foreign researchers or Belgian researchers who have worked abroad for the last couple of years. The engagement is double: on the one hand the university ensures a fixed appointment with a competitive salary, while the Funding Agency FWO on the other hand provides the researcher with substantial start-up funding (up to €150,000 per year for senior researchers and up to €200,000 per year for high potentials). The funding lasts for 5 years.
- The Foundation for **Polish** Science has established the International Research Agendas Programme (IRAP)¹⁷, co-funded by ESIF. The programme is based on the Teaming for Excellence programme, which is part of Horizon 2020. It gives top scientists, irrespective of their nationality, the opportunity to create a research

¹³ <https://www.agreenskills.eu/>

¹⁴ <https://www.humboldt-foundation.de>

¹⁵ <http://www.avcr.cz/en/academic-public/support-of-research/the-j.-e.-purkyne-fellowship/>

¹⁶ <http://www.fwo.be/nl/mandaten-financiering/onderzoeksprojecten/odysseusprogramma/>

¹⁷ <https://www.fnp.org.pl/en/oferta/irap/>

unit (innovative centre of excellence) in Poland that would conduct world-class R&D activities focused on a specific and timely scientific challenge. Researchers must cooperate with a renowned research centre based in another country. Thanks to its (non-exclusive) focus on foreign researchers, it is (partly) an incoming mobility scheme.

- The **Turkish** Academy of Sciences (TÜBA) manages the TÜBA Academy Prizes ([see description in annex](#)) since 2015, which are dedicated to young researchers with original, leading and path-breaking works in their fields, and encourage international mobility. As part of the existing "Outstanding Young Scientist Award Program" (GEBIP), the use of the award during the research visit abroad has been facilitated. The objective of TÜBA-GEBIP is to foster young, outstanding scientists who are at the stage of establishing their own research programmes in Turkey after finishing their post-doctoral research activities. TÜBA supports these scientists for a period of three years and helps them set up their own research groups.
- In **Sweden**, the Individual Grants for Future Research Leaders¹⁸ bestowed by the Swedish Foundation for Strategic Research (SSF) aim to support and promote young scientists of the highest standing, from Sweden as well as from other countries, who have the potential to become future leaders of academic and/or industrial research in Sweden. Each grant amounts to SEK 12 million (incl. overheads) and covers a period of five years. Up to 20% of the grant can be used to cover the recipient's own salary, with the remainder used to build a research group.
- The PEARL programme¹⁹ in **Luxembourg** supports the recruitment of foreign outstanding scientists in strategically important areas to work in research institutions in Luxembourg. The financial contribution can be used flexibly to implement the research programme at the host institution. PEARL projects have a lifespan of five years with a financial contribution of between 3-4 MEUR by the national research funding agency, FNR. The FNR's ATTRACT²⁰ programme is a similar programme targeting junior researchers.
- The **Finnish** Distinguished Professor (FiDiPro)²¹ funding programme, run by the Academy of Finland and Tekes, supports universities and research institutes in hiring foreign professor-level researchers or Finnish professor-level researchers who have long worked abroad to conduct research in Finland for a fixed period. They will primarily be based in scientifically significant and strategically key fields defined by universities and research institutes and are expected to strengthen internationally competitive research and innovation in Finland.
- In **Spain**, the Plan I3 – Plan for Promoting the Incorporation and Intensification of Research Activity – under INGENIO 2010 encourages the recruitment of highly-reputed Spanish or overseas research professors into the Spanish National Science and Technology System under stable employment conditions.

Short-term mobility schemes, which are often limited to the funding of mobility costs (while salaries are still borne by the home institutions), are found in many countries. These include:

- The **UK** (incoming) Visiting Fellowships scheme offers awards of up to £33,000 to support: subsistence and accommodation costs; research expenses; travel expenses; and a contribution of 50% of the total award to enable the UK

¹⁸ <https://strategiska.se/en/call-for-proposals/>

¹⁹ <https://www.fnr.lu/funding-instruments/pearl/>

²⁰ <https://www.fnr.lu/funding-instruments/attract/>

²¹ <http://www.aka.fi/en/about-us/scientists-behind-the-research/fidipro/>

institution to host the Visiting Fellow. Bilateral programmes in the UK do also support short-term mobility (both ways) with specific regions of the world, for example: (i) the ICSSR (Indian Council for Social Science Research)-ESRC India-UK Scholar Exchange Scheme; (ii) the ESRC-SSRC (Social Science Research Council) Collaborative Fellowship Scheme for the Americas; and (iii) the BA (British Academy)-AHRC (Arts and Humanities Research Council)-ESRC Visiting Fellowships for South Asia and the Middle East.

- Tübitak in **Turkey** manages various incoming and outgoing scholarship programmes for both native or international PhD students in order to trigger the effective participation of young people in higher education and to have them involved more in research activities (see full list in annex).
- The National Scholarship Programme of the **Slovak Republic**²² supports mobility of PhD students, university teachers, researchers of any nationality except Slovak (EU and non-EU) for stays of 1-10 months in a Slovak HEI (incoming grant) and well as outgoing mobility. It supports living expenses and travel costs.
- The **Hungarian** Academy of Sciences²³ awards subsidies to distinguished scientists to come to Hungary for the purpose of research work at the Hungarian Academy of Sciences or with HAS research groups at Hungarian universities, for periods of 3-12 months. The subsidies cover living expenses.
- The Kristjan Jaak and Dora Plus Scholarships (the latter co-funded by ESIF) **Estonian** are governmental programmes aimed at internationalising Estonia's science and research. They provide incoming and outgoing grants to early career researchers for short study visits up to 30 calendar days.
- The Fulbright programme, co-funded by the American and national governments, is run in many EU countries. In **Sweden**²⁴ for example, it offers a variety of grants, notably for Swedish Visiting Lecturer/Research Scholars willing to stay in the US to conduct advanced research and/or lecture for a period of 3 to 12 months, or – vice-versa, for US scholars to make short-term visits to Sweden or stay for periods from 6 to 12 months.
- The **German** DADD programme²⁵ provides a return scheme for German nationals that have worked abroad for at least 1 year. It offers travel grants for job interviews and scientific presentations in Germany that might enable their possible return. It also offers monthly scholarships to conduct research in Germany with the goal of reintegrating into the German scientific community. A dual career service²⁶ in Germany offers family-friendly assistance, especially in the fields of education or research. The employer supports the (highly) qualified partners of new employees in finding a job and provides practical help with settling into new surroundings.

Concerning the **portability of grants**, a recent survey²⁷ states that this is possible for only a small minority of funding agencies in the EU (24% for single investigator grants

²² <https://www.scholarships.sk/en/main/o-programe>

²³ http://mta.hu/data/dokumentumok/palyazatok/MTA_vendegkutatoi_palyazati_felhivas_EN_2016.pdf

²⁴ http://www.fulbright.se/About_Us/index.html

²⁵ <https://www.daad.org/en/>

²⁶ <http://www.research-in-germany.org/en/jobs-and-careers/info-for-senior-researchers/dual-career-programmes.html>

²⁷ Final report of the ERA-SGHRM Working Group on access to and portability of grants (2012). https://cdn1.euraxess.org/sites/default/files/policy_library/access_to_and_portability_of_grants_may_2012.pdf

and 12% for multiple investigator grants)²⁸. Overheads and equipment are the least portable components of research grants. The most frequent conditions for portability set by funders include a commitment to continue to report the results of the project (including mentoring and monitoring) and an agreement by the host institution to provide the working environment in which the research will take place. Examples of programmes managed by funding agencies that allow the portability of grants are:

- The D-A-CH programme, which is a joint research funding programme from **Germany, Austria and Switzerland**, includes a provision that allows the principal investigator of a funded project to move to another country partner of the programme during the implementation of the research; the grant is transferred from the original research institutions to the new institution.
- The **Dutch** public research funding agency NWO²⁹ has established the 'Money follows the researcher' scheme: if conditions likely to ensure the success of a research project are present, NWO agrees to allow research grants awarded under its 'Veni-Vidi-Vici' scheme to accompany principal investigators moving to another EU country.

The **virtual mobility** of researchers is promoted through two types of structural initiatives: the creation of networks connecting home-based and foreign-based national researchers (the first two examples below); and the establishment of international cooperation networks (see the last two examples):

- The Wild Geese Network of Irish Scientists (WGNIS)³⁰ is an all-**Ireland** professional network enabling connection, communication and collaboration between the Irish scientific, technological and engineering diaspora. The Network provides a forum for discussion, advancement of ideas, consultancy, publicity and engagement of Irish scientists in policy, and aims to facilitate the engagement of Irish scientists abroad or their institutions in knowledge-based development of the Irish economy, thereby maintaining the connectivity of scientists both within Ireland and abroad.
- The OST Scientist Network (OSTINA)³¹ is an interdisciplinary network of over 2,000 **Austrian** scientists and scholars based in the United States and Canada with the aim of building bridges of knowledge and expertise between these and scientists at home. OSTINA provides a forum for understanding the needs of Austrian scientists and scholars in North America, offering support on issues such as dual citizenship and double taxation and providing networking opportunities and information on job openings and research collaboration opportunities in Austria.
- The **Sino-German** Center for Research Promotion (SGC) Cooperation Groups³², jointly established by the Deutsche Forschungsgemeinschaft (DFG) and the National Natural Science Foundation of China (NSFC), offers support to German and Chinese researchers to establish cooperation groups in order to engage in intensive exchanges on specific scientific topics, possibly leading to a comprehensive joint research project and preparing the establishment of this project. The funding extends for 3 years and covers the costs of meetings and travel.

²⁸ This is confirmed in Fernandez-Zubieta, A. and R. Van Bavel (2011), op. cit. According to their enquiry to all EU MS, only the Netherlands reportedly allows researchers to move their publicly funded grant to another ERA country 'to a large extent'. Seven countries reportedly allow it at 'to a moderate extent' and five countries 'to a small extent'.

²⁹ <https://www.nwo.nl/en/research-and-results/programmes/Money+follows+researcher>

³⁰ <http://wildgeesenetwork.org>.

³¹ <http://www.ostina.org>.

³² http://www.sinogermanscience.org.cn/de/forderung/forderprogramme/koo/201503/t20150316_9414.html

- The **Polish-Norwegian** Research Programme³³ pursues the aim of reducing economic and social differences and promoting bilateral cooperation through popularisation and support of scientific research. Mechanisms implemented to intensify this cooperation include a mobility component, allowing the Polish and Norwegian R&D project partners to take advantage of each other's research expertise.

3.2 International mobility schemes for researchers in the private sector

Given the dominance of company-level decisions in the matter of researcher mobility in the private sector, governmental schemes promoting that type of mobility are much more seldom than those targeting researchers from the public sector. Many countries have programmes that support the placement of highly qualified people (PhDs, masters) for research positions in companies, which are in principle open to foreigners. However, their effectiveness in attracting foreign researchers is generally not known as this is not a primary goal of such programmes.

There are examples of **mobility schemes that are open to companies** as host organisations for mobile researchers or highly skilled people:

- In **Catalonia**, TECNIOspring PLUS³⁴ is an incoming/outgoing/return mobility programme that aims at fostering the mobility of experienced researchers. The programme is managed by ACCIÓ, the executive public Agency for competitiveness of Catalan companies. Fellows may join a company, research or technology centre in Catalonia and/or anywhere in the world. Fellows hosted by a research organisation may be seconded to a company (cross-sectoral secondments) or spend some time there (short visits). The programme offers two types of fellowships: 1) Incoming: a 2-year contract in a Catalan company or a TECNIO entity; 2) Outgoing + return: a 1-year contract in a research/technology centre or R&D department of a company located outside Spain, and a 1-year contract in Catalonia or a TECNIO entity afterwards. The programme funds salary, research and travel costs.
- In **Wallonia**, the BEWARE fellowships³⁵, funded by the regional government and the COFUND EU programme, provides two-year fellowships to researchers of any nationality, established abroad, with 4 to 10 years research experience. Incoming researchers can be hosted in public research centres as well as in research intensive SMEs. They have to work in one of the priority research areas as defined by the regional government.
- In **Ireland** the Back for Business initiative³⁶ launched in 2017 aims to foster entrepreneurial activity among returning Irish emigrants. This innovative initiative is funded through the Emigrant Support Programme by the Department of Foreign Affairs and Trade. Rather than being a funding scheme, Back for Business is based on a model of peer support, entrepreneurs supporting entrepreneurs meeting in round table sessions, focused on goals and milestones and facilitated by volunteer Lead Entrepreneurs.

Other types of policies targeting the attraction of foreign workers to companies consist in **tax reliefs for incoming talent**:

³³ <http://www.ncbr.gov.pl/en/norwaygrants/>

³⁴ <http://catalonia.com/en/innovate-in-catalonia/tecniospringplus/index.jsp>

³⁵ <http://recherche-technologie.wallonie.be/fr/menu/acteurs-institutionnels/service-public-de-wallonie-services-en-charge-de-la-recherche-et-des-technologies/departement-des-programmes-de-recherche/direction-des-programmes-federaux-et-internationaux/cofund-beware-fellowship/cofund-beware-fellowships.html>.

³⁶ Contributions on Ireland from Helena Acheson are gratefully acknowledged. <https://www.backforbusiness.com/>

- In **Ireland**³⁷ the Special Assignee Relief Programme (SARP)³⁸ seeks to encourage the relocation of key talent to Ireland and is an income tax concession. The main target group are higher paid key executives of multi-national companies being assigned to work in Ireland. Following a (positive) Review in 2014, the programme was renewed in subsequent Finance Acts and runs until 2020.
- **Italy** has established a fiscal incentive for researchers which are EU citizens, working abroad and coming to work as researchers in Italy, the 'Rientro dei cervelli' (Re-entry of brains) incentive³⁹ (which foresees tax breaks in the form of reduced income taxability – only 70% of revenues are taxed). The regime has a duration of 5 years.

Migration policies in many countries aim at providing good conditions to attract highly qualified migrants, in order to address skills shortages in the national economy and reinforce the human resources side of the national research and innovation system. Three types of approaches are found across the EU⁴⁰: 1) criteria-based points accumulating systems⁴¹, which are based on the matching of supply and demand approaches: immigrants are given points according to those specific characteristics and skills that are seen as potentially beneficial for the host country's economy; 2) employer-led systems, which are present in almost all countries, where the decision to accept the skilled migrant is left to employers; and 3) hybrid systems⁴². It should be noted that these systems are developed within the realm of migration policies without explicit links to research or innovation policies.

Examples illustrate how changes in migration policies can support inward mobility for non-EU nationals:

- In **Germany**⁴³, the action programme 'Labour Migration helping to ensure there is an adequate supply of skilled workers in Germany' (Beitrag der Arbeitsmigration zur Sicherung der Fachkräftebasis in Deutschland) of 16 July 2008 is removing barriers to the immigration of highly-qualified and highly-skilled people to Germany to meet the demands of the labour market. For academics from the new EU Member States it is completely open. For academics from outside the EU, the labour market is open subject to a priority check (Vorrangprüfung) that ensures that no German researcher is suited for the post (BMI, 2008). Since 2008, the Vorrangprüfung is no longer required for any foreign employee that has graduated in Germany.
- Following **Ireland's**⁴⁴ implementation of the Third Country Directive in 2007, there is now an administratively light procedure for accredited research organisations to recruit researchers from outside Europe for specific research contracts. Additionally, the implementation of the Directive facilitates researchers to bring their spouses and children to Ireland for the duration of the research contract. Regarding dual career opportunities (i.e. positions offered to couples in same institution), these may be offered at the discretion of the higher education institution concerned.

³⁷ Id.

³⁸ <https://www.revenue.ie/en/personal-tax-credits-reliefs-and-exemptions/income-and-employment/special-assignee-relief-programme/index.aspx>

³⁹ <http://www.dottorinalavoro.it/notizie-c/pubblicato-il-decreto-sul-rientro-dei-cervelli>

⁴⁰ Jones, B. (2012), *Innovation and Human Resources: Migration policies and employment protection policies: Compendium of Evidence on the Effectiveness of Innovation Policy Intervention*, Manchester Institute of Innovation Research. <http://www.innovation-policy.org.uk>.

⁴¹ Jones, B. (2012) cites the UK, Denmark and the Czech Republic in the EU, as countries applying a point-based system.

⁴² Jones, B. (2012) cites Sweden, UK and Denmark as EU countries adopted the hybrid approach.

⁴³ Example extracted from Fernandez-Zubieta, A. and R. Van Bavel (2011), op. cit.

⁴⁴ Idem.

4 Lessons

4.1 Lessons related to international mobility schemes for researchers in the public sector

4.1.1 Lessons concerning barriers faced by mobile researchers

As a starting point, it should be remembered that the overall attractiveness of a national public research system is crucially determined by the level of excellence and quality of research activities, infrastructure and working conditions for researchers (including career paths, degree of research freedom, access to funding, social security provisions, pension rights, etc.). Mobility schemes are intended in the long-run to enhance this overall attractiveness, but their chances of success are greatly dependent on existing levels of attractiveness. Thus, the primary goal for governments willing to raise the level of researcher mobility is to act upon the system as a whole to reinforce its effectiveness and attractiveness⁴⁵. As an illustration, in its 2017 advice the **Flemish** Advisory Council for Innovation and Enterprise highlighted⁴⁶ (see full description in annex) the importance of “putting top international talent at the centre” as a strategic objective for the region. Moreover, it considers that four broad factors are key to this aim: “(1) attractive careers and work; (2) attractive knowledge and innovation infrastructure; (3) attractive living environment; (4) smooth immigration policy.” **Turkey** has adopted its Tenth Development Plan 2014-2018 ‘Attracting Qualified Human Resources Programme’: creating a suitable environment and conditions, and improving cooperation among universities, industry, public sector and research centres, are seen as key conditions for improving the country’s attractiveness to foreign talent (see full description of Turkish strategies in annex). That programme includes a range of performance indicators to assess its success.

Salary levels have an important influence on the transnational mobility of researchers. Low levels on offer constitute an effective deterrent: high levels are a magnet. In most cases, however, it is not possible to escape from national rules and norms that bar the payment of higher salaries to incoming foreign researchers from countries with higher salary scales.

There are nevertheless other determinants of mobility that are more amenable to direct and focused governmental responses.

- One barrier impeding outgoing mobility is the failure in some countries to valorise foreign experiences in the career progression of researchers⁴⁷. Mobility is hampered by rules that do not consider stays abroad as positive elements in the career paths of researchers, favouring instead those who stay in domestic institution for most of their careers. This is one issue that can be dealt with by Ministries in charge of HEIs and universities.
- Other barriers include lack of information on the availability of research positions in other countries; on their conditions (contracts, pay differentials etc.); and on potential funding and support programmes⁴⁸. Conversely, the multiplicity of programmes and initiatives supporting all types of mobility is also experienced as a problem, since it can make it more difficult to make appropriate choices. Euraxess and national portals are of help in this respect.

⁴⁵ A discussion of routes of action to be taken by governments to make researchers’ careers more attractive can be found in Fernandez-Zubieta, A. and R. Van Bavel (2011), op. cit.

⁴⁶ Flemish Advisory Council for Innovation and Enterprise (VARIO) (2017), *VARIO advise n°1: international toptalent aantrekken en verankeren*, Vario, www.vario.be.

⁴⁷ This is one clear finding from IDEA CONSULT (2008), op. cit.

⁴⁸ Idem.

- The difficulty faced by mobile researchers when trying to overcome language and culture barriers⁴⁹ is one area where governments can offer programmes or schemes, possibly within the larger frame of immigration policies. Overcoming language barriers faced by incoming researchers can also be addressed by developing English as a working language, an issue that might be difficult to implement due to regulatory barriers, e.g. in **Flanders** the law imposes Flemish as the official language at HEI both for education and management.
- Lack of transparency in researcher recruitment procedures is another hurdle that can be addressed by national authorities, along with lack of equal opportunities due to a bias against foreign applicants.
- A lack of efficient accreditation procedures⁵⁰ to establish the equivalence of foreign degrees or other academic qualifications is another problem that can be addressed to lift a mobility barrier.

As mentioned above, the situation differs between countries with stronger or weaker research systems, the former being characterised by higher rates of researcher mobility than the latter. The fear of brain-drain is logically more present in the latter countries and hence it has been found that these countries tend to resist policies targeting 'brain circulation' and focus on 'brain attraction' only. Nevertheless, it can be argued⁵¹ that countries with weaker research systems would also benefit from brain circulation and that this could be fostered by incentives targeting returnees and young researchers at home.

4.1.2 Lessons from mobility support initiatives

Lessons can be learned from existing experiences with national efforts to promote the mobility of public sector researchers. A few evaluations of mobility schemes (in countries with well-performing research systems) deliver a number of messages:

- Two evaluations of the **Austrian** Erwin Schrödinger scheme^{52,53} are available. Both are very positive about the effectiveness of the programme. Warta (2006) found that the programme very effectively fulfilled the expectations of outgoing researchers in terms of gaining experience abroad, but expressed a concern about the low rate of outgoing fellows returning back to Austria⁵⁴. She also concluded that the length of the outgoing scheme (2 years) was too short, especially in some disciplines. Finally, former grant-holders reported a lack of support after the grant and a desire for more networking activities for alumni. The more recent evaluation of the scheme by Meyer and Bühner (2014) confirmed the additionality of the scheme and found that higher research output of the incoming Schrödinger fellows and the good reputation they enjoyed within the Austrian science system explained their impressive career advancement. The programme works well in terms of improving the position of Austria in international research networks. They found that poor research conditions and unattractive career prospects within the Austrian science system explained the relatively low rate of return of outgoing Schrödinger fellows, especially women. However, they also highlighted the fact

⁴⁹ Fernandez-Zubieta and Guy (2010), op. cit.

⁵⁰ See Fernandez-Zubieta, A. and R. Van Bavel (2011), op. cit.

⁵¹ Fernandez-Zubieta and Guy (2010), op. cit.

⁵² Warta, K. (2006), *Evaluation of the FWF mobility programs Erwin Schrödinger and Lise Meitner*, Technopolis, Vienna.

https://www.fwf.ac.at/fileadmin/files/Dokumente/Ueber_den_FWF/Publikationen/FWF-relevante_Publikationen/fraunhofer-isi_schroedinger-impact-evaluation.pdf

⁵³ Meyer, N. and S. Bühner (2014), *Impact Evaluation of the Erwin Schrödinger Fellowships with Return Phase*, Final Report for the Austrian Science Fund (FWF), Institute for Systems and Innovation Research ISI.

⁵⁴ "Very often, the qualification resulting from the Schrödinger grant allows them to apply for a higher position that is not vacant in their former institute, but which is elsewhere, maybe abroad." (Warta, K. 2006).

that these outgoing Schrödinger fellows assumed the role of 'bridge heads' that improve the integration of Austrian researchers in international networks. The evaluation concluded as follows: *"To increase the positive impacts of the Schrödinger Program, it seems warranted to focus on an improvement of the research conditions and career prospects within the Austrian science system."*

- The lessons from an evaluation⁵⁵ of another **Austrian** mobility scheme, the Lise Meitner incoming programme, point towards the benefits gained over time when the programme has been modified on three fronts: an increase in funding allocated to beneficiaries, an extension of the duration of the grants and a shift from scholarship to employment in the host institution. All those features are relevant to the goal of attracting high calibre researchers.
- The Vienna Science and Technology Fund (Wiener Wissenschafts-, Forschungs- und Technologiefonds – WWTF) in **Austria** was evaluated in 2013⁵⁶. Although this is not a mobility scheme per se, the good conditions of the WWTF grants (which offer fixed-term professorships, tenure-track positions and, in some cases, fixed-term positions) have been found to play a positive role in initiating international mobility and attracting star scientists from abroad who are then in a position to attract ERC grants. The main limitation of the funding scheme is its fixed term nature.
- In **Germany** a recent evaluation⁵⁷ of the Alexander von Humboldt Professorship awards, which aims to attract 'star' researchers from abroad (half of those awarded professorships are German), found that *"these awards promote and strengthen internationality and top-level research at research institutions in Germany thanks to the flexibility it allows in the use of funds, its clear focus, efficient processing, and well-proportioned budget and duration. The Humboldt Professors often become central actors in building structures (centres) which cross-cut the universities' traditional organisation into faculties"*. It also found that *"the majority of Humboldt Professors embark on new collaborations with partners abroad after they have taken up their professorships"*. An important finding is that all the awarded professors remained in Germany after the subsidy period. Since the nominee's qualifications and the universities' commitment are equal criteria in the selection process, the result is that the awarded professors become key players in the development of their host institution. The report also noted that the support for dual careers provided by the Foundation is a positive aspect of the scheme (see description in annex).

Apart from the above in-depth evaluations, evidence on impacts of mobility schemes is very scarce. It is even more difficult to trace effectiveness of support for mobility when this is embedded in larger research funding programmes, within which the promotion of mobility is only an incidental feature.

Other lessons can be learned from a study of the state-of-play of ERA initiatives⁵⁸, which includes a chapter on researcher mobility:

- There is a growing interest in initiatives aimed at providing tailored information to mobile researchers, as well as services like the provision of housing facilities.

⁵⁵ Warta, K. (2006), op. cit.

⁵⁶ Laudel, G. (2013), *An In-depth Case Study of Selected WWTF Impacts*, WWTF evaluations 2013/14. https://www.wwtf.at/upload/WWTF_impacteval2013_CasestudyLaudel.pdf

⁵⁷ Warta, K. A. Geyer and J. Gorraiz (2017), *Evaluation of the Alexander von Humboldt Professorship – International Award for Research in Germany*, Technopolis. <https://www.humboldt-foundation.de/web/evaluation-alexander-von-humboldt-professorship.html>

⁵⁸ Nauwelaers, C. and R. Wintjes (2009), *Monitoring progress towards the ERA*, ERAWATCH report. <https://rio.jrc.ec.europa.eu/en/file/8897/download?token=cmHcen-e>

- Mobility initiatives are seldom restricted to European countries⁵⁹. Policies most often address worldwide mobility without making a distinction between EU and non-EU countries. Many schemes focus on specific countries or group of countries, e.g. schemes for attracting researchers from the developing world or emerging countries. Other schemes take the form of bilateral agreements between countries. In some cases, national mobility schemes tend to prioritise non-EU mobility (e.g. some schemes in Finland and Italy), on the grounds that EU mobility is promoted through EU-level instruments.
- There are too few in-depth evaluations of mobility scheme impacts.
- Available (patchy) evidence, gained through evaluations and other studies, indicates that volume and continuity of grants are key conditions for the success of mobility initiatives. In several cases of inward mobility schemes, the size of the grants had to be increased in successive programmes because it was found that the prevailing grant schemes were insufficient to attract top-level researchers.
- Short-term schemes may be gaining relevance as possibilities for virtual cooperation increase. Small amounts of seed money for international travel, such as grants for research networks run by the British Council, have usefully led to longer term research collaboration.

4.2 Lessons related to international mobility schemes for researchers in the private sector

As mentioned above, the level of mobility of highly skilled staff within the private sector is primarily influenced by companies' internal decisions. The general economic context conditions for economic activities also influence this mobility, as do measures within the R&D policy sphere targeting companies, such as the availability of R&D tax incentives for hiring researchers: the latter can have an important influence on the attractiveness of a country to foreign researchers.⁶⁰

It is hard to identify lessons from public initiatives targeting private sector researcher mobility since these initiatives are scarce and are not central features of STI policies. Only limited anecdotal evidence can be reported:

- A recent study⁶¹ found that, for researchers in the private sector, profession-related motives – referring to motivations related to the career or the profession of the researchers (e.g. personal research agendas, career progression goals, career opportunities at a new location, salary and other financial incentives, etc.) – are more important motivations for international mobility than other motivations.
- Lessons can be learned from a programme in the **UK**, the Dorothy Hodgkin Postgraduate Award (DHPA), which focuses on PhD students. The scheme attracts outstanding people from the developing world by offering them a stipend, with 50 per cent of the total cost met by the Research Councils and 50 per cent met by a corporate sponsor. The latter feature is relevant to mobility schemes targeting researchers too. Despite limited evidence, an evaluation⁶² of the scheme found that: *“the DHPA can offer corporate sponsors a number of benefits, including access to some of the best students from the developing world, improved links with academic partners and the opportunity to carry out research which is half-*

⁵⁹ This is confirmed by the analysis of Fernandez-Zubieta and Guy (2010), op. cit.

⁶⁰ This issue is covered in another MLE exercise: <https://rio.jrc.ec.europa.eu/en/policy-support-facility/mle-administration-and-monitoring-rd-tax-incentives>.

⁶¹ IDEA (2010), op. cit.

⁶² Booth, K. (2010), *Review of the Dorothy Hodgkin Postgraduate Award Scheme*, report to British Research Council.

funded by the Research Councils. However, the lack of awareness of the scheme amongst potential corporate sponsors has meant that only a very small proportion of eligible companies have been able to benefit from the scheme.” In addition: “the scheme has successfully attracted top students to the UK that would have otherwise gone to competitor countries such as Australia or the US, and furthermore around half of all students have indicated that they will actively maintain their links to the UK.”

- The evaluation of the **Irish** Special Assignee Relief Programme (SARP) showed the need for such a scheme in order to attract specialised, experienced senior executives to Ireland and that this is becoming more urgent in an increasingly competitive global market. In the absence of such a scheme, companies and their key employees are choosing to locate in other, more attractive, less costly jurisdictions thus resulting in a loss to Ireland of investment, taxes and employment opportunities. That such a policy is at odds with the need to broaden the tax base, remove unnecessary tax reliefs from the system and to ensure overall tax equity are arguments the Government is prepared to ignore when set against the priorities to improve Ireland’s competitiveness, to increase FDI levels and increase employment thereby improving the living standards of all.
- Concerning **migration policies**, according to Jones (2012)⁶³, the points-based system is the most effective for attracting highly skilled migrants. However, the use of this system is hampered by difficulties in assessing present and future skills requirements in recipient countries. There are only limited attempts to carry out fully-fledged impact assessments of these policies, the best examples are found in Canada and Australia.

⁶³ Op. cit. The report provides also an overview of the limited evidence on the effects of international mobility of high skilled labour on innovation in host countries.

5 Challenges

5.1 Challenges for international mobility schemes for researchers in the public sector

Q1: Is it more appropriate to have mobility goals integrated into 'normal' research funding schemes or included in mobility-specific programmes?

Q2: Is it more appropriate to have incoming, outgoing and return schemes in a single programme or in different ones? In the case of a single programme, is it possible or not for researchers to move from one scheme to another (e.g. to combine incoming and outgoing periods)?

Q3: What are the relative benefits of, and the right balance between, short-term versus long-term schemes? What are the possibilities in terms of combining short-term periods aiming for equivalence with long-term, continuous periods?

Q4: Can virtual or part-time mobility substitute (in part) for real mobility? Is the former a good way of overcoming barriers linked to differences in salary scales between countries? Could it be an appropriate approach for countries with less attractive research environments?

Q5: What is a good balance between financial incentives for mobility and non-financial support (e.g. information, dual career support, accreditation schemes, etc.)?

Q6: What should be the balance between target groups in mobility schemes mixes: e.g. between young versus experienced researchers?

Q7: When is it more appropriate to use subsidies or tax incentives as support schemes for mobility? How can the additionality of both types of schemes be ensured?

Q8: For outgoing and return mobility schemes: how can the 'return' commitment of national researchers funded by the schemes be established and how can it be strengthened?

Q9: Is it true that 'returning researchers' are more involved in international cooperation than 'stay-at-home' researchers? How can this be established?

Q10: How can perceptions of outgoing mobile researchers be transformed from being 'a loss to their home national systems' to being seen as 'bridge heads' to their home national systems?

Q11: For incoming mobility schemes: what is the retention rate of foreign top talent after the funding period? How can good conditions for the sustainability of 'star scientists' chairs positions be ensured?

Q12: Should we conclude from the scarce evidence contained in evaluations that only 'bold' (big, large and long grants) incoming mobility schemes work?

Q13: For portable grant schemes, how can the possibility of unwanted 'brain drain' be assessed? How can it be avoided?

Q14: How should mobility policies differ (volume of funding, direction of mobility, length, etc.) between countries with strong versus weak research systems?

5.2 Challenges for international mobility schemes for researchers in the private sector

Q1: Could existing mobility schemes involve companies as sponsors?

Q2: How does the challenges differ between large multinational companies and SMEs?

Q3: How can efforts to attract skilled migrants from developing economies avoid depleting human resource capital in these countries?

Q4: Is there scope for an 'R&D-specific' strand in migration policies?

5.3 Questions to focus the discussion of this Challenge Paper in the meeting in Zagreb on 6-7 February 2018

Q1: How can an effective policy mix of support measures for the mobility of researchers be designed that ensures a good balance between: (a) incentives for incoming, outgoing and 'return' mobility; (b) young and new researchers; (b) long-term and short-term mobility; (b) physical and virtual mobility?

Q2: What are the effective 'soft' measures that could support mobility (e.g. information provision and access, dual career support, accreditation schemes, etc.)?

Q3: What are the possibilities for existing public-sector oriented mobility schemes to be extended towards the private sector?

ANNEX: Examples of policies to attract qualified R&D staff in the public and private sectors

1.1 Croatia: NEWFELPRO⁶⁴ mobility programme for public sector researchers

The International Fellowship Mobility Programme for Experienced Researchers in Croatia – NEWFELPRO is a fellowship project of the Government of the Republic of Croatia and the Ministry of Science and Education (MSE). This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 291823. Its total value is 7 million euros, out of which 60% is financed from national sources. Project duration is from 2013 until 2017.

The long-term objective of NEWFELPRO is to raise the presence of research-qualified individuals by providing them with new opportunities to gain relevant international experience, and thus contribute to the further development of international scientific networks.

The Strategic Objectives of NEWFELPRO are:

1. To provide new impulse to national research programmes for foreign researchers, encouraging incoming mobility of experienced researchers from abroad to Croatia (incoming fellowship scheme, duration 12 or 24 months);
2. To facilitate additional mobility of the Croatian research community by increasing outgoing mobility of Croatian scientists abroad (outgoing fellowship scheme, duration 16 or 36 months);
3. To reverse the "brain drain" process by encouraging outstanding Croatian researchers to develop their careers in Croatia, also inviting them to return to Croatia (reintegration fellowship scheme, duration 24 months);
4. To internationalize research developed at all Croatian universities by fostering competitiveness and exchange of ideas with the best international research institutions (all schemes);
5. To support the development of an effective labour market for researchers in Croatia by connecting industry and scientific community.

NEWFELPRO offers 3 types of fellowships for researchers in public sector:

- The outgoing fellowship scheme is designed for Croatian researchers who aim to improve their scientific potential by spending a period of time in top class research institutions worldwide. The scheme includes researchers' stay abroad and a return phase in Croatia.
- The incoming fellowship scheme is directed to foreign researchers who are presently working abroad and wish to work with scientists at public scientific institutes and universities in Croatia.
- The reintegration fellowship scheme targets Croatian researchers active abroad wishing to return in Croatia to work in public research institution or university.

Of the total number of 83 fellowships, 41 fellowship are intended for experienced researchers (4 to 10 years of research experience), while 42 fellowships are planned for senior researchers (more than 10 years of research experience).

⁶⁴ <http://www.newfelpro.hr/default.aspx?id=63>

1.2 Germany: the Humboldt Research Fellowship⁶⁵

A Humboldt Research Fellowship for postdoctoral researchers funds research (6-24 months) in Germany. Applicants choose their own topic of research and their academic host. Scientists and scholars of all nationalities and disciplines may apply to the Alexander von Humboldt Foundation directly at any time. The fellowship is worth 2,650 EUR per month. This includes a mobility lump sum and a contribution towards health and liability insurance.

Additional benefits for research fellows are granted:

- lump sum for the fellow's travel expenses if the costs are not borne by a third party;
- language fellowship for an intensive language course lasting two to four months at selected language institutes in Germany immediately prior to the actual period of research; language fellowships may also be granted to accompanying marital partners.
- family allowances for accompanying family members staying at least three months (monthly allowance: up to 326 EUR for marital partners and up to 240 EUR for each child);
- for single-parents: flat-rate allowance for accompanying children (under the age of 18) for stays of at least three months (400 EUR per month for the first child and 100 EUR per month for every additional child);
- additional extension of the fellowship up to 12 months for research fellows accompanied by children under the age of 12;
- a subsidy towards research costs to be paid to the hosts in Germany amounting to 800 EUR per month (for research in the natural sciences and engineering) and 500 EUR (for research in the humanities and social sciences);
- Europe allowance for a research stay at a research institute in another European country (though not the research fellow's own country); for a designated period in the course of the fellowship if necessary to ensure the success of the research;
- extensive alumni sponsorship once a successful research stay has come to an end, especially for maintaining contacts with collaborative partners in Germany during the Humboldtian's entire academic career.

⁶⁵ <https://www.humboldt-foundation.de/web/sponsorship.html>

1.3 Flanders: advice from the Flemish Advisory Council for Innovation and Enterprise for an integral and coordinated strategy to attract and retain top international talent⁶⁶

In view of developing an integral and coordinated strategy to attract and retain top international talent in Flanders, the Flemish Advisory Council for Innovation and Enterprise puts forward 20 concrete action points within four major recommendations.

RECOMMENDATION 1: Work out an integral and coordinated strategy that delivers tangible results quickly

- Action point 1: create a sense of urgency with all partners to attract and retain top international talent;
- Action point 2: develop an integral and coordinated strategic plan to develop Flanders into an attractive innovation hub for top international talent;
- Action point 3: appoint a superintendent who coordinates, monitors and evaluates the strategy. The intendent falls under the responsibility of the Flemish Prime Minister;
- Action point 4: put top international talent at the center, considering four broad factors: (1) attractive careers and work; (2) attractive knowledge and innovation infrastructure; (3) attractive living environment; (4) smooth immigration policy;
- Action point 5: ensure a dynamic recruitment policy in which Flanders responds quickly to major events elsewhere in or outside Europe;
- Action point 6: establish a good knowledge base and monitor the objectives of the strategy with KPIs.

RECOMMENDATION 2: Promote Flanders internationally as a sophisticated, single brand and a lively knowledge and innovation ecosystem

- Action point 1: develop a new and powerful Flemish brand to improve perception at an international level;
- Action point 2: continue to invest in a lively ecosystem of excellent knowledge institutions, entrepreneurship and innovation as an attractive breeding ground for top international talent.

RECOMMENDATION 3: Work on a friendly welcome policy

- Action point 1: create a one stop shop for top international talent that is radically digital. This portal links to other relevant websites in Flanders, enabling international talent to find all the necessary information and executing all formalities in a digital way;
- Action point 2: make immigration policies for top international talent smooth and proactive. Make work of the recommendations in the 2013 VIONA6 publication about the Flemish economic immigration policy for higher educated people;
- Action point 3: prepare a superfast procedure for the Single Permit⁷ and for family reunification. The new Advisory Committee on Economic Migration can play an active role;
- Action point 4: simplify the decretal language regulation for higher education. For the Master's programs, the quotas should be removed as well as the requirement for equivalent Dutch-language programs. For the bachelor's degree programs, the quotas

⁶⁶ <http://www.vario.be/nl/publicaties/raadpleeg-hier-het-1ste-vario-advies>

should be elevated, but the requirement for equivalent Dutch-language programs should be retained;

- Action point 5: further simplify the language requirements for foreign lecturers to language level B1 after five years;
- Action point 6: provide services in English, especially in municipal and urban administrations and in local administrations;
- Action point 7: continue to focus on affordable international schools.

RECOMMENDATION 4: Focus on top foreign students, top researchers and top professors, and reward internationalization with hard money

- Action point 1: develop a customized target group policy for foreign top students, top researchers and top professors;
- Action point 2: increase the international attractiveness of Flemish universities and university colleges; for example, by assigning a budget to internationalization within existing financing programs and by defining smart KPIs for this purpose (e.g. as part of the BOF8 allocation key for financing research at universities); by expanding the scholarships for international top students, such as in STEM;
- Action point 3: develop retaining strategies to enable top international talent, graduated in Flanders, to move to the Flemish labour market. For instance, develop smart KPIs in the management agreements of Flemish strategic research centres, encourage inter sectoral mobility, provide personal career counselling and planning;
- Action point 4: attract more international top professors to Flanders by assigning part of the financial growth path for more university faculty members to international top professors, by providing a transparent and internationally competitive remuneration package, by raising the percentage of top foreign professors through the Odysseus brain gain financing program, by further relaxing the language regulation for foreign lecturers...;
- Action point 5: set a part of the income of international top talent free from taxes. Get inspiration from the 30% ruling in the Netherlands.

1.4 Turkey: national strategies and support programmes for attracting talent

Science and Technology Human Resources Strategy and Action Plan 2011-2016

Science and Technology Human Resources Strategy and Action Plan is to be the National Strategy that involves the main strategies and actions to foster the human resources in science, technology and innovation. The vision of the Strategy has been set as "Turkey; a country with high competitiveness regarding the STI HR; which becomes an attraction centre globally".

Increasing the number and improve the sectoral and occupational distribution of the R&D personnel; developing a research culture, and the skills and experience of researchers; increasing the mobility of researchers; developing the employment capacity of R&D personnel; improving the living and work environment of researchers have been the main objectives of the National S&T Human Resources Strategy and Action Plan.

For the year 2023, which marks the 100th anniversary of the Republic Turkey the aim is to raise the number of full-time equivalent (FTE) researchers to 300,000 and the number of FTE researchers in the business sector to 180,000 with regard to STI HR.

On this ground, the Supreme Council for Science and Technology mandated TUBITAK to coordinate the preparation of Science and Technology Human Resources Strategy and Action Plan 2011-2016. Within the preparation process (2008-2010), 12 workshops were organized with the participation of more than 500 research personnel from all stakeholders, such as international and national academicians, private sector R&D managers, and public sector lab managers under the coordination of TUBITAK. Ad-hoc committees have also been convened based on various governmental and non-governmental stakeholders to improve the R&D climate for researchers based on practical, regulatory measures.

Tenth Development Plan 2014-2018 "Attracting Qualified Human Resources Program"

Countries can make their development processes more competitive by utilizing global high quality human capital on top of their own qualified human resources.

Compared to developed countries, Turkey is not benefiting sufficiently from the highly qualified international human capital. With this program, in order to increase knowledge based competitiveness at global level, the aim is to make Turkey an attractive country for national and international highly qualified human power, with a special attention to Turkish nationals living abroad, through creating suitable environment and conditions, and improving cooperation among universities, industry, public sector and research centres.

The target group of the program is highly qualified international human power, especially Turkish nationals living abroad, who can provide Turkey with impetus in needed areas and accelerate Turkish development processes. The program mainly aims at:

- Increasing the number of qualified human power, especially Turkish nationals living abroad, moving to Turkey
- Increasing the number of foreign re-searchers working under contract at educational and research institutions

Performance Indicators are determined as below:

- Ratio of Turkish nationals living abroad and foreigners visiting Turkey for research, education, internship and work purposes in total incoming visitors
- Number of foreign researchers working in TÜBİTAK supported projects
- Number of Turkish nationals living abroad who visit Turkey with support of TÜBİTAK programs
- Number of research centres established abroad about Turkey

- Number of foreigners who work at educational and research institutions
- Number of foreigners and Turkish nationals living abroad who benefit from internship, mobility and exchange programs.

The Decrees on Education and HR adopted at 24th Meeting of the Supreme Council for Science and Technology

The Supreme Council for Science and Technology (SCST) is the highest ranking STI policy-making body in Turkey chaired by the Prime Minister with the decision-making power for national S&T and innovation policy.

For each decree determined by the SCST, the main responsible public bodies and affiliated institutions are precisely identified; and the improvements for each decree are monitored within the SCST meetings held twice a year on a regular basis. At the realization stage of the decrees, new plans-strategies-action plans, new support schemes, new governance mechanisms, new protocols, new methodologies and models; procedures etc., namely all various kinds of STI schemes are stimulated.

"The role of education and human resources to reach national targets for the year 2023" was determined as the main agenda of the 24th Meeting of the Supreme Council for Science and technology held on 7th August, 2012. 9 new dedicated decrees were adopted and these decrees form the basis for many endeavors concerned the education system and STI human resources in general.

9 new dedicated decrees are given below:

- Conducting Educational Assessment Studies for Evaluating and Improving the Quality of Education System
- Developing Digital Contents for Primary and Secondary Education Curriculum and Making Them Accessible
- Promoting Development of Digital Course Contents for Higher Education and Making Them Accessible
- Revising Teaching Programmes and Designing Educational Contents To Enable Students Acquire Core Competencies More Efficiently
- Developing Alternative Models for Foreign Language Teaching in Primary and Secondary Education
- Restructuring Scholarship Programs for Graduate Students to Study Abroad
- Organization of Science Fairs for the Primary And Secondary School Students
- Restructuring the System of Admission to Higher Education
- Conducting Preparatory Work for the Participation of Turkey to Horizon 2020-Framework Programme for Research and Innovation 2014-2020

SCST evaluates all ongoings related to all decrees twice a year on a regular basis; and TUBITAK acts as the secretariat of the SCST; reports the improvements for each decree to the SCST.

The Decree of the Supreme Council for Science and Technology (SCST) on "Development of Mechanisms Aimed at Increasing the Quality and Quantity of Doctorate Holders [2015/102]"

The 28th meeting of Supreme Council for Science and Technology (SCST) was held on 6th January, 2015, with a remarkable participation of 3 Vice Prime Ministers, 15 Ministers and nearly 90 senior officials and the main theme of the 28th meeting of SCST was "National Innovation and Entrepreneurship System". The decree on "Development of Mechanisms Aimed at Increasing the Quality and Quantity of Doctorate Holders" has been approved within this meeting. The main motive behind this initiative is to promote R&D affiliated human resources both qualitatively and quantitatively and increase the number of researchers with a PhD degree in the long term. And the concrete objectives of the initiative have been determined as below:

- Developing a new support scheme for universities with PhD programmes dedicated to the priority areas of the National Science, Technology and Innovation Strategy
- Developing a quality-based support scheme devoted to the thesis supervisors in PhD programmes
- Providing exclusive financial assistance to the firms operated in technology Development Zones, business affiliated R&D centres and firms accomplished R&D projects successfully through TUBITAK supports schemes; which employ researchers with PhD degree
- Carrying out trend and need-oriented analyses intended for human resources with PhD degree.

PhD and Post-Doctoral Scholarship Programmes For Native and International Students

By 2013, there are 29 active science fellowships and grant programmes from TUBITAK. 10 of these are considered as specifically international fellowships for both Turkish and foreign students and researchers. The two research fellowship programmes for Turkish PhD students and postdoctoral researchers have been in force since 1978. Within these programmes, since 2003 total support numbers have been gradually increased. Between 2000 and 2013 (second application period is not included), 1.363 PhD students 2.476 postdoctoral researchers were supported and TRY 75 million was allocated to these fellows for their research outside Turkey.

There are various scholarship programmes managed by TUBITAK for both native or international students at undergraduate and graduate levels in order to trigger the effective participation of young people in higher education and to have them involved more in research activities; some of which are listed below:

- National Scholarship Programme for PhD Students (a scholarship programme for students pursuing a PhD in Turkey)
- International PhD Fellowship Programme (Graduate students who are pursuing their PhD studies at research centres or universities abroad are supported in the fields determined by TÜBİTAK's Scientific Council. The fields vary from call to call upon the Council's decision)
- International Research Fellowship Programme (PhD students who are registered in PhD programmes in Natural Sciences, Medical Sciences, Social Sciences and Humanities and Engineering and Technological Sciences at universities or research centres in Turkey are supported to perform research abroad that cannot be performed within the infrastructure in Turkey)
- National Summer School Support Programme for Turkish Master and PhD Students (Summer schools are supported to adopt the current advances in STI and to teach the currently utilized techniques in the fields of Natural Sciences, Medical Sciences, Engineering and Technological Sciences and Social Sciences and Humanities)
- Graduate Scholarship Programme for The Least Developed Countries (This Program provides master and doctorate scholarships in science and education fields for citizens of LDCs with a duration of 10 years)
- National Postdoctoral Research Scholarship Programme (Native Scientists who perform research in Natural Sciences, Medical Sciences, Social Sciences and Humanities and Engineering and Technological Sciences in Turkey are supported)
- International Postdoctoral Research Scholarship Programme (Scientists who perform research in Natural Sciences, Medical Sciences, Social Sciences and Humanities and Engineering and Technological Sciences abroad are supported).

Moreover there are also award programs of Turkish Academy of Sciences (TÜBA) dedicated to young researchers; such as TÜBA Academy Prizes which is launched in 2015, and open to all scientists, which will encourage the international mobility. As part of the existing "Outstanding Young Scientist Award Program" (GEBIP), the use of the award during the research visit abroad has been facilitated. TÜBA Academy Prizes are annually given, in three categories, to nominated scientists with original, leading and path-breaking works in their fields. Nominations are made by TÜBA members, academies and inter-academy organizations with which TÜBA is in cooperation and other science

institutions and scientists invited as nominators. The objective of TÜBA-GEBIP is to foster young, outstanding scientists who are at the stage of establishing their own research programmes in Turkey after finishing their post-doctoral research activities. TÜBA supports these scientists for a period of three years and helps them set up their own research groups at a stage when they are in need for incentives. In this way TÜBA tries to contribute to develop a new generation of competent researchers from all disciplines, including social sciences and humanities, basic sciences and health sciences. The Turkish Academy of Sciences considers itself as a school to train young promising academicians. The GEBIP programme aims to set up a kind of Young Academy of scientists under the age of 40. Aside from a grant provided for a period of three years, a member of the Academy is assigned as the mentor, and an environment of solidarity and interaction is created through joint meetings held with Academy members.

Last but not least, the Ministry of National Education has also scholarship program for Turkish B.Sc. holders to conduct graduate studies abroad; Scholarships are granted to Turkish researchers with B.Sc. in order to promote their graduate studies abroad. Within the context of a new project titled "5000 Students in 5 Years", the number of scholars increased immensely since 2006. The priority scientific fields are determined each year, based on the S&T human resources requirements of institutions. 954 researchers in 2014 and 1134 researchers in 2015 have been granted scholarships.

TUBITAK 2209-B "Support Program For Industry Oriented B.Sc. Thesis"

The S&T Human Resources (S&T HR) Strategy and Action Plan 2011-2016, which is monitored within the frame of National STI Strategy and Action Plan for 2011-2016 has five strategic objectives: Increasing the Quantity of the S&T HR, Increasing the Quality of the S&T HR, Improving the Research Climate for S&T HR, Increasing the Mobility of S&T HR and Improving the Capacity for the Employment of S&T HR. The strategic objective of increasing the mobility of S&T human resources is implemented through fellowships and support mechanisms developed for intersectoral mobility.

TUBITAK has developed a new research fellowship program to provide the B.Sc students to collaborate with industry in their thesis studies. This new research fellowship program is expected to promote inter-sectoral mobility culture in researchers, starting from early stages of their career. The B.Sc. thesis studies, which aim to solve an R&D challenge of an industrial organization and/or which has the potential to be implemented in industry are supported in engineering, natural sciences, social sciences, humanities, medical sciences and agricultural sciences.

The contribution is 4000 TRY/project and 1000 TRY for their academic consultant.

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The paper serves as a background document for a workshop organised under the Mutual Learning Exercise (MLE) devoted to widening participation to FP and enhancing synergies between FP and ESIF. The focus of this paper is on national-level strategies, initiatives, programmes and schemes targeting the attraction of qualified R&D staff working abroad (within or outside the EU), into national research performing organisations from the public and private research sectors, namely PROs/HEIs and R&D-active companies. The topic also includes outgoing mobility schemes for national researchers. The paper provides a landscape of existing initiatives and identifies key challenges to be discussed with respect to practices in 2 areas: 1) International mobility schemes for researchers in the public sector; 2) International mobility schemes for researchers in the private sector.

Studies and reports