European Commission

Study on mobility flows of researchers in the context of the Marie Skłodowska-Curie Actions: analysis and recommendations towards a more balanced brain circulation across the European Research Area

Final Report

Marie Skłodowska-Curie actions

EUROPEAN COMMISSION

Directorate-General for Education, Youth, Sport and Culture
Directorate C — Innovation, International Cooperation and Sport
Unit C.2 — Marie Skłodowska-Curie Actions

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Study on mobility flows of researchers in the context of the Marie Skłodowska-Curie Actions: analysis and recommendations towards a more balanced brain circulation across the European Research Area

Final Report

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2022

Directorate-General for Education, Youth, Sport and Culture
Marie Skłodowska-Curie Actions

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Luxembourg: Publications Office of the European Union, 2022

PDF ISBN 978-92-76-47141-7 Catalogue number NC-06-22-063-EN-N doi:10.2766/401134

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Abstract

The study on mobility flows of researchers in the context of the Marie Skłodowska-Curie Actions (MSCA) was launched by the Directorate-General for Education, Youth, Sport and Culture of the European Commission. In line with the Commission's policy priorities, the study provides a detailed analysis of the structure and determinants of researchers' mobility flows under the MSCA and recommendations toward a more balanced brain circulation across the European Research Area. The analysis of mobility trends reveals that inflows of MSCA researchers are concentrated in a handful of EU and Horizon 2020 associated countries, with 12 regions across Europe attracting 30% of all MSCA fellows. It also shows that MSCA mobility patterns resemble the general patterns in international scientific mobility, which suggests that the MSCA do not exacerbate the problem of imbalanced research mobility in Europe but merely reflect pre-existing trends. Moreover, the MSCA help to effectively retain European talents, attract foreign researchers to Europe and encourage European researchers to return to Europe. The study also assesses the impact of the Widening Fellowships pilot, which facilitated more balanced brain circulation and contributed to fostering interest in and attracting researchers to widening countries. Finally, the study investigates the possibility of establishing return grants. Since the MSCA already enable return mobility, particularly for experienced researchers and towards widening countries, the study does not recommend reintroducing return grants for researchers and provides instead a set of policy recommendations to enhance the quality and attractiveness of the less advanced Research and Innovation systems.

1 Introduction

1.1 Policy context and objectives

The Marie Skłodowska-Curie Actions (MSCA) play a key role in attracting top talents worldwide to the European Research Area, as well as retaining European researchers and reintegrating those who have been working elsewhere. Although the MSCA foster brain circulation by supporting the mobility and training of tens of thousands of excellent researchers across Europe and beyond, a number of countries are still underperforming in relation to the MSCA and are negatively affected by brain circulation.

In light of this, the Council Decision 2021/764 establishing the Horizon Europe Programme provided that "If appropriate and justified by a study, support for researchers to return to their country of origin within and to the Union shall be provided within the context of the existing broad lines"[1].

The Directorate-General for Education, Youth, Sport and Culture of the European Commission has therefore contracted PPMI Group, in cooperation with the Centre for Strategy & Evaluation Services (CSES) and the Austrian Institute of Technology (AIT) to carry out a study on mobility flows of researchers in the context of the MSCA.

This study provides an analysis of the mobility flows of MSCA researchers and proposes recommendations with a view to achieving more balanced brain circulation across the European Research Area. In addition, the study assesses the impact of the Widening Fellowships pilot and the possibility of establishing return grants, as requested by the Council Decision.

The study reveals that countries with more advanced research and innovation ecosystems tend to experience a so-called 'brain gain'. On the other hand, countries with weaker R&I ecosystems tend to have their nationals participating in the MSCA mobility projects abroad, but fail to attract as many researchers to work in their own countries/institutions. This is especially true for the so-called 'widening countries'[2]. This study assesses in detail the trends in mobility flows, paying particular attention to MSCA researchers' mobility to and from widening countries.

To support mobility to widening countries, a Widening Fellowships pilot was established in 2018 (now renamed 'ERA Fellowships' under Horizon Europe). The pilot was launched within the 'Spreading excellence' chapter in Horizon 2020 with the intention of supporting excellent researchers not funded through the MSCA to undertake an individual fellowship in a widening country. Hence, this study also aims to assess the impact of the MSCA and the Widening Fellowships pilot, on the attractiveness to researchers of widening countries.

1.2 Methodology

Desk research

As the key source of evidence for this study, we used Horizon 2020 administrative data on the projects, organisations, and researchers participating in all types of MSC actions: ITN,

[1] *Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation and repealing Decision 2013/743/EU (Text with EEA relevance).*

[2] *Member States that are categorised as widening countries under Horizon 2020 are Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia and Slovenia. The following associated countries are also considered widening countries: Albania, Armenia, Bosnia and Herzegovina, the Faroe Islands, the Republic of North Macedonia, Georgia, Moldova, Montenegro, Serbia, Tunisia, Turkey and Ukraine.*

IF, COFUND and RISE[3]. The analysis of administrative data was enriched by comparing Horizon 2020 with MSCA data from the previous funding period, 7th Framework Programme (FP7), as well as the data on researchers' mobility collected for the MORE4 study[4].

Another important stream of the desk research work was a review of existing literature and previous studies. Section 2 of this study presents a condensed review of the literature on the determinants of mobility flows. The analysis throughout this report is backed by information gained from the literature and previous studies, such as the previous study of business participation and entrepreneurship in the Marie Skłodowska-Curie actions[5] and the review of Marie Skłodowska-Curie actions unit costs in preparation for Horizon Europe[6].

Surveys

All participating organisations and individual researchers were also surveyed to ensure that enough meaningful data were obtained to explain the trends in mobility flows and to assess the impact of the MSCA and the Widening Fellowships pilot. In total, we received:

- 4,539 responses from fellows (IF, ITN and COFUND);
- 50 responses from widening fellows;
- 1,128 responses from RISE researchers and staff; and
- 1,644 responses from organisations (IF, ITN, COFUND and RISE).

Interviews, case studies and online workshops

In addition, 43 interviews were performed. The insights from these interviews are included in the narrative of the report. Seven out of the 43 interviews targeted the information required for the case studies. The study team organised the first online expert workshop to select topics for the in-depth case studies, as well as to gather experts' perspectives on the relevant analytical directions for the overall study. The case studies are annexed to this report. There are five case studies in total, covering the following topics:

- Case study 1: Bridging the gap in mobility flows towards and from widening countries.
- Case study 2: Importance of mobility determinants for individual MSCA fellows.
- Case study 3: Career paths of researchers who spend their mobility period in business.
- Case study 4: How to foster the development of ties between researchers and their home country?
- Case study 5: Influence of support to applicants on mobility flows.

The study team organised two online expert workshops on 11 November 2021 and 10 March 2022 to discuss the topics of the case studies and verify the study findings and recommendations.

For more detailed description of the methodology, please refer to Annex 6.

[3] *IF – Individual Fellowships (Postdoctoral Fellowships under Horizon Europe), ITN – Innovative Training Networks (Doctoral Fellowships under Horizon Europe), COFUND - Co-funding of regional, national and international programmes.*

[4] *European Commission, Directorate-General for Research and Innovation, MORE4: support data collection and analysis concerning mobility patterns and career paths of researchers, Publications Office, 2021, https://data.europa.eu/doi/10.2777/645537.*

[5] *Dinges, M., Pupinis, M., Leitner, K. & Dumcius, R. (2017). Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020). https://op.europa.eu/en/publication-detail/-/publication/decfab92-5ae2-11e7-954d-01aa75ed71a1/language-en*

[6] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Pupinis, M., Brožaitis, H., Navikas, V. et al. (2020). Review of Marie Skłodowska-Curie actions unit costs in preparation for Horizon Europe: final report, Publications Office.*

1.3 Structure of the report

This report is structured as follows:

- The second section of the report, which immediately follows this introduction, provides an in-depth analysis of the existing literature on researcher mobility.
- Section 3 analyses the mobility flows of MSCA researchers. Geographical mobility is analysed at both country and regional levels. The analysis also includes intersectoral mobility and its trends.
- Section 4 discusses the impact of MSCA mobility. It assesses the state of play with regard to how the MSCA is contributing to the retention of European talents, as well as attracting European and foreign researchers to Europe.
- Section 5 assesses the impact of the Widening Fellowships pilot.
- Section 6 discusses the determinants of MSCA mobility flows.
- Section 7 investigates the possibility of establishing return grants.
- Section 8 provides overall conclusions and recommendations.
- Annexes 1 – 5 are the case study reports.
- Annex 6 provides more details on the methodology used.

2 Trends in, and determinants of, international scientific mobility: evidence from the literature

Mobility decisions can be understood through the theoretical framework developed by migration theorist Everett S. Lee.[7] According to Lee's 'push and pull' theory, three types of factors contribute to mobility decisions:

- Factors associated with the place of origin (those that *push* researchers to conduct research/study abroad).
- Factors associated with the place of destination (those that *pull* researchers towards the selected host countries/organisations).
- Intervening *obstacles*.

In Lee's theory, an individual's perception of the pull and push forces influences their actual migration. This perception is impacted by personal factors such as age, gender and educational level. Depending on how the push and pull factors are conceptualised, the same factors may be present in both the 'push' and 'pull' categories. For example, the level of remuneration and the level of research infrastructure may be both push and pull factors.

Another way of conceptualising these determinants is to consider them as drivers and enablers of mobility, or as barriers to mobility. In this sense, a driver might be better access to research infrastructure, an enabler would be the ability to speak the local language, and a barrier could be administrative obstacles. This conceptualisation is similar to the one used in the MORE4 study, which looked at drivers and enablers of attractiveness in relation to international scientific mobility.[8]

2.1 International scientific mobility and brain circulation at national and system level

[7] *Lee, E.S. (1966). A Theory of Migration. Demography 3(1).*
[8] *European Commission, Directorate-General for Research and Innovation (2021). MORE4. Support data collection and analysis concerning mobility patterns and career paths of researchers. Survey on researchers in European higher education institutions.*

A review of the existing literature reveals some stark differences in the mobility of researchers between particular countries. Research shows that there are recognisable patterns of mobility ('brain gain') towards countries that are leaders in producing world-class, high-quality scientific research. Such countries are concentrated in particular in North America and Western Europe.[9] Mobility patterns are also evident at a regional level, with certain regions acting as centres of scientific excellence.[10]Negative brain circulation is generally considered a problematic phenomenon, with research showing that it has a negative impact on the so-called 'sending' countries.[11] The reasons behind researchers' mobility decisions are multi-faceted and heterogeneous. Not only do organisational and system-level differences contribute to mobility decisions, but individual-level factors such as the researcher's field of study, gender and country of origin also have an impact.[12]

At system level, international mobility facilitates capacity building and interconnectivity. From a broader policy perspective, global scientific mobility contributes to the diffusion of knowledge while at the same time allocating human resources in research labour markets.[13] This leads to the aggregation of human capital and improved knowledge, which leads to increases in selected outputs (e.g. innovation, income and publications), contributing to a more robust scientific base and the ability to address new challenges, as well as to economic growth and welfare.[14]

What can countries do to increase incoming scientific mobility and retain talent? These system-level factors are often related to macroeconomic questions such as the level of investment in science, labour market issues (e.g. lack of fair, transparent and open recruitment practices; non-recognition of qualifications; language barriers) and the availability of research positions, as well as other research, development and innovation factors, with political and cultural factors sometimes playing a role. Another important factor is the stability and predictability of R&D funding. Having a stable and predictable system contributes to efficient long-term planning, which can be supported by effective coordination between all the actors in the scientific sphere. Stability and effective coordination of R&D funding is associated with well-developed ecosystems.[15]

At the same time, public R&D funding may not be a key determinant of the mobility of MSCA fellows. According to Alexander Cuntz, greater relative R&D funding may not attract more elite scientists. Rather, there is an 'excellence attracts excellence' mechanism in place, meaning that higher-performing national research systems with a higher level of scientific excellence attract more elite scientists.[16]

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[9] Dosi, G., Llerena, P. & Labini, M.S. (2006). The relationship between science, technologies and their industrial exploitation. An illustration through the myths and realities of the so-called 'European Paradox'. Research Policy 35(10); Hardeman, S., Van Roy, V. & Vertesy, D. (2013). An Analysis of National Research Systems. A composite indicator for scientific and technological research excellence. Luxembourg, Publication Office of the EU.

[10] Mahroum, S. (2000). Scientific Mobility. An Agent of scientific expansion and institutional empowerment. Science Communication 21(4).

[11] Doria Arrieta, O.A. et al. (2017): Quantifying the negative impact of brain drain on the integration of European science. Science Advances 3, no. 4.

[12] European Commission, Directorate-General for Research and Innovation (2021). MORE4 study.

[13] Stephan, P. (2012). How economics shapes science. Harvard University Press, Cambridge, London; Lepori, B., Seeber, M. & Bonaccorsi, A. (2015). Competition for talent. Country and organizational-level effects in the internationalization of European higher education institutions, Research Policy, 44.

[14] Cañibano, C. & Woolley, R. (2015). Toward a socio-economics of the brain-drain and distributed human capital. International Migration, Vol. 53(1); Cañibano, C., Vértesy D. & Vezzulli A. (2017). An inquiry into the return mobility of scientific researchers in Europe, EUR 28600 EN, Publications Office of the European Union, Luxembourg.

[15] Guth, J. & Gill, B. (2008). Motivations in East–West Doctoral Mobility: Revisiting the Question of Brain Drain. Journal of Ethnic and Migration Studies 34(5).

[16] Cuntz, A. (2016). Do Public R&D Funds Affect the Location Choices of Elite Scientists in Europe? Research Evaluation 25(4).

In a recent study which included an assessment of the MSCA, Klaus Schuch analysed mobility patterns of researchers from six Western Balkan countries. Schuch noted that, relative to their size and research capacities, these countries were performing well in terms of the participation of their own researchers and organisations in the MSCA, but that they were unattractive to people from higher-income countries. Schuch states that country size and the lack of research capacity appear to contribute to the unattractiveness of these countries as destinations.[17]

Policymaking certainly plays a role in increasing the attractiveness of a destination country, with local, regional and national authorities setting up multiple schemes to attract foreign and returning researchers.[18] Other relevant policy areas include those relating to social security and pension systems, health policies and immigration rules (e.g. visa schemes and work permits), all of which can impact the number of incoming researchers.[19] Policymakers can also seek to improve employment conditions that inhibit mobility.[20] In all cases, a key factor in improving the system-level factors that contribute to international mobility is to ensure efficient and effective coordination and governance between decision-makers at all levels.[21]

2.2 Individual-level determinants of mobility

Individual-level determinants of mobility can be broadly understood to fall into two main categories: they are either career and work-related, or they relate to personal reasons. The relative importance of these determinants in mobility decisions depends on various other factors such as a researcher's age and career stage, as well as their gender and family status.

From a career perspective, the drivers of mobility relate to increasing one's research capacities and opportunities for career advancement. Ackers and Gill (2009) argue that many early-stage researchers consider international experience as being a fundamental requirement for their future career prospects.[22] Indeed, various policy requirements often include geographical academic mobility as an important step in the development of a researcher's academic and research career, and as a requirement for academic communities to move towards establishing independent research programmes. This has contributed to the concept of 'forced mobility', i.e. the extent to which researchers feel forced to move to another country, due to international mobility being a requirement for career progression in the researchers' home countries.[23]

International mobility has been shown to impact researchers' productivity and career progression. First, international mobility contributes to the building and broadening of a

[17] *Schuch, K. (2021): Patterns of geographical mobility of researchers from six Western Balkan countries in regional and European mobility-based training programmes. Journal for Research and Technology Policy Evaluation.*
[18] *Canibano, C., Vértesy, D. & Vezzulli, A. (2017). An inquiry into the return mobility of scientific researchers in Europe. JRC Technical Reports; Boc, E. (2020) Brain Drain in the EU. Local and regional public policies and good practices. Transylvanian Review of Administrative Sciences.*
[19] *Bennion, A. & Locke, W. (2010). The Early Career Paths and Employment Conditions of the Academic Progression in 17 Countries. European Review 18(1); Weert, E. (2013). Support for Continued Data Collection and Analysis Concerning Mobility Patterns and Career Paths of Researchers. DG RTD, Brussels.*
[20] *Ackers, L. (2008). Internationalisation, Mobility and Metrics: A New Form of Indirect Discrimination? Minerva 46(4).*
[21] *Van Hoed, M. et al (2021) Policy Brief. Pathways for a balanced brain circulation in the EU. WP8 – Mapping brain drain and contributing to solutions. Draft report.*
[22] *Ackers, L. & Gill, B. (2009). Moving People and Knowledge. Scientific mobility in an Enlarging European Union. Cheltenham, Edward Elgar Publishing.*
[23] *European Commission, Directorate-General for Research and Innovation (2021). MORE4 study.*

researcher's professional network, and the gaining of high-quality work experience.[24] Second, international mobility is linked to increased research productivity and impact.[25] These factors contribute to the perception that international mobility is a way to accelerate career advancement.[26] Hence, they are drivers of international mobility.

Other drivers contributing to researchers' decisions to become internationally mobile relate to a desire to improve both the research opportunities available to them, and the subsequent rewards that can be reaped. These benefits can manifest themselves in the form of higher salaries, as well as access to better working conditions and advanced technology or research infrastructure that would otherwise be unavailable.[27] While higher remuneration may act as an incentive, particularly during the early stages of their careers, researchers seem willing to trade off higher salaries to achieve better outcomes in the long run.[28] For MSCA specifically, satisfaction with remuneration is generally high, and does not appear to be a main determinant of mobility.[29] Furthermore, the main previous source of dissatisfaction (insufficient family allowance) has already been addressed in the new MSCA unit costs in Horizon Europe.

The availability of research funding is something that researchers value highly. In fact, the MORE studies have consistently shown that it is one of the key factors motivating international mobility. The MORE4 study also notes that the two most significant barriers to mobility are a lack of suitable positions and a lack of research funding.[30] The MSCA can therefore be considered to play a crucial role in enabling mobility by directly addressing these two issues.

With regard to employment-related mobility and retaining talents, researchers value open, transparent and meritocratic recruitment practices. If returning researchers consider the recruitment culture of their country of origin to be a closed system, this will also limit return mobility. Other employment-related practices that can hinder or promote mobility concern the security and/or stability of employment.[31] Research careers are known to be precarious, due to their instability (e.g. a lack of permanent positions) and limited opportunities for academic careers; researchers therefore tend to value opportunities that offer relative stability for their careers.[32]

Mobility determinants also differ depending on the destination country. According to one study, the main determinants of mobility from Western countries with better R&I systems to Poland were specific job offers; having a personal relationship with a Polish partner; a

[24] *Laudel, G. & Bielick, J. (2019). How do field-specific research practices affect mobility decisions of early career researchers. Research Policy 48(9); Netz, N. Hampel, S. & Aman, V. (2020). What effects does international mobility have on scientists' careers? A systematic review. Research Evaluation 29(3).*
[25] *Cf. Canibano, C. et al. (2020). Scientific Careers and the Mobility of European Researchers. An analysis of international mobility by career stage. Higher Education 80.*
[26] *Ackers, L. (2008).*
[27] *Panagiotakopulos, A. (2020): Investigating the factors affecting brain drain in Greece. Looking beyond the obvious. World Journal of Entrepreneurship, Management and Sustainable Development 16(3).*
[28] *European Commission, Directorate-General for Research and Innovation (2021). MORE4 study.*
[29] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Pupinis, M., Brožaitis, H., Navikas, V. et al. (2020). Review of Marie Skłodowska-Curie actions unit costs in preparation for Horizon Europe: final report, Publications Office.*
[30] *European Commission, Directorate-General for Research and Innovation (2021). MORE4 study.*
[31] *Ackers, L. & Gill, B. (2009).*
[32] *OECD Study. 2021. Precarity of Academic Research Careers. https://www.ei-ie.org/en/item/25122:oecd-study-precarity-of-academic-research-careers*

specific interest in Polish culture; willingness to join a particular research group; limited career opportunities in the country of origin; or the desire to experience an adventure.[33]

Gender, age and family reasons also contribute to mobility decisions. While young and single women tend to be as mobile as their male counterparts, levels of mobility among female researchers decline at doctoral and postdoctoral stages. This is especially true if the female researcher's partner is also employed in scientific research, and often results in the tendency for women to leave and/or fail to progress in scientific careers.[34] Having children has also been found to harm mobility: the older and more experienced a researcher is, the less likely they are to be internationally mobile.[35]

Family ties and social networks can act as barriers to leaving, but barriers can also emerge due to a strong sense of national and/or cultural identity. The same strong sense of national and/or cultural identity can also act as a driver of mobility, particularly for returning researchers. Geographical proximity to the mobility destination country, and familiarity with its culture and language, also shape international mobility patterns. These factors contribute to easing the logistical and psychological barriers that a researcher may experience during international mobility. Familiarity with a country's culture and language contributes to social integration, both in and outside of work.[36] In particular, anglophone countries seem to benefit from the fact that English is the primary language of the scientific community.[37]

Cultural and linguistic familiarity also help researchers to be productive from the start. According to Wolley and Cañibano, the process of adaptation and convergence of circulating skills is simplified when mobility occurs across similar consolidated networks.[38]

Other individual-level determinants that must be considered in relation to include researchers' previous mobility experience, as researchers who have previously been mobile internationally are more likely to do so again in the future.[39] This helps researchers to accrue what has been described as "migration capital". In particular, international mobility during the early stages of a researcher's career appears to increase their appetite for and confidence in moving again.[40]

2.3 Organisation-level determinants

From an organisational perspective, attracting researchers relies on the capacity to build 'pulling power'. This can be understood as having a resource-rich centre of excellence with both the know-how and the resources to enhance scientific productivity and researchers' career progression. Pulling power also relates to the ability to offer specific expertise, resources and training required by researchers. In order to retain talent and encourage

[33] *Kurek-Ochmanska, O. & Luczaj, K.: 'Are You Crazy? Why Are You Going to Poland?' Migration of Western Scholars to Academic Peripheries. Geoforum 119, 2021.*
[34] *Ackers, L. (2004). Managing relationships in peripatetic careers: Scientific mobility in the European Union. Women's Studies International Forum 27(3):189–201.*
[35] *Waibel, S. et al. (2017). Career Consequences of Transnational Educational Mobility. A systematic literature review. Educational Research Review 20; Reale, E., Morettini, L. & Zinilli, A. (2019): Moving, remaining, and returning: international mobility of doctorate holders in the social sciences and humanities. Higher Education 78.*
[36] *See, for example: Franzoni, C., Scellato, G. & Stephan, P. (2012). Foreign-born scientists: mobility patterns for 16 countries. Nature Biotechnology 30; Scellato, G., Franzoni, C. & Stephan, P. (2014). Migrant Scientists and International Networks. Research Policy 44(1); Rostan, M. & Höhle, E.A. (2014). The International Mobility of Faculty. In: Huang, F., Finkelstein, M. & Rostan, M. (eds.), The Internationalization of the Academy, Springer Netherlands.*
[37] *Rostan, M. & Höhle, E.A. (2014).*
[38] *Woolley, R. & Cañibano, C. (2010). Scientific mobility and development. Toward a socio-economic conceptual framework. INGENIO Working Paper Series Nº2010-07.*
[39] *Weert, E. (2013).*
[40] *Ackers, L. & Gill, B. (2009).*

returning talent to come home, transparent recruitment practices and offering permanent positions can be considered pull factors, especially if they match researchers' needs.[41] In this respect, researchers consider the research quality, prestige and excellence of the institution as being important to their mobility decisions.[42]

A recent investigation of the potential of European universities as hosts for MSCA grantees revealed that the likelihood of hosting MSCA grantees increases significantly with university's level of excellence (research performance), size, and the country group or European region in which it is located. In addition, a deepening of excellence (citations), international orientation and the teaching burden (student-staff ratio) are significant predictors of an institution's likelihood of hosting grantees.[43]

Tim Mazzarol and Geoffrey N. Soutar have argued that awareness of the reputation of the host country and its institutions is likely to be critical. They also add that personal recommendations are likely to influence researchers' mobility decisions.[44] This is supported by further research, which indicates that researchers' mobility decisions are dictated by their perceptions regarding the attractiveness of a destination. Pre-existing academic hierarchies are slow to change, and these guide mobility decisions – meaning that certain institutions in countries such as the United States and the United Kingdom are more likely to be perceived as centres of excellence.[45]

Such perceptions relate to the visibility of participating organisations, especially with regard to the MSCA. Myklebust has analysed the factors contributing to the awarding of MSCA grants. According to his analysis, certain institutions such as KU Leuven and the University of Copenhagen (some of the largest MSCA participants) are particularly keen on promoting MSCA opportunities. They also offer assistance with the application process by organising masterclasses for potential grantees.[46] Falk and Hagsten also explain that some high-ranking universities participate less in the MSCA because they provide other grants for individuals, thus reducing the pressure to attract MSCA funding and fellows. Falk and Hagsten also note that the university may decide not to use its full potential due to staff availability, space, or other reasons.[47]

[41] *Cf. Ackers, L. & Gill, B. (2009); Halme, K., Cartalos, O., Lähteenmäki-Smith, K. & Viljamaa, K. (2012). The Attractiveness of the EU for Top Scientists. IP/A/ITRE/ST/2011-17. Brussels: Directorate-General for Internal Policies.*
[42] *Franzoni, C., Scellato, G. & Stephan, P. (2014). The Mover's Advantage: The Superior Performance of Migrant Scientists. Economics Letters 122(1).*
[43] *Falk, M.T. & Hagsten, E. (2021). Potential of European universities as Marie Curie grantee hosts. High Educ 81, 255–272.*
[44] *Mazzarol, T. & Soutar, G.N. (2002). 'Push-pull' factors influencing international student destination choice. International Journal of Educational Management, 16(2).*
[45] *Bauder, H., Lujan, O. & Hannan, C.-A. (2018). Internationally mobile academics. Hierarchies, hegemony, and the geoscientific imagination. Geoforum 89.*
[46] *Myklebust, J. Factors behind Marie Skłodowska -Curie Actions grant wins. University World News, 27 February 2021.*
[47] *Falk, M.T. & Hagsten, E. (2021) Potential of European universities as Marie Curie grantee hosts. Higher Education 81.*

3 How are the mobility flows of MSCA researchers structured, and what are the underlying trends, strengths and weaknesses?

3.1 Geographical mobility

3.1.1 Country-level mobility

The analysis of long-term MSCA mobility (IF, ITN, COFUND[48]) below shows that MSCA researchers' inflows are concentrated in a handful of the EU and Horizon 2020 (H2020) associated countries. Together, the United Kingdom, Germany, Spain, France and the Netherlands hosted over 58% of all incoming MSCA researchers under Horizon 2020. Overall, these countries experienced either positive or balanced researcher flows under the Horizon 2020.

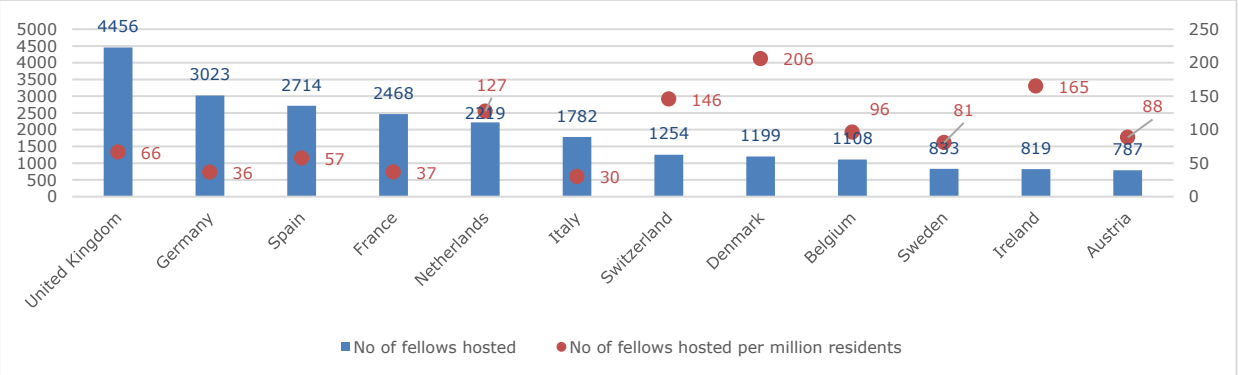
In addition, the analysis below shows that 110 countries hosted at least one MSCA researcher for either long-term or short-term mobility during Horizon 2020. Widening countries participated more actively in RISE projects than in other MSCA actions. This suggests that RISE promotes mobility to a large extent between widening and non-widening countries.

Analysis of MSCA long-term mobility (IF, ITN and COFUND actions)

The geographical mobility of researchers under the MSCA reveals significant differences between destination countries in terms of their attractiveness. When looking at IF, ITN, and COFUND actions (i.e. MSCA long-term mobility), the United Kingdom is the most attractive destination in Europe by a wide margin. Germany, Spain, France, the Netherlands and Italy are also popular destinations, all of them showing similar levels of mobility. Switzerland, Denmark, Belgium, Sweden, Ireland and Austria belong to a third group, after which there is a significant drop in the number of MSCA fellows attracted per country.

The figure below compares researcher inflows per million residents of each country. Here, the picture is slightly different. Countries such as Denmark, Ireland and Switzerland stand out, as they attract the most MSCA researchers relative to the size of their populations.

Figure 1. Most popular destinations for MSCA fellows (IF, ITN, COFUND), Horizon 2020



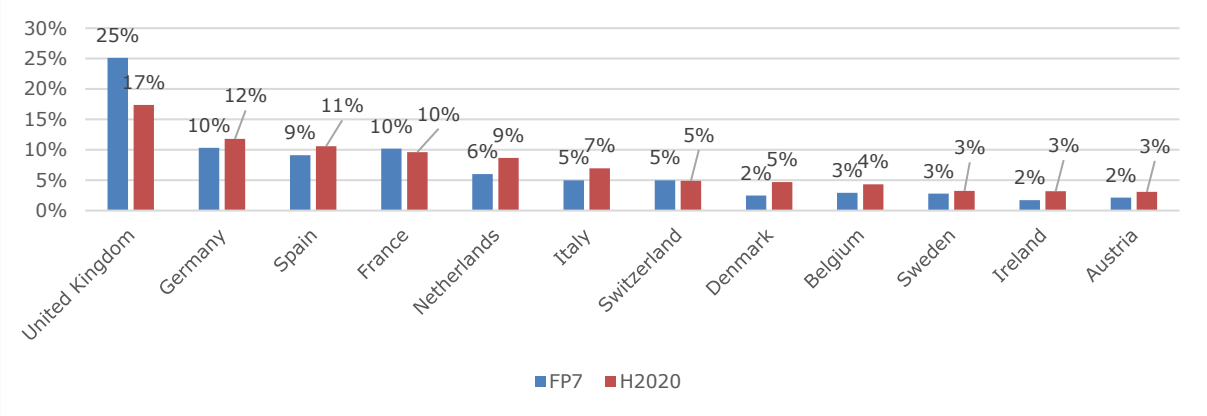
[48] *IF – Individual Fellowships (Postdoctoral Fellowships under Horizon Europe), ITN – Innovative Training Networks (Doctoral Fellowships under Horizon Europe), COFUND - Co-funding of regional, national and international programmes.*

Source: CORDA database.

In general, the situation in terms of geographical mobility under Horizon 2020 is largely unchanged since the previous funding period (FP7). Most researchers chose the same host countries for their mobility under FP7 as they do under Horizon 2020. There are, however, a few exceptions: Israel was among the top 12 MSCA destinations under FP7 (4% of total participants went there, compared with 0.5% under Horizon 2020), while Ireland's share increased from 1.7% to 3.1%.

Counted together, the countries represented in the figure below hosted over 80% of all fellows during FP7 (2007-2013), as well as during Horizon 2020 (2014-2020). The figure presents the respective shares of fellows hosted by the most popular mobility destinations. We can see that the overall trend in fellows' preferences (and perhaps the availability of excellent host organisations) has remained fairly stable over the last 14 years.

Figure 2. The most popular destinations for MSCA fellows (IF, ITN, COFUND) under Horizon 2020 as compared to the FP7

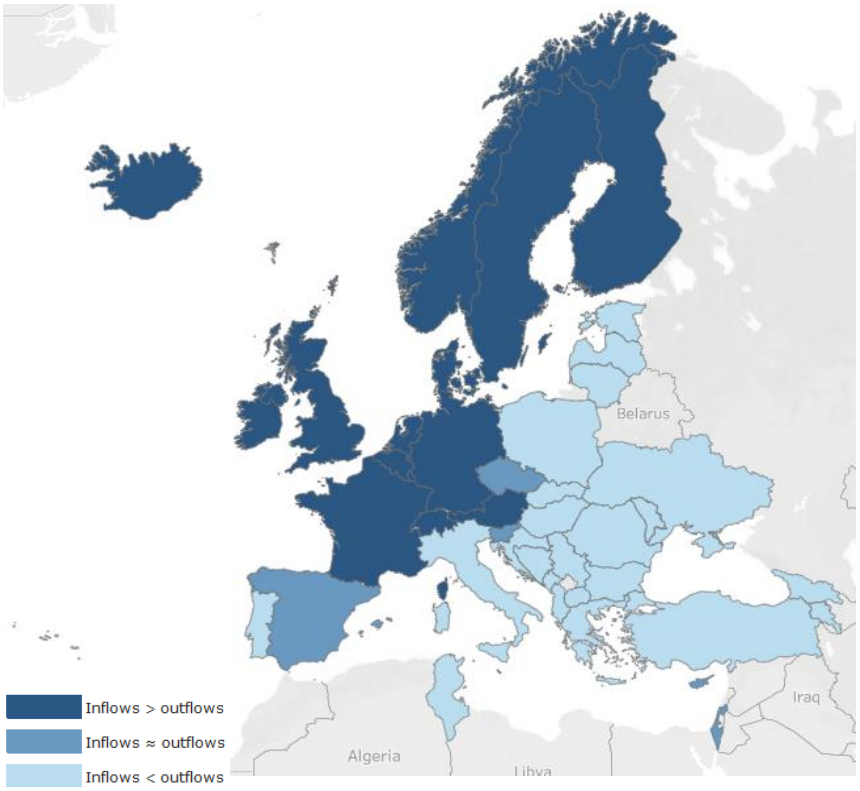


Source: CORDA database.

Almost all the most popular MSCA host countries have significantly higher inflows of researchers than outflows during the Horizon 2020 funding period (see Figure 3). The figure also shows that **widening countries[49] mostly hosted fewer foreign fellows compared with the number of their nationals who undertook an MSCA fellowship abroad**.

[49] *With the exception of Czechia, Slovenia and Cyprus, which have fairly balanced researcher inflows and outflows.*

Figure 3. Balance of MSCA long-term mobility flows in the EU and associated countries (IF, ITN, COFUND), Horizon 2020



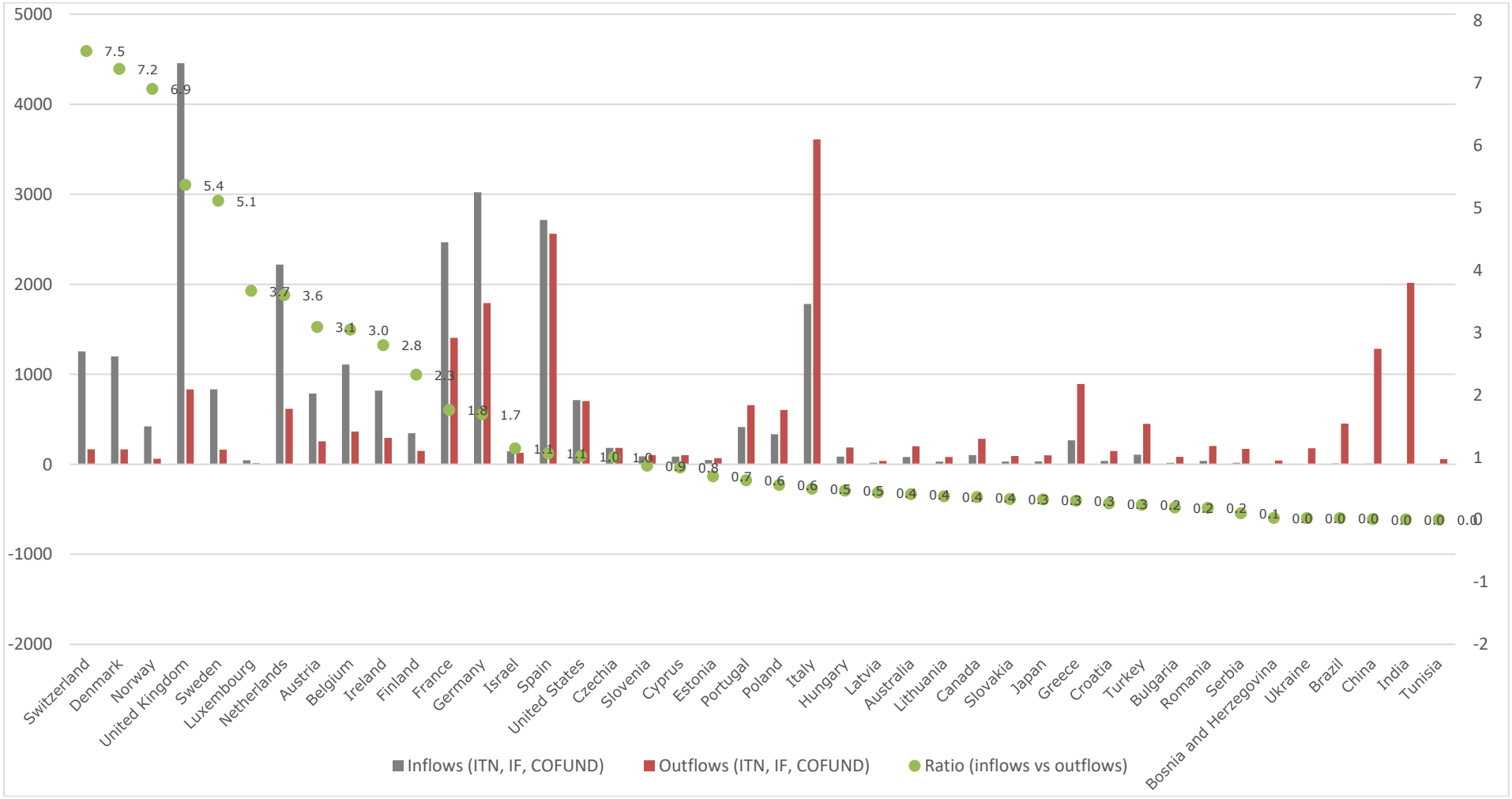
Source: CORDA database.

Figure 4 below provides a deeper insight into the countries with a positive balance of MSCA mobility. Of these, Switzerland has the largest positive balance, with 7.5 times more fellows being hosted in Switzerland than there were Swiss researchers undertaking MSCA fellowships abroad. The United Kingdom, which welcomed the largest total number of MSCA fellows, has had more than five times fewer UK nationals undertaking IF, ITN or COFUND fellowships abroad compared with the number of fellows coming to the UK. Italian nationals are the most active participants in MSCA (IF, ITN, COFUND); however, only half as many foreign researchers choose Italian institutions as a destination for their MSCA fellowship. The figure also illustrates a clear challenge for widening countries to attract the MSCA fellows.

Major differences also exist between widening countries that belong to the EU and Horizon 2020 associated countries. While EU Member States experience outflows of researchers that are up to 5.7 times higher than inflows (Romania), among certain non-EU widening countries, this difference jumps to 44 times (Ukraine). The difference between the EU Member States and associated countries is most visible in those countries that only have a small number of fellows participating in the MSCA. Such Horizon 2020 associated countries have only a few nationals participating in IF, ITN or COFUND actions, and barely host any foreign researchers.

Overall, MSCA long-term researcher mobility flows are balanced in only five participating EU and/or associated countries: namely, Spain, Israel, Czechia, Slovenia and Cyprus. Note that Spain is the third most attractive host country, and Spanish fellows are also the nationality with the second-largest participation in the MSCA (IF, ITN and COFUND).

Figure 4. Inflows and outflows of IF, ITN and COFUND fellows in the EU, associated countries, and leading third countries

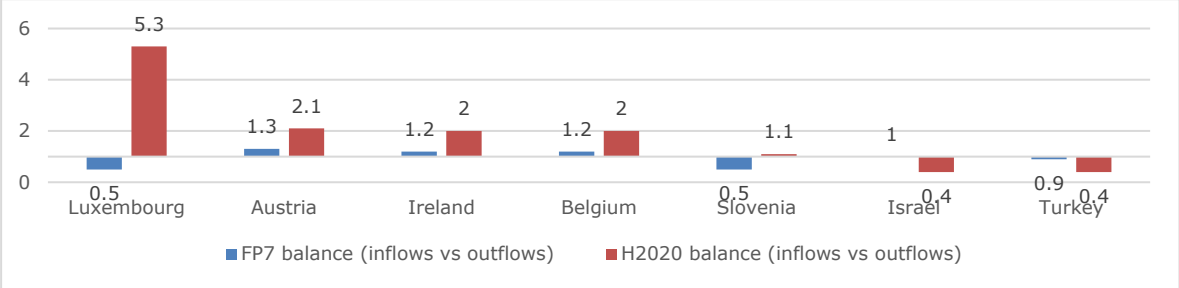


Source: CORDA database.
Note: the Republic of Moldova, the Faroe Islands, Iceland, Albania, Malta, North Macedonia, Armenia, Montenegro and Georgia are excluded from the figure due to their small overall number of MSCA participants. Data for third countries also includes short-term mobilities under the IF-GF action.

Compared to FP7, the overall mobility flows were distributed quite similarly under Horizon 2020: wealthier countries with stronger research systems received more fellows than other EU and associated countries[50].

In the figure below, we present only those host countries that have seen a significant change in the balance of inflows vs outflows under Horizon 2020, compared with FP7. We see that over time, Luxembourg, Austria, Ireland, Belgium and Slovenia have become more attractive host countries for experienced researchers, while Israel and Turkey have started to 'lose' more researchers than they receive.

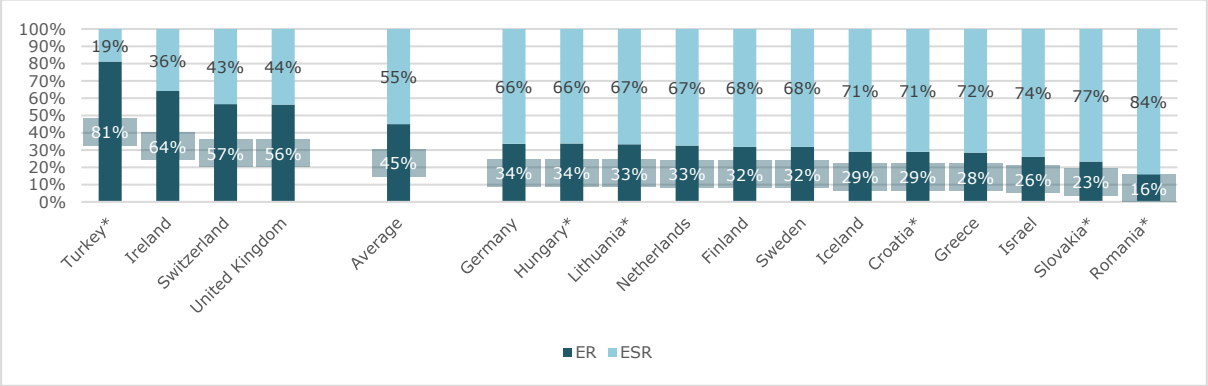
Figure 5. Inflows vs outflows of experienced researchers (the equivalent of IF) under FP7 and Horizon 2020



Source: CORDA database.

Looking into the inflows of ERs and ESRs to the host countries, we notice that most of the EU and H2020 associated countries receive a balanced (as compared to the MSCA total average) number of fellows in terms of experience (around 45% ERs and 55% ESRs). However, some countries stand out. Turkey and Ireland attract more experienced researchers than an average MSCA host country. At the same time, Romania, Slovakia, and Israel seem much more attractive to the early-stage researchers (see Figure 6).

Figure 6. ERs and ESRs in the MSCA (IF, ITN, COFUND) host countries



Source: CORDA database[51]. *Widening countries.

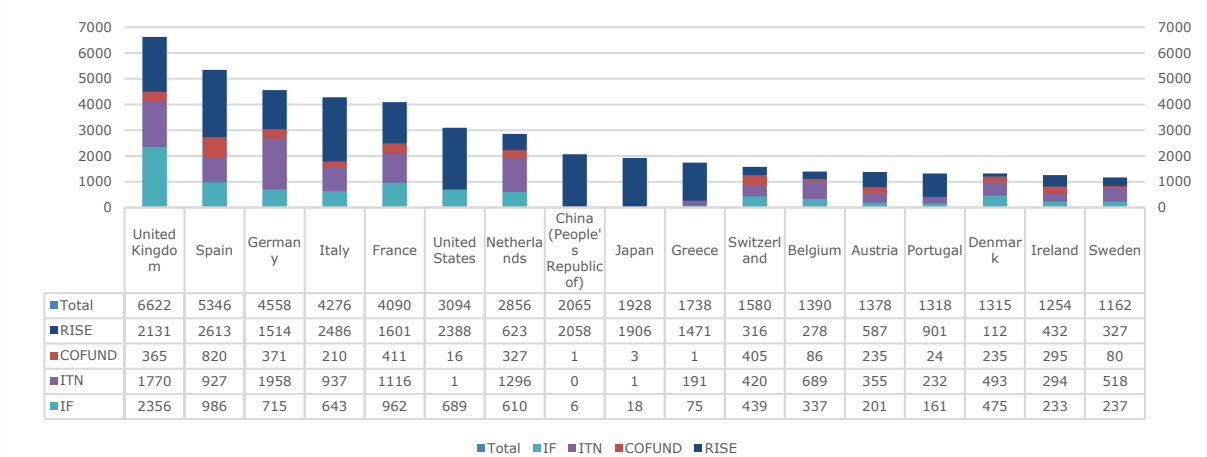
Analysis of MSCA short-term mobility (RISE secondments)

Over the Horizon 2020 funding period, 110 countries hosted at least one MSCA researcher for either long-term or short-term mobility. RISE was essential in ensuring such a wide diversity of participating countries. Under Horizon 2020, RISE projects involved organisations in 109 countries. This compares with IF, ITN and COFUND projects, which involved 73 countries combined.

[50] *However, due to limitations in the availability of data, we could only compare fellows taking part in IF (or the FP7 equivalent of IF).*
[51] *Nationalities with less than 30 fellows in MSCA IF, ITN, COFUND were excluded from the analysis.*

Figure 7 illustrates the most attractive MSCA host countries from all actions combined (i.e. the 18 most popular MSCA destinations, based on the overall number of researchers hosted). As the figure shows, RISE makes up a substantial part of all MSCA mobilities. For example, in the UK, the most attractive MSCA host country, 30% of all individuals participating in MSCA were RISE researchers and staff.

Figure 7. MSCA participating countries that hosted the most researchers, by type of action (all actions combined)



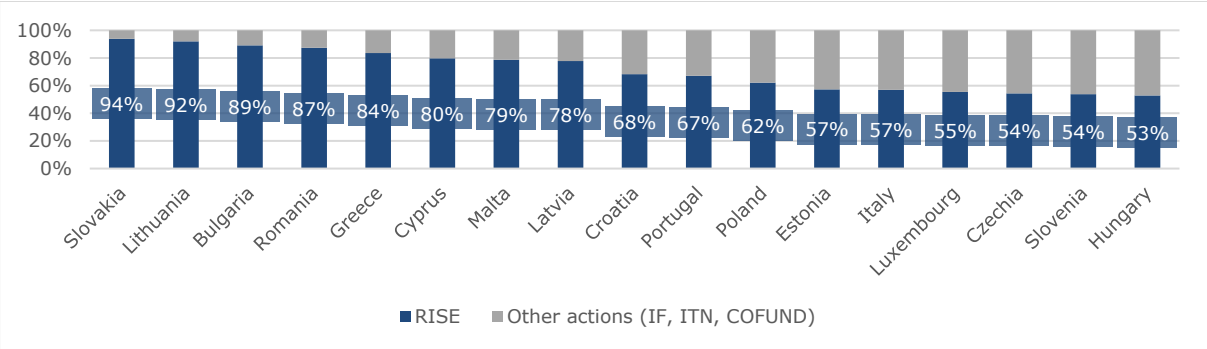
	United Kingdom	Spain	Germany	Italy	France	United States	Netherlands	China (People's Republic of)	Japan	Greece	Switzerland	Belgium	Austria	Portugal	Denmark	Ireland	Sweden
Total	6622	5346	4558	4276	4090	3094	2856	2065	1928	1738	1580	1390	1378	1318	1315	1254	1162
RISE	2131	2613	1514	2486	1601	2388	623	2058	1906	1471	316	278	587	901	112	432	327
COFUND	365	820	371	210	411	16	327	1	3	1	405	86	235	24	235	295	80
ITN	1770	927	1958	937	1116	1	1296	0	1	191	420	689	355	232	493	294	518
IF	2356	986	715	643	962	689	610	6	18	75	439	337	201	161	475	233	237

Source: CORDA database.

RISE secondments make up the largest share of all MSCA mobilities (54%) and therefore a substantial part of overall researcher inflows to all participating countries. In 37 countries, RISE staff are the only MSCA researchers hosted during the 2014-2020 funding period. All these 37 countries are non-EU countries; three of them (Tunisia, Moldova and Armenia) are associated to Horizon 2020, while the rest are third countries. This suggests that RISE works as a bridge between EU Member States and third countries. On the other hand, such a large share of RISE mobilities in certain countries is due to the nature of the RISE action itself, given that these are short-term staff exchanges and that one project may involve hundreds of mobilities.

Among EU27+UK countries, researcher inflows from RISE secondments make up the absolute majority (over 50%) of MSCA researcher inflows in 17 countries (illustrated in the figure below). All but two (Greece and Italy) are widening countries.

Figure 8. Countries where RISE produces the largest share of incoming MSCA researchers

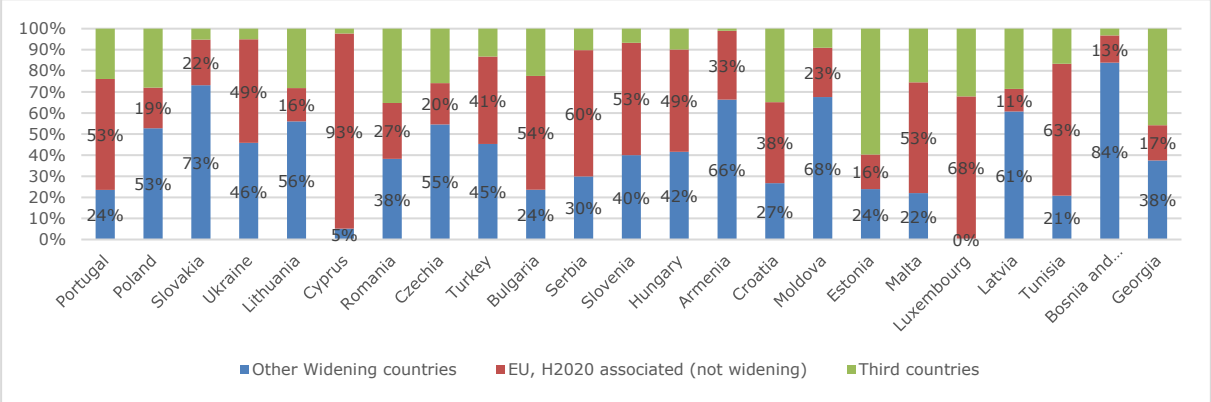


Source: CORDA database.

The chart above shows that widening countries are active participants in RISE staff exchange projects. In terms of researchers hosted in widening countries via RISE,

most staff come from other (non-widening) EU and Horizon 2020 associated countries. Figure 9 illustrates that in Cyprus, Luxembourg, Tunisia and Serbia, over 60% of researchers and staff members hosted are from organisations located in other EU and Horizon 2020 associated countries.

Figure 9. Widening countries' partner regions in RISE



Source: CORDA database[52].

Due to the nature of RISE projects, short-term mobility flows are fairly balanced in the majority of RISE participating countries. This is especially the case among EU countries. Nevertheless, third countries with advanced research and innovation ecosystems tend to host more RISE researchers than others (e.g. Japan, China, USA), whereas third countries with weaker ecosystems sometimes have higher outflows than inflows (e.g. Egypt, Iran, Kazakhstan).

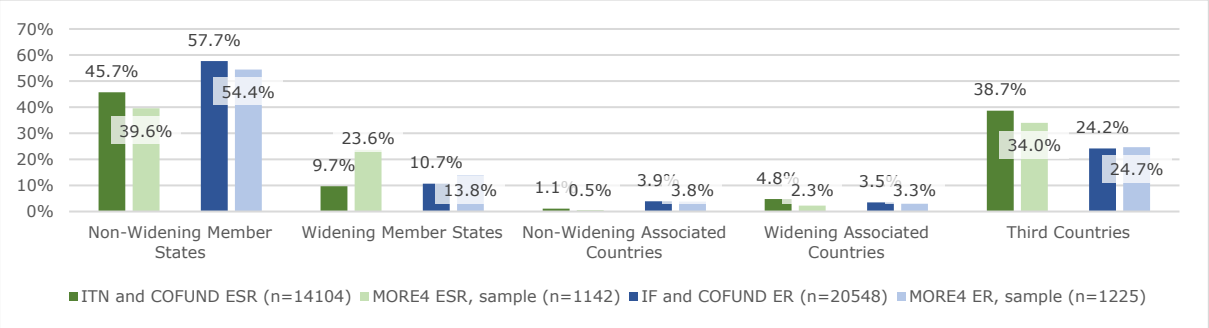
3.1.2 How do MSCA mobility flows differ from overall research mobility in Europe?

The following section compares MSCA mobility patterns with the overall researchers' mobility in Europe (based on data from the MORE4 survey). This analysis provides important information about the differences between MSCA fellows and the general mobile scientific population. Unless otherwise indicated, the analysis accounts for MSCA mobility under both FP7 and Horizon 2020.

Figure 10 compares the MORE4 sample with the MSCA population (IF, ITN, COFUND) by career stage and country group. Differences in distribution are more evident at country-level. Still, even here, we can see differences between non-widening and widening Member States, particularly with regard to early-stage researchers. Among experienced researchers, the differences are not striking at this level, providing a preliminary indicator that the MSCA and general mobility are fairly similar in terms of countries of origin.

[52] *Albania is excluded from this chart due to very low mobility flows (it hosted only five RISE researchers, with one MSCA RISE project).*

*Figure 10. Distribution of researchers by career stage and country of origin**

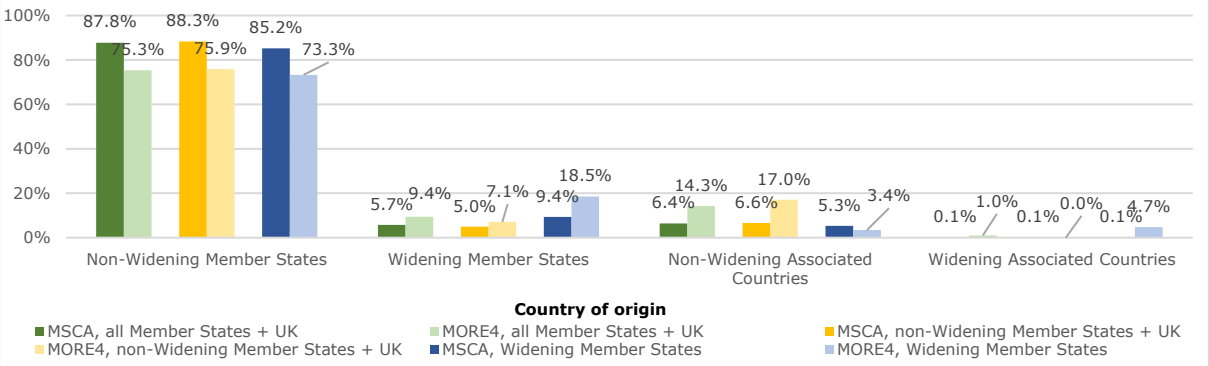


Source: CORDA database; MORE4 Survey. *Country of origin information not available for all MSCA fellows during FP7.

For early-stage researchers, we can see that MSCA ITN and COFUND fellows are more likely to go to non-widening Member States and to the United Kingdom, compared with mobile researchers in general (a difference of 9.2 percentage points). The shares are lower for widening and associated countries. This is to be expected as the MSCA is an excellence-based programme, making it more likely that MSCA fellows would choose to go to host institutions in countries with more advanced research infrastructures and better-regarded universities (see Section 6 for a detailed analysis of mobility determinants).

Non-widening Member States as well as the United Kingdom attract a slightly higher share of researchers in the MSCA, which is reflected in a slightly lower share for widening Member States. Overall, these differences are marginal, and at this level, the distribution of mobility can be described as being in line with overall patterns of mobility. When examining mobility destinations by country of origin, some differences emerge between the MSCA and MORE4 populations of early-stage researchers. Figure 11 includes non-widening and widening Member States as countries of origin, along with the United Kingdom, while excluding associated and third countries, which means that the percentage shares differ from earlier charts. The bars in darker hues represent MSCA mobility, whereas the bars in lighter hues indicate MORE4 mobility.

Figure 11. Mobility destinations of early-stage researchers by country of origin (EU27+UK)



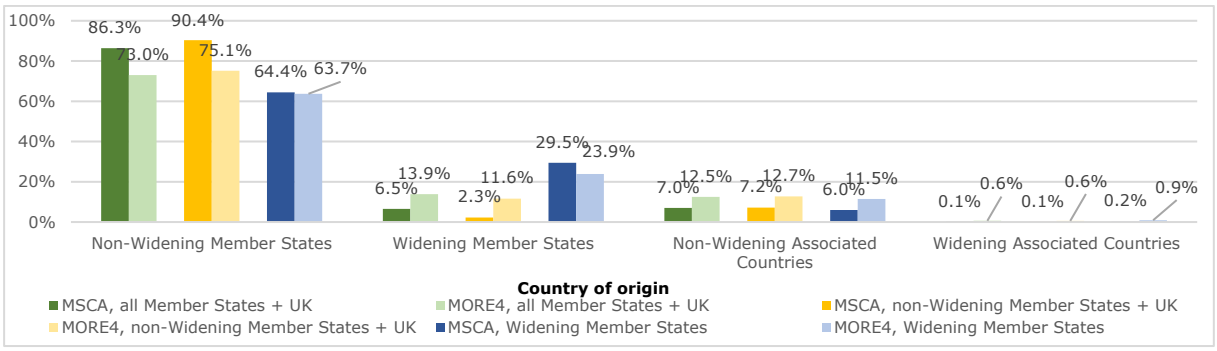
Source: CORDA database; MORE4 Survey. ITN and COFUND ESR n=16,791; MORE4 ESR n=902.

MSCA early-stage researchers who are nationals of Member States are more likely to go to non-widening Member States and to the United Kingdom than MORE4 early-stage researchers from Member States. MORE4 early-stage researchers are more likely to be mobile to widening Member States and non-widening associated countries.

The clearest difference is that non-MSCA researchers from non-widening Member States and the United Kingdom are more likely to go to non-widening associated countries (a difference of 11.4 percentage points). Among researchers from widening Member States, there are two notable differences: a larger share of non-MSCA researchers go to other

widening Member States (a difference of 9.1 percentage points compared with the MSCA) and to widening associated countries (a difference of 4.6 percentage points). Figure 12 below provides an overview of the mobility destinations of experienced researchers.

Figure 12. Mobility destinations of experienced researchers by country of origin (EU27+UK)



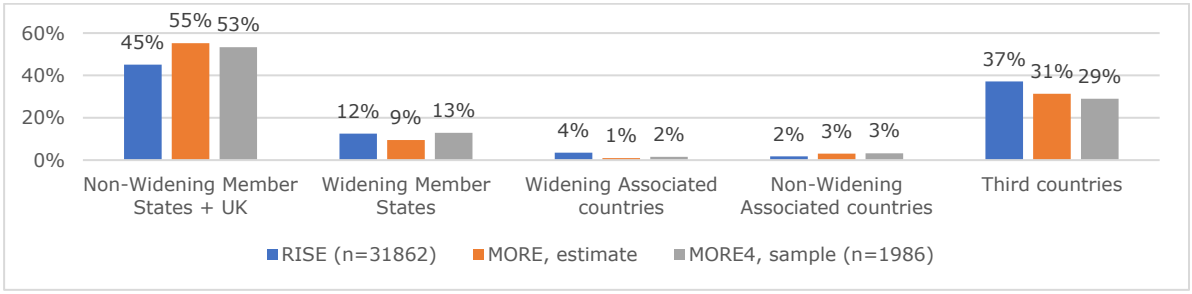
Source: CORDA database; MORE4 survey. ITN and COFUND ER n=20,609; MORE4 ER n=1,228.

Like Figure 11, Figure 12 includes only the Member States and the United Kingdom as countries of origin, while excluding associated and third countries. The bars in darker hues represent MSCA mobility, whereas the bars in lighter hues indicate MORE4 mobility.

Experienced researchers from non-widening Member States and the United Kingdom are more likely to go to non-widening Member States and to the United Kingdom, at the expense of other country groups (a difference of 15.3 percentage points compared with MORE4 mobility). For experienced researchers from widening Member States, mobility to non-widening Member States and the United Kingdom is similar in both the MSCA and MORE4 populations. However, **the MSCA support mobility from widening Member States to other widening Member States to a greater extent than is evident in MORE4 mobility patterns.**

Figure 13 shows the differences in mobility patterns between RISE staff and other short-term mobile researchers by destination country group. In the MORE4 study, short-term mobility is considered to be less than a year.

*Figure 13. Mobility destinations of RISE staff compared with other short-term mobile researchers**



Source: CORDA database; MORE4 survey. *Only mobilities during Horizon 2020 included.

Based on this analysis, RISE strongly supports mobilities to third countries, widening Member States and widening associated countries. One cannot exclude, however, the possibility that these differences emerge from the way in which the MORE4 sample was constructed. If we remove third countries as a destination, widening Member States and associated countries are supported by RISE to a greater extent (2 and 3 percentage points higher than the MORE4 sample); less so for the non-widening Member States and associated countries (3 and 2 percentage points lower, compared to the MORE4 sample).

Based on the above analysis, we conclude that there are striking similarities between the MSCA and MORE4 mobility patterns. While the MSCA support mobility to non-widening Member States to a greater extent than is evident in general mobility

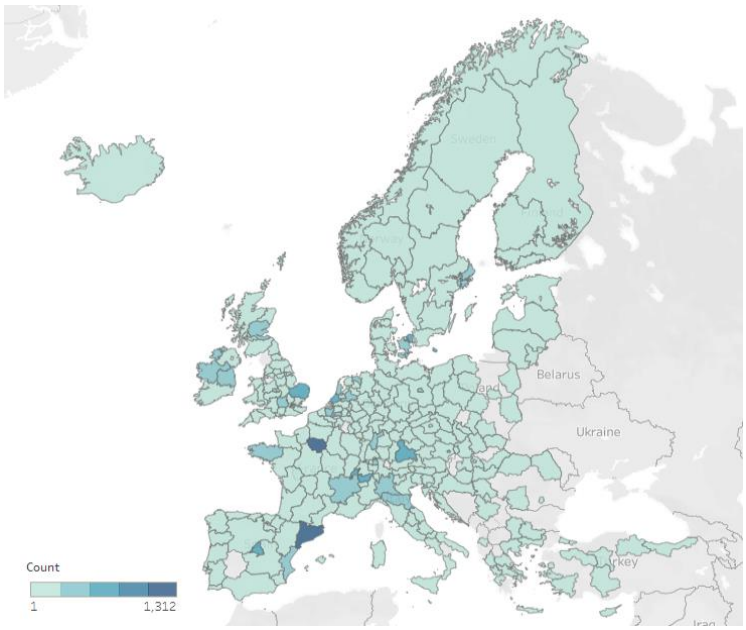
patterns, this difference may be expected, due to the focus of the MSCA on excellence. Furthermore, the differences practically disappear when looking at the mobility patterns of experienced researchers. The gender balance in MSCA mobility is at the same level as that of the general mobility, as the MSCA help researchers with a diverse range of scientific backgrounds to be mobile. While greater attention could be paid to making widening countries more attractive to early-stage researchers, the findings show that **overall, we should consider mobility under the MSCA as mirroring general flows of mobility**.

3.1.3 Regional (NUTS-2) level mobility

Analysis of MSCA long-term mobility (IF, ITN and COFUND actions)

A large share of the most attractive host organisations is concentrated in only a handful of European regions. As illustrated in the map below, these regions are mostly located in Western Europe.

Figure 14. Number of researcher inflows by NUTS-2 region (IF, ITN, COFUND), Horizon 2020



Source: CORDA database.

In fact, 12 regions[53] hosted 30% of all fellows involved in MSCA long-term mobility. The most popular regions were the areas surrounding Barcelona (ES) and Paris (FR), which hosted 1,215 and 1,119 fellows, respectively. A detailed list of the most popular IF, ITN and COFUND destination regions is presented in the table below[54].

Table 1. Most popular host regions among IF, ITN and COFUND fellows

NUTS2 region	Total number of fellows hosted	Most prominent cities	Examples of the most prominent participant organisations
Catalonia (ES51)	1,215	Barcelona	• Spanish National Research Council • Autonomous University of Barcelona • University of Barcelona
Ile de France (FR10)	1,119	Paris	• French National Centre for Scientific Research • Sorbonne University

[53] *In total, MSCA IF, ITN and COFUND fellows were hosted in 346 regions.*
[54] *Note that some regions listed are those in which large research institutions are headquartered (e.g. the French National Centre for Scientific Research in Paris). Such institutions also have branches elsewhere in the country; hence, numbers of researcher inflows may be inflated for such regions.*

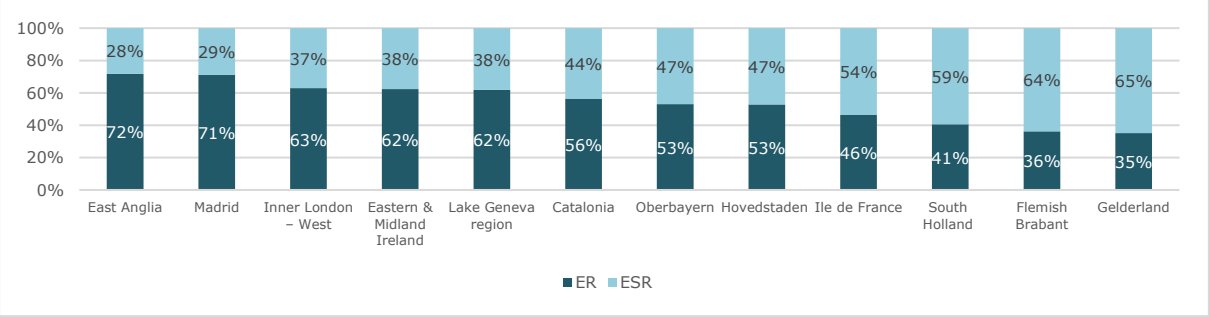
Inner London – West (UKI3)	718	London	• Imperial College of Science, Technology and Medicine • University College London
Hovedstaden (DK01)	687	Copenhagen	• Technical University of Denmark • University of Copenhagen
Oberbayern (DE21)	596	Munich	• Ludwig Maximilian University of Munich • Technical University of Munich
Madrid (ES30)	550	Madrid	• Complutense University of Madrid • Spanish National Research Council
South Holland (NL33)	535	Delft Leiden Rotterdam	• Delft University of Technology • Leiden University
East Anglia (UKH1)	508	Cambridge	• University of Cambridge • Medical Research Council
Lake Geneva region (CH01)	528	Geneva Lausanne	• Swiss Federal Institute of Technology Lausanne • University of Geneva
Eastern & Midland Ireland (IE06)	444	Dublin	• University College Dublin, National University of Ireland
Flemish Brabant (BE24)	436	Leuven	• Catholic University of Leuven (KU Leuven)
Gelderland (NL32)	415	Amsterdam	• University of Amsterdam • Vrije Universiteit Amsterdam

Source: CORDA database.

The situation with regard to regional distribution of mobility has changed notably since FP7. Under FP7, mobility flows were more concentrated than under Horizon 2020; the top 12 regions hosted 39% of all mobile MSCA fellows. In addition, a significant share of fellows went to third countries for their fellowship (5%, 628 fellows in total). In contrast, under Horizon 2020, only 197 fellows (1% of the total) were hosted in third countries. Furthermore, under FP7, five out of the 12 most popular host destinations were located in the UK, while under Horizon 2020, the UK's importance as a host country declined (as well as that of regions, including cities such as London or Oxford). Instead, regions in the Netherlands (with cities as Delft, Leiden, Rotterdam and Amsterdam), Ireland (Dublin) and Belgium (Leuven) have gained more importance as MSCA host destinations.

The analysis of MSCA long-term mobility flows under Horizon 2020 shows that some regions have a strong focus on either experienced or early-stage researchers. Organisations in regions such as East Anglia (which includes Cambridge) and Madrid tend to attract more experienced researchers, while regions in the Netherlands and Belgium host more early-stage researchers (see Figure 15).

Figure 15. Experienced and early-stage researchers hosted in the most popular regions for IF, ITN and COFUND fellows



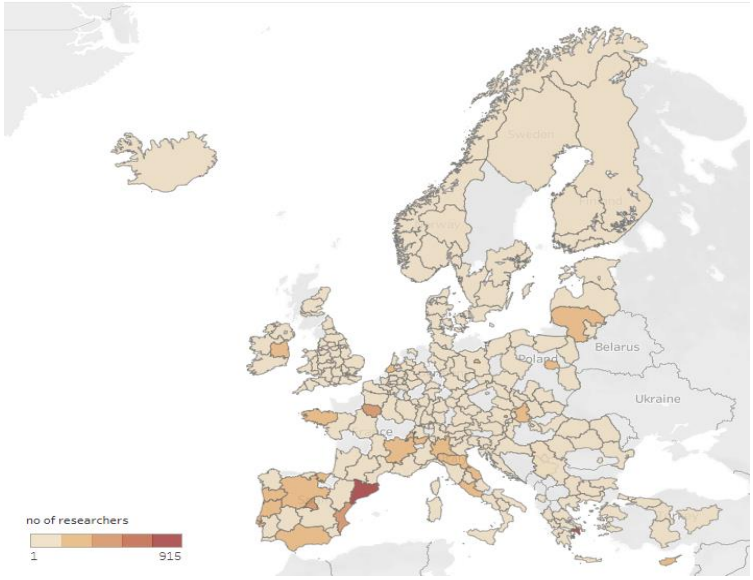
Source: CORDA database.

Analysis of short-term MSCA mobility (RISE secondments)

Compared with long-term mobility trends, RISE most popular host regions are dispersed slightly more widely across Europe. As illustrated in the figure below, some

of the most popular regions can be found in Greece, Spain, Portugal, Cyprus, Ireland, Italy as well as Eastern European countries such as Poland and Lithuania.

Figure 16. Intensity of researcher inflows by NUTS-2 region (RISE), Horizon 2020



Source: CORDA database.

The top 10 most popular RISE destinations are listed in the table below; these 10 regions host 25% of all RISE (Horizon 2020) mobile researchers and staff. Half of these regions are located on the Iberian Peninsula (Spain and Portugal). In addition, and in line with the country-level mobility trends discussed above, the most popular RISE host countries/regions also include some widening countries (Cyprus, Portugal)[55].

Table 2. Ten most popular host regions in Europe among RISE staff

NUTS2 region	Total number of fellows hosted	Most prominent cities	Examples of the most prominent participant organisations
Attica (EL30)	915	Athens	• National and Kapodistrian University of Athens
Catalonia (ES51)	831	Barcelona	• Autonomous University of Barcelona • University of Barcelona
Ile de France (FR10)	512	Paris	• French National Centre for Scientific Research
Valencian Community (ES52)	444	Valencia	• Universitat Politecnica de Valencia • University of Valencia
Madrid (ES30)	390	Madrid	• Complutense University of Madrid • Spanish National Research Council
Lazio (ITI4)	360	Rome	• University of Rome • National Institute of Nuclear Physics
Andalusia (ES61)	354	Granada Sevilla	• University of Sevilla • University of Granada
Cyprus (CY00)	344	Limassol Nicosia	• Cyprus University of Technology • Cablenet Communication Systems LTD
Área Metropolitana de Lisboa (PT17)	318	Lisbon	• NOVA ID FCT - Association for Innovation and Development • Technical University of Lisbon
Centro Portugal (PT16)	313	Aveiro	• University of Aveiro • SMALLMATEK - Small Materials and Technologies LDA

[55] *Note that some of the regions listed are those in which large research institutions are headquartered (e.g. the French National Centre for Scientific Research in Paris), which also have branches around the respective country; hence, numbers of researcher inflows may be inflated for such regions.*

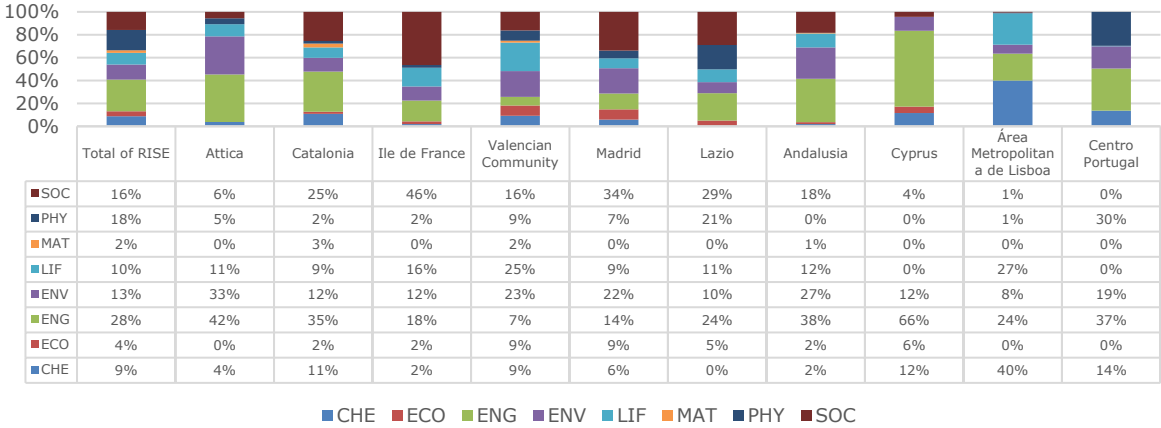
Source: CORDA database.

The comparison between short-term mobility trends under FP7 and Horizon 2020 is complicated by the limited availability of data regarding the comparable actions (FP7-PEOPLE-IAPP and FP7-PEOPLE-IRSES). Nevertheless, the CORDA administrative data show that Horizon 2020 involved significantly more mobilities to third countries. Under Horizon 2020, 39% (12,596) of short term mobilities were directed to third countries. Under FP7, only 2% (13 in total) of short-term mobilities were to third countries. Also, regions in Portugal (including Lisbon and Aveiro) and Spain (Granada, Sevilla, Valencia), as well as Cyprus, significantly increased their importance as short-term mobility hosts under Horizon 2020.

In line with overall trends in RISE and the MSCA, the majority of RISE mobility participants going to the most popular regions were experienced researchers. The share of early-stage researchers and other staff (managerial, administrative and technical) are similar across these regions. A slight outlier is the Madrid region, which hosted the largest share of mobile staff who were not researchers (24% of the RISE staff hosted were "other staff", compared with a RISE average of 9%).

The scientific panel is an important variable defining the choice of the RISE mobility destination. Figure 17 illustrates that in relative terms, the Lisbon region (Area Metropolitana de Lisboa) hosts the largest share of researchers in chemistry (40% of hosted staff work in the field of chemistry, compared with a RISE average of 9%). RISE researchers coming to Cyprus mostly work in engineering (60% of total RISE staff in Cyprus, compared with a RISE average of 28%). The Paris region hosted a relatively large share of researchers and staff working in social sciences.

Figure 17. RISE staff hosted in the most popular regions, by scientific panel



	Total of RISE	Attica	Catalonia	Ile de France	Valencian Community	Madrid	Lazio	Andalusia	Cyprus	Área Metropolitana de Lisboa	Centro Portugal
SOC	16%	6%	25%	46%	16%	34%	29%	18%	4%	1%	0%
PHY	18%	5%	2%	2%	9%	7%	21%	0%	0%	1%	30%
MAT	2%	0%	3%	0%	2%	0%	0%	1%	0%	0%	0%
LIF	10%	11%	9%	16%	25%	9%	11%	12%	0%	27%	0%
ENV	13%	33%	12%	12%	23%	22%	10%	27%	12%	8%	19%
ENG	28%	42%	35%	18%	7%	14%	24%	38%	66%	24%	37%
ECO	4%	0%	2%	2%	9%	9%	5%	2%	6%	0%	0%
CHE	9%	4%	11%	2%	9%	6%	0%	2%	12%	40%	14%

Source: CORDA database.

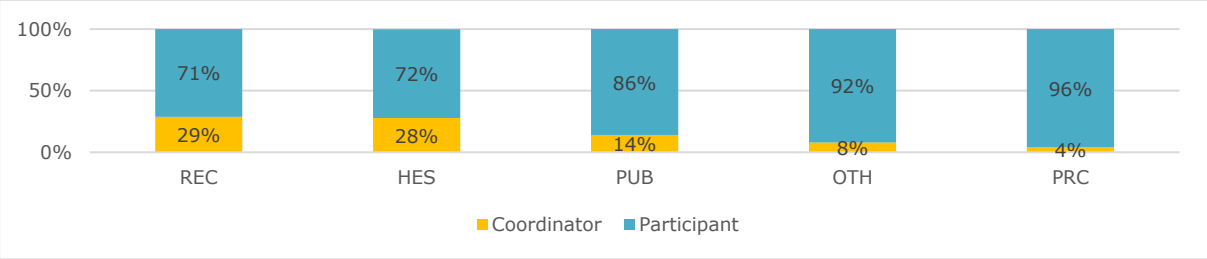
3.2 Intersectoral mobility

3.2.1 Analysis of trends

Intersectoral mobility is instrumental for knowledge transfer between academia and industry. It can enrich the competitiveness of the EU by creating cutting-edge solutions and fostering competitive human resources in research and academia. Under Horizon 2020, **businesses accounted for 17.3% of participations in the long-term MSCA (IF, ITN, COFUND),** which is comparable to research organisations (17.5%), but significantly lower than higher education institutions.

In addition, as illustrated in Figure 18, **where businesses did take part in MSCA projects, they were primarily project partners and not coordinators.** For example, research organisations (REC) and higher education institutions (HEI) coordinated almost 30% of MSCA projects in which they participated. In contrast, where businesses participated in the MSCA, they acted as coordinators in only 4% of cases. Under RISE, businesses coordinated only 2% of projects.

Figure 18. Participant organisations in the MSCA by role in projects and sector of activity (IF, ITN, COFUND)

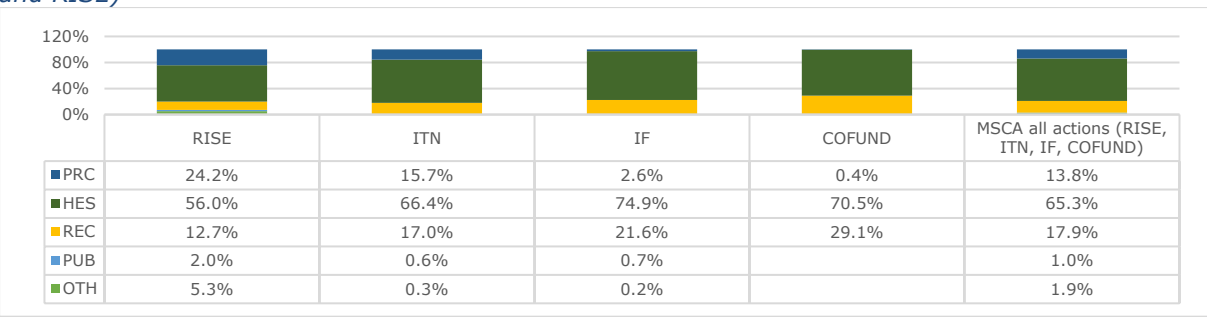


Source: CORDA database.

Under Horizon 2020, 8.7% of MSCA fellows in long-term mobility projects (IF, ITN, COFUND) were hosted in private for-profit entities (PRC). Business participation was greatest in RISE, with 24.2% of RISE researchers and staff being hosted in private for-profit entities (see Figure 19). Given that intersectoral mobility is a key aspect of RISE projects, such an observation is unsurprising. The second largest business participation was in ITN, with around 16% of MSCA fellows hosted in the private sector. 83.5% of these were taking part in European Training Networks (ETN). While European Industrial Doctorate (EID) projects require at least two beneficiaries, one of which should ideally be an enterprise, these accounted for only 16% of ITN fellows hosted in the private sector.

The private sector was the least active in IF, where businesses accounted for just 3% of participations. As one representative of a host from industry explained during an interview, companies prefer to have flexibility in defining the scope and length of a project. Given that companies come from different sectors and have different timelines, having a single format for a project is a limiting factor.

Figure 19. Share of MSCA fellows, by sector of host organisation and by action (ITN, IF, COFUND and RISE)[56]



	RISE	ITN	IF	COFUND	MSCA all actions (RISE, ITN, IF, COFUND)
PRC	24.2%	15.7%	2.6%	0.4%	13.8%
HES	56.0%	66.4%	74.9%	70.5%	65.3%
REC	12.7%	17.0%	21.6%	29.1%	17.9%
PUB	2.0%	0.6%	0.7%		1.0%
OTH	5.3%	0.3%	0.2%		1.9%

Source: CORDA database.

When comparing scientific panels across different sectors, private for-profit entities accounted for the largest share of engineering (ENG) and life sciences (LIF) in each of the MSCA programmes (IF, ITN, RISE[57]). Fields such as economics (ECO) and mathematics

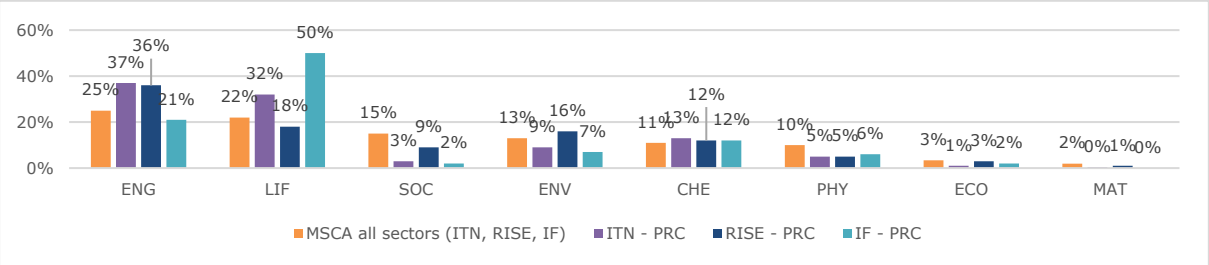
[56] *The information on host organisation type was missing for 245 COFUND fellows. These have been excluded from the analysis.*

[57] *The scientific panel data for COFUND are not available*.

(MAT) received the lowest number of MSCA proposals across all sectors and actions (IF, ITN, RISE).

Under ITN, researchers hosted in the private sector mainly worked in information science and engineering (ENG), life sciences (LIF) and chemistry (CHE). Unlike ITN, **RISE received proposals from more diverse scientific panels**. RISE researchers and staff hosted in the private sector mainly came from information science and engineering, life sciences, environment, and chemistry (see Figure 20).

Figure 20. Scientific panels for MSCA researchers and staff hosted in private for-profit entities (PRC) vs in all sectors

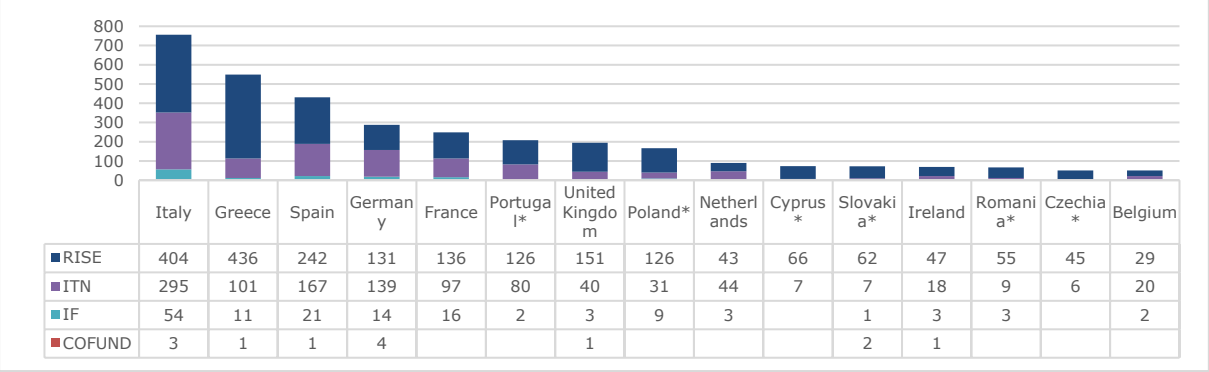


Source: CORDA database.[58]

The majority of MSCA researchers hosted in the private sector were experienced researchers, in line with the overall trend for the MSCA. The share of experienced and early-stage researchers varies between different actions. For example, in COFUND, 75% of fellows hosted in industry were experienced researchers, while the overall percentage of experienced researchers in COFUND was 59%. On the other hand, the share of experienced researchers in the private sector under RISE is comparable with the overall share across MSCA (for overall MSCA see Figure 19).

The nationality of MSCA researchers and staff hosted in the private sector is also similar to the general trends for the MSCA. While such staff include both non-widening and widening European countries, the top nationalities come from the EU14+UK (see figure below).

Figure 21. Nationality of MSCA researchers and staff hosted in private for-profit entities



	Italy	Greece	Spain	Germany	France	Portugal*	United Kingdom	Poland*	Netherlands	Cyprus*	Slovakia*	Ireland	Romania*	Czechia*	Belgium
RISE	404	436	242	131	136	126	151	126	43	66	62	47	55	45	29
ITN	295	101	167	139	97	80	40	31	44	7	7	18	9	6	20
IF	54	11	21	14	16	2	3	9	3		1	3	3		2
COFUND	3	1	1	4			1				2	1			

Source: CORDA database.[59] *Widening countries.

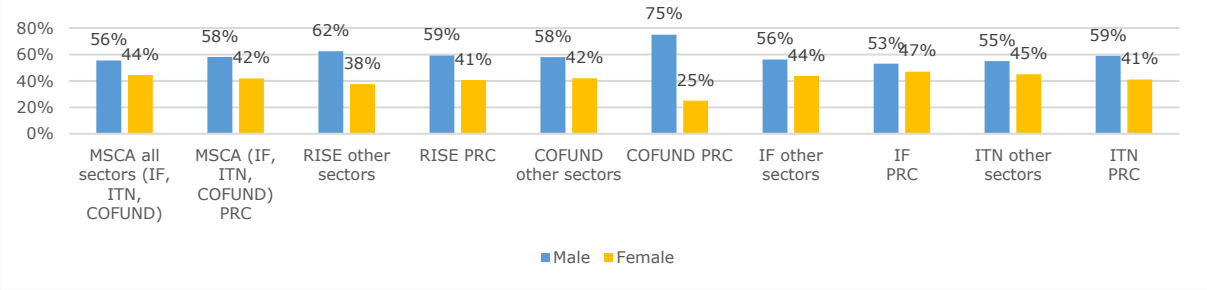
Gender was slightly less balanced among fellows hosted in the private sector, compared with the overall MSCA average (see Figure 22). In particular, differences appear when comparing researchers' gender under the same action but within different

[58] *COFUND was not included in the chart because data on scientific panels were not available.*
[59] *The chart only includes European countries that had a total of 100 or more nationals participating in the MSCA (COFUND, IF, ITN, RISE).*

sectors. For example, when considering researchers hosted in private for-profit entities, the share of women is four percentage points lower under ITN and 17 percentage points under COFUND. However, the total number of COFUND fellows hosted in the private sector was only 16, which is a small sample size to draw meaningful conclusions. At the same time, IF and RISE had a slightly higher share of female researchers hosted in the private sector compared with other sectors (three percentage points).

In IF, ITN and COFUND, women accounted for 44% of fellows. This is comparable to the wider academic community. While women account for 48.1% of doctoral graduates in the EU-27, they remain under-represented in academic and research careers. For example, women account for 42.3% of academic staff and 23.6% of heads of higher education institutions.[60] Supporting women researchers is crucial to increasing the number of researchers across Europe and harnessing the unused potential of female researchers. Increased gender diversity in research can help to improve scientific quality and innovation through the increased diversity of ideas and cognitive strategies.[61]

Figure 22. Gender of MSCA (IF, ITN, COFUND) researchers hosted in private for-profit entities vs those hosted in other sectors



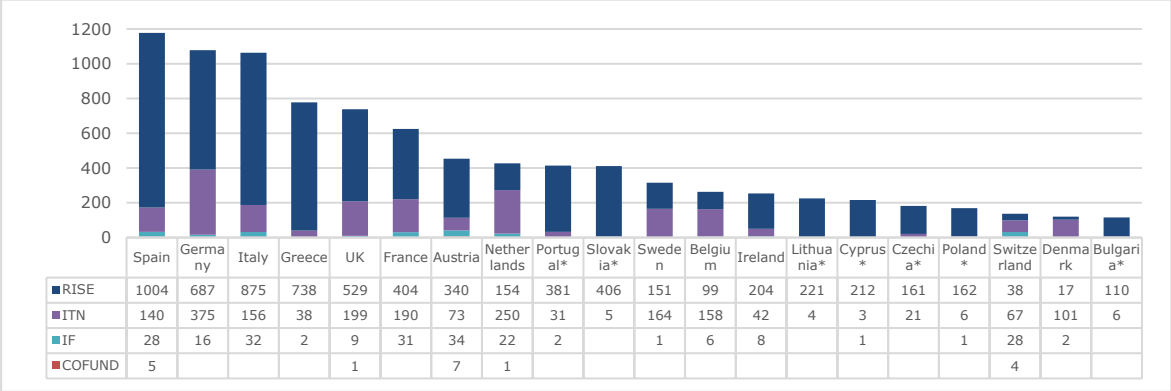
Source: CORDA database.

Over 90% of MSCA researchers and staff in private for-profit entities were hosted in Europe. The majority of private host organisations in Europe were concentrated in EU-14 countries and the United Kingdom. The top three host countries are Spain, Germany and Italy. Private enterprises from widening countries such as Slovakia, Portugal and Ukraine mainly hosted RISE researchers and staff (see Figure 23).

[60] *She Figures 2021: The path towards gender equality in research and innovation (R&I). https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/61564e1f-d55e-11eb-895a-01aa75ed71a1*

[61] *GenSET report 2010: Recommendations for Action on the Gender Dimension in Science, 2010. https://gender-summit.com/images/genSET_Recommendations_for_Action_on_the_Gender_Dimension_in_Science.pdf*

Figure 23. Top host countries for MSCA researchers and staff hosted in private for-profit entities



	Spain	Germany	Italy	Greece	UK	France	Austria	Netherlands	Portugal*	Slovakia*	Sweden	Belgium	Ireland	Lithuania*	Cyprus*	Czechia*	Poland*	Switzerland	Denmark	Bulgaria*
RISE	1004	687	875	738	529	404	340	154	381	406	151	99	204	221	212	161	162	38	17	110
ITN	140	375	156	38	199	190	73	250	31	5	164	158	42	4	3	21	6	67	101	6
IF	28	16	32	2	9	31	34	22	2		1	6	8		1		1	28	2	
COFUND	5				1		7	1										4		

Source: CORDA database.[62] *Widening countries.

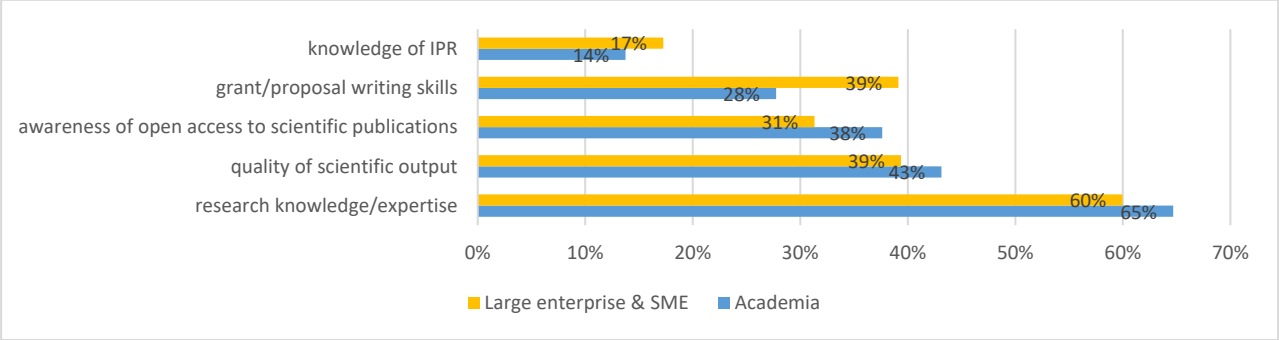
3.2.2 Strengths and weaknesses of intersectoral mobility under the MSCA

Intersectoral mobility has many benefits at individual, institutional and national levels. At individual level, it fosters the development of researchers' skills and supports their career growth, enabling them to pursue research in diverse sectors. At institutional level, intersectoral mobility facilitates the transfer of knowledge and technologies, the exchange of best practices, and the co-creation of cutting-edge solutions to effectively address societal challenges. At national level, intersectoral mobility increases the value of scientific work and promotes greater sectoral collaboration and innovation. These benefits can foster positive societal changes, competitiveness, a country's long-term economic development. Through their various actions, the MSCA promote researchers' intersectoral mobility and widen their career perspectives. In previous studies, PPMI found that intersectoral mobility helped to develop researchers' industry-relevant skills, improving their employability and helping them to secure research and innovation-related jobs in the private sector.[63] This can be instrumental in addressing the precariousness of research careers and assisting researchers in securing employment outside of academia.

Intersectoral mobility can help researchers to build marketable skills. MSCA fellows developed relevant skills to varying degrees, depending on the sector of their main hosting institution. For example, in the survey taken at the end of the fellowship fellows were asked to assess the impact of the fellowship with regard to a number of skills by rating them as 'strongly increased', 'increased', 'unchanged (fellowship did not help)' or 'unchanged (skills already acquired before fellowship)'. Fellows hosted in academia reported a 'strong increase' in skills such as research knowledge, the quality of scientific work and awareness of open access to scientific data. Meanwhile, fellows hosted at large enterprises and SMEs indicated a 'strong increase' in their knowledge of grant and proposal writing and intellectual property rights (IPR) (see Figure 24).

[62] *The chart only includes European countries that hosted a total of 100 or more researchers and staff under the MSCA (COFUND, IF, ITN, RISE).*
[63] *Dinges, M., Pupinis, M., Leitner, K. & Dumcius, R. (2017). Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020). https://op.europa.eu/en/publication-detail/-/publication/decfab92-5ae2-11e7-954d-01aa75ed71a1/language-en.*

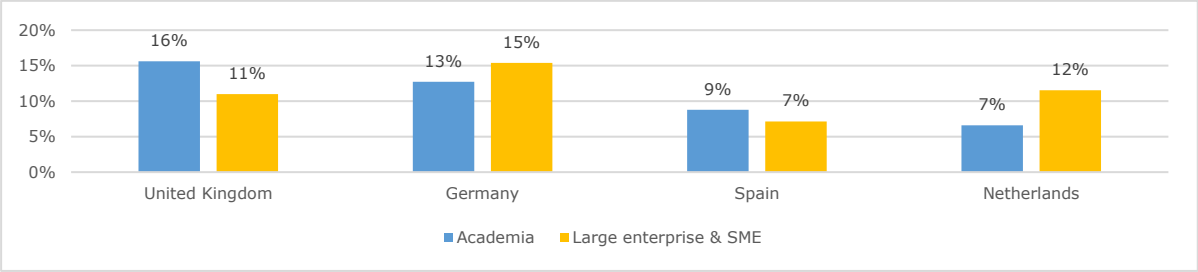
Figure 24. Impact of MSCA fellowships on researchers' skills by the sector of their main hosting institution



Source: End of fellowship survey.[64]

Fellows hosted in the private sector were better able to secure employment after their fellowship than those who had been hosted in academia. Fellows hosted in large enterprises and SMEs reported slightly higher employment rates within the first three months after the end of their MSCA fellowship (60%), compared with those hosted in academia (55%). Moreover, 69% of those who gained employment remained in the same country in which they had undertaken their mobility period.[65] The top four countries (the UK, Germany, Spain and the Netherlands, see figure below) in which these fellows found employment were the same for both groups. These specific countries are among the top destinations for long-term MSCA mobility, including MSCA fellows hosted in the private sector. Overall, MSCA fellowships in businesses can be a driver of relocation, as only 13% of those who undertake a fellowship in a business plan to return to their countries of origin.[66]

Figure 25. Country of employment at the end of the MSCA fellowship (within first three months)



Source: End of fellowship survey.

Fellows hosted in the private sector were better able to make use of their MSCA fellowship to find future employment than fellows hosted in academic institutions. For instance, 52% of fellows hosted in the private sector stated that the MSCA fellowship had helped them find a job, compared to 42% hosted in academia. Moreover, fellows hosted in the private sector were better able to secure employment at one of the institutions involved in their MSCA project (64%), compared with fellows hosted in academia (49%). This is unsurprising, given that MSCA projects involving business also had a significant job-creation effect. To illustrate this, 218.5 new FTE (full-time equivalent)

[64] *The survey also asked fellows to rate other skills such as project management, the ability to build and maintain international/intersectoral partnerships, and presentation and communications skills. These were not included in the chart, given that there was no significant difference in the fellows' responses based on the sector of the host institution.*
[65] *Study on mobility flows of researchers in the context of the MSCA. Annex 3. Case study 3: Career paths of researchers who spend their mobility period in business.*
[66] *Ibid.*

jobs were created or planned at beneficiary business organisations due to their participation in the MSCA.[67] Hence, it is likely that some MSCA fellows benefitted from these job openings and managed to secure employment at one of these partner organisations.

Overall, intersectoral mobility provides a number of advantages for individual fellows, for the institutions involved, as well as for the MSCA programme in general. For the beneficiary fellows, the major strengths of intersectoral mobility include acquiring new knowledge and developing industry-relevant skills and competencies. Business participation also increases the chance of a patent application being registered.[68] As seen above, it also leads to jobs being created at beneficiary business organisations, leading to employment opportunities for MSCA fellows. Meanwhile, the main weakness of intersectoral mobility is that it does not provide the same levels of skills development, supervision and experience that are valued in academic careers. Businesses therefore need to be incentivised to participate actively in the MSCA and to take leading roles, both in coordinating MSCA projects and training, and in supervising MSCA fellows.

3.2.3 Which determinants are responsible for good permeability between sectors, or for a lack thereof?

MSCA projects are instrumental in linking academic with non-academic partners and promoting knowledge transfer between sectors. Under Horizon 2020, private companies accounted for 17.3% of MSCA participations (coordinators and partners). In particular, ITN and RISE created strong links between the academic and private sectors. Some of the key factors that promote good permeability between sectors include the availability of research and development funding, the presence of a large number of companies with continuous in-house R&D, strong research ecosystems, a critical mass of researchers, a high level of activity by companies, and a large share of business's staff working in R&D.

Country and organisational capacity to participate in the MSCA

This section analyses relative levels of participation in the MSCA by examining country and organisational capacity. This analysis shows that Germany, the United Kingdom, the Netherlands and France accounted for the biggest shares of private sector participation in long-term mobility under the MSCA. However, the extent to which private businesses have participated in MSCA projects largely reflects the overall numbers of private enterprises in each country. For example, Germany has more private enterprises than Latvia, and accounted for 16.8% of host MSCA organisations from the industry, compared with 0.1% from Latvia.

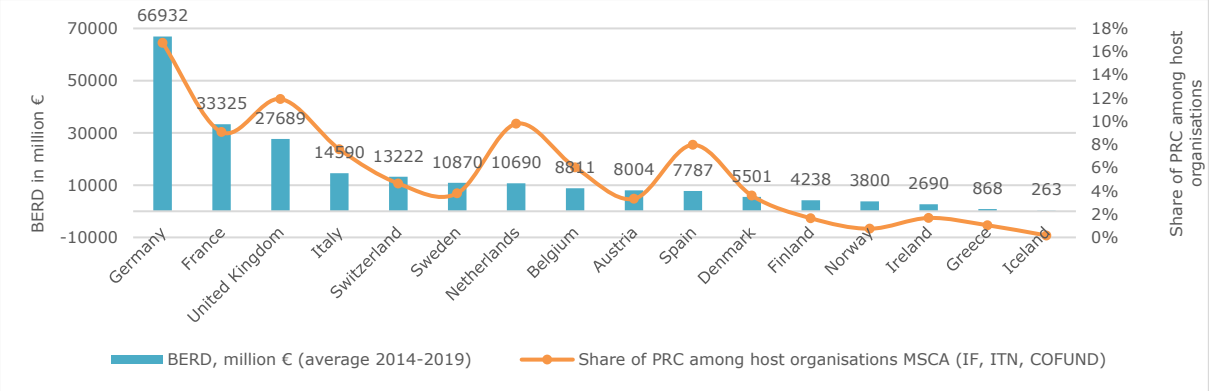
On the other hand, countries such as the Netherlands have fewer companies than Germany, but still enjoyed high levels of business participation in the MSCA. To illustrate, nine companies in the Netherlands accounted for almost a quarter of business participation in the MSCA, compared with 26 companies in Germany. These nine companies also participated more actively and repeatedly as hosts in the MSCA.

Public and private sector spending on research and development (R&D) appears to encourage greater participation by industry in the MSCA. With regard to industry participation in the MSCA, non-widening countries significantly outperform widening countries. Businesses in non-widening countries are more successful at attracting MSCA fellows. Overall national business expenditure on R&D correlates with a country's share of

[67] *Dinges, M., Pupinis, M., Leitner, K. & Dumcius, R. (2017). Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020). https://op.europa.eu/en/publication-detail/-/publication/decfab92-5ae2-11e7-954d-01aa75ed71a1/language-en*
[68] *Ibid.*

private for-profit entities (PRC) as hosts, out of all industry hosts in the MSCA. We found a very strong positive correlation (r=0.87) for non-widening countries (see Figure 26) and a strong positive correlation (r=0.77) for widening countries (see Figure 27).

Figure 26. Comparison of business expenditure on R&D with private for-profit entities as a share of all PRC hosts in the MSCA for non-widening countries[69]



Source: CORDA database; Eurostat.

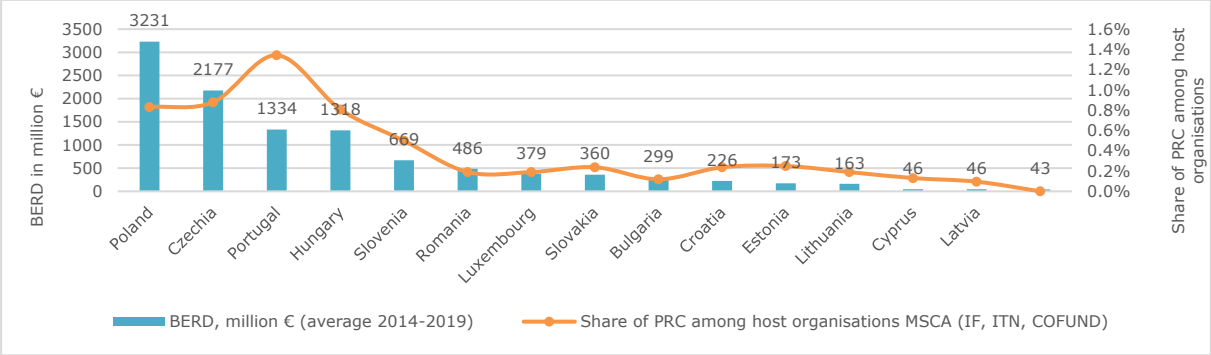
Overall, business expenditure on R&D (BERD) strongly impacts the level of business enterprises participating as host institutions in non-widening countries. Some countries, notably the United Kingdom, Italy, the Netherlands, and Spain, appear to have more industry hosts than R&D spending would suggest, implying that some other factors play a role.

The correlation coefficient is smaller for widening countries, indicating a weaker positive association. Differences in performance are also visible in the figure below, particularly in the case of Portugal, which attracts more private for-profit entities than would be expected, based on its level of BERD. However, if Portugal is removed from the analysis as a clear outlier[70], there is a very strong positive correlation (r=0.89) between BERD and the share of PRCs as hosts in widening countries. This suggests that **business expenditure on R&D can contribute to greater business participation in the MSCA**.

[69] *BERD information was missing for Switzerland for 2014, 2016 and 2018.*

[70] *Portugal is considered as a statistical outlier in this analysis. The reason for that is that amongst widening countries, Portugal has been the most effective in setting up a coordinated national strategy that promotes the development of the R&I system as a whole. Among other factors, Portugal received the most Horizon 2020 funding out of all widening countries, reaching one billion Euro in FP funding. More details on why Portugal performs better than other widening countries are laid down in Annex 1 (Case study 1).*

Figure 27. Comparison of business expenditure on R&D with private for-profit entities as a share of all PRC hosts in the MSCA for widening countries

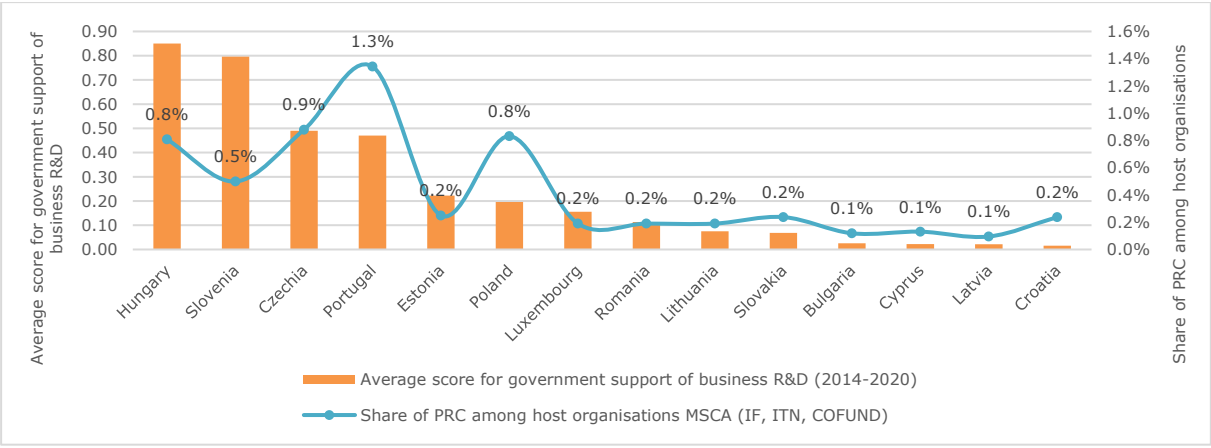


Source: CORDA database; Eurostat.

Looking at gross domestic expenditure on R&D (GERD), the results and trends are similar. When comparing each country's GERD with the share of all PRC hosts in the MSCA which were private for-profit entities (PRC), this association is very strong for non-widening countries (r=0.88), and strong for widening countries (r=0.79).[71]

When comparing direct and indirect government support for business R&D with the share of all PRC hosts in the MSCA which were private for-profit entities, we can identify significant differences between non-widening and widening countries. In non-widening countries, the relationship between government support for business R&D and businesses as hosts is practically non-existent (r=0.06); however, when we look at widening countries, as shown in the figure below, a stronger relationship (r=0.7) appears to exist. While we should be careful about interpreting these results, they seem to indicate strongly that direct and indirect government support plays a stronger role in widening countries' capacity to have private enterprises as hosts, compared with non-widening countries. Essentially, **this indicates that government support for businesses is required to a larger extent in widening countries,** as partially explained by the differences in businesses' expenditure on R&D.

Figure 28. Comparison of government support for business R&D with private for-profit entities as a share of all PRC hosts in the MSCA (IF, ITN, COFUND) for widening countries

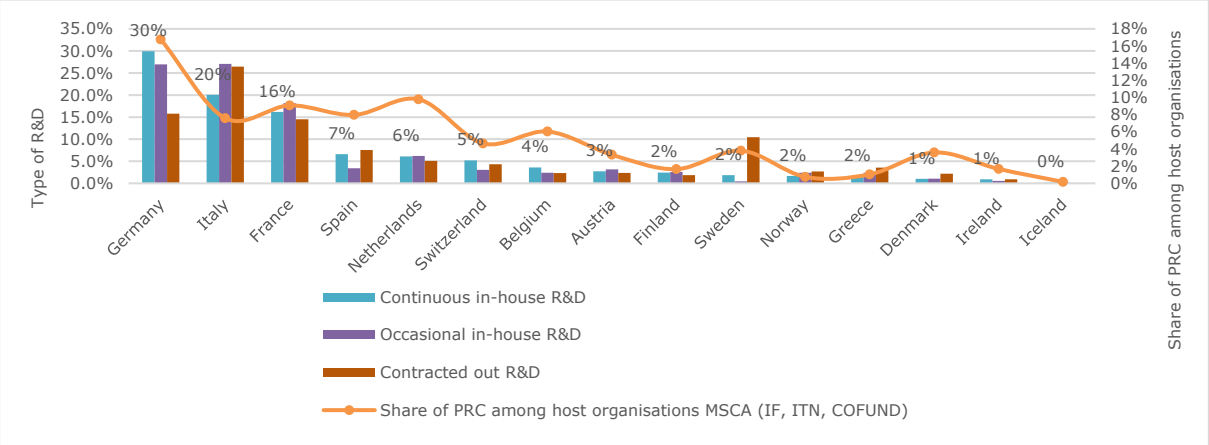


Source: CORDA database; European Innovation Scoreboard.

[71] *Calculations based on data from the CORDA database and Eurostat.*

Figure 29 analyses the relationship between the participation of businesses in the MSCA and the types of R&D conducted in those businesses[72]. The figure shows, as percentages of the total, the share of companies that carry out continuous in-house R&D. This is the most relevant type of R&D for businesses to participate in the MSCA.

Figure 29. Comparison of businesses by type of R&D and private for-profit entities as a share of all PRC hosts in the MSCA for non-widening countries[73]



Source: CORDA database; Eurostat.

The number of companies conducting continuous in-house R&D appears to be very strongly associated with the share of MSCA hosts who are private for-profit entities (r=0.87) in non-widening countries. As may be expected, the effect is weaker for companies with occasional in-house R&D (r=0.76) and contracted out R&D (r=0.63). **Hence, the number of companies with continuous in-house R&D appears to determine the level of participation in the MSCA by businesses, as well as the level of intersectoral mobility to different countries in the MSCA.**

For companies in widening countries, the narrative is similar. While the number of businesses with continuous in-house R&D is strongly associated with the share of private for-profit entities as hosts (r=0.81), this figure is somewhat smaller than in non-widening countries. However, if Portugal is removed from the calculations, the figure rises to a level that is comparable with non-widening countries (r=0.90). Again, the relationship is not as strong for companies with occasional in-house (r=0.69) or with contracted out R&D (r=0.61). **This clearly indicates that the number of businesses with ongoing in-house R&D has a strong positive effect on the rate of business participation in the MSCA.**

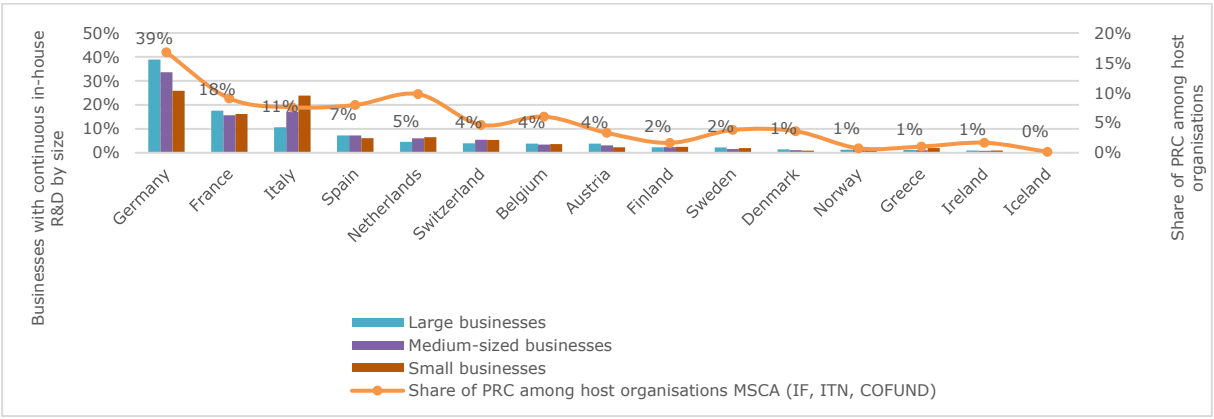
A previous study[74] has shown that the size of a business impacts the likelihood of its participation in the MSCA. Some larger companies in non-widening countries have MSCA mobility factored in as part of their human resources (HR). Between 2007 and 2016, 32% of businesses that participated in the MSCA were large businesses, while the share of SMEs was 40% (information was missing on 28% of cases). This can be considered a significant overrepresentation of large businesses, given that between 2014 and 2019, the average

[72] The percentage shares of companies have been calculated to maintain the difference in the number of companies between countries by the type of R&D conducted (e.g., out of all non-widening companies with continuous in-house R&D, 30% were German).
[73] The United Kingdom has been excluded from the analysis due to a lack of data.
[74] Dinges, M., Pupinis, M., Leitner, K. & Dumcius, R. (2017). Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020). https://op.europa.eu/en/publication-detail/-/publication/decfab92-5ae2-11e7-954d-01aa75ed71a1/language-en

share of businesses in Europe that were large companies was 2.9%; the rest were SMEs.[75] Below, we account for how differences in the size of businesses may contribute to differences in their participation in the MSCA, and to intersectoral mobility. This analysis only considers companies with continuous in-house R&D, as this is clearly the most important type of business R&D activity in relation to MSCA.

For non-widening countries, there is a very strong association between all sizes of company and business participation in the MSCA. This relationship is slightly stronger for large businesses (r=0.88) and medium-sized businesses (r=0.89), than for small businesses (r=0.82).

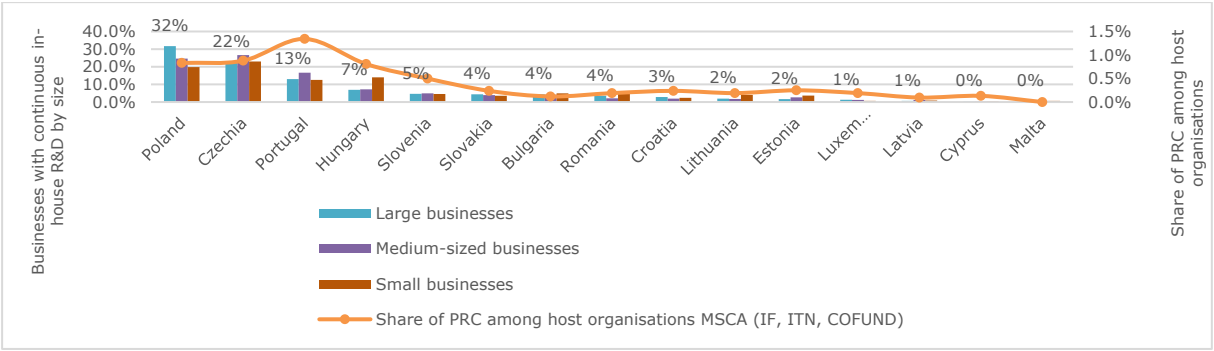
Figure 30. Comparison of businesses with continuous in-house R&D, by size and private for-profit entities as a share of all PRC hosts in the MSCA for non-widening countries



Source: CORDA database; Eurostat.

In widening countries, the situation is slightly different. For large businesses (r=0.72), the relationship between company size and the share of private-sector hosts is weaker than for non-widening countries. Medium-sized businesses (r=0.81) and small businesses (r=0.82) show a stronger relationship with the share of business hosts. Again, if Portugal is removed, the relationship changes: without Portugal, large businesses (r=0.82), medium-sized businesses (r=0.85) and small businesses (r=0.93) all show stronger relationships.

Figure 31. Comparison of businesses with continuous in-house R&D by size and private for-profit entities as a share of all PRC hosts in the MSCA for widening countries



Source: CORDA database; Eurostat.

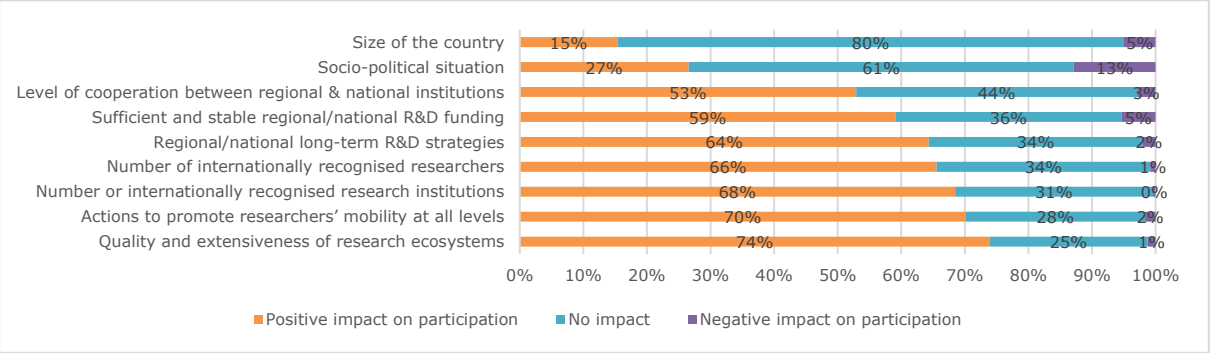
[75] *Calculations based on Eurostat data. Micro-sized businesses (businesses with fewer than 10 employees) were excluded.*

The analysis indicates that when it comes to the participation of businesses in the MSCA, **non-widening countries benefit from having larger companies with continuous in-house R&D**, which remains an area of relative weakness for companies in widening countries. Similarly, the higher the number of companies in a country carrying out in-house R&D, the higher the number of participating organisations and incoming fellows in the MSCA. Therefore, **a country's capacity, which is based on the size of its business sector, the level of business activity, and the investments made in R&D, determines its ability to take in MSCA fellows. This eventually influences the number of MSCA fellows going to that country, and the level of intersectoral mobility there.**

Countries that are innovation leaders and innovation followers on the European Innovation Scoreboard have more **long-term structured schemes to support intersectoral mobility**. These usually rely on government funds, skills training programmes at PhD level, and sufficient demand for MA and PhD level researchers outside academia. Meanwhile, modest and moderate innovator countries often have **short-term, small-scale and specialised projects that promote academia-industry partnerships.** These countries usually rely on European programmes and funds, while having limited national funds.[76] This further explains the differences in intersectoral mobility between non-widening and widening countries. Members of the latter group lack sufficient financial resources and long-term strategy to foster intersectoral mobility.

The findings from the MSCA organisations survey also underline the importance of a country's capacity in influencing the ability of host organisations to engage in the MSCA. As illustrated in Figure 32, the leading factors at system- and country-level that contribute to the capacity of host organisations to participate in the MSCA relate to the quality and extensiveness of research ecosystem; initiatives that promote researchers' mobility; the number of internationally recognised researchers; and the presence of long-term R&D strategies and funding. While having strong research and innovation infrastructure and sufficient funding are essential to attracting MSCA researchers, mobile and international researchers also strengthen such ecosystems. As discussed in the literature, excellence attracts excellence: countries with strong research ecosystems are better able to attract international researchers, which helps them to advance their ecosystems and build centres of excellence, which attracts more researchers.

Figure 32. Please assess how the following system- and country-level factors contribute to your capacity to participate in the MSCA (filtered by businesses organisations)?



Source: survey of MSCA organisations (2022), n=242.

Private for-profit entities can better promote good permeability between sectors, by engaging in intersectoral mobility and retaining MSCA fellows as staff. When asked about how effective the participation of host organisations in the MSCA has been in

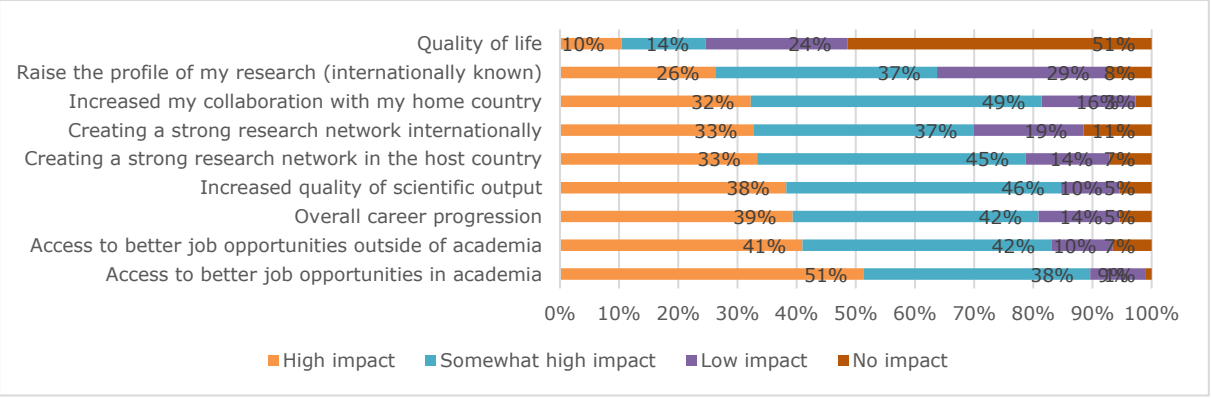
[76] *Vandevelde, K. (2014). Intersectoral Mobility. https://biblio.ugent.be/publication/5812851/file/5812884.pdf*

promoting intersectoral mobility, only 20% of organisations representing all sectors stated it was 'very effective', compared with 27% of private for-profit entities. However, the former were more likely than private sector organisations to have an action plan to promote intersectoral mobility. Similarly, only 20% of all organisations were 'very successful' in retaining MSCA researchers after their fellowships, compared with 27% of private-sector organisations. This is also in line with the findings from the end-of-fellowship questionnaire. A larger share of fellows hosted in the private sector managed to secure employment at one of the institutions involved in their MSCA project. This can be explained by the fact that a greater share of private sector organisations (26%) had specific measures in place to help retain MSCA researchers, compared with organisations from all sectors (17%). Some of the measures that industry participants mentioned include creating open positions for researchers, offering fast-track recruitment, and providing help with funding applications. Moreover, a greater share of industry hosts (37%) stated that they had adopted specific measures to help ensure continuing collaboration with MSCA fellows after the end of their fellowships, compared with all organisations (31%). These measures mainly include a planned strategy to continue research collaboration and communication via e-mail and newsletters. Meanwhile, a common obstacle faced by all organisations in retaining MSCA fellows was the lack of employment opportunities, which was primarily due to lack of funding.

Individual-level determinants of permeability between sectors

Most fellows perceive the MSCA as a steppingstone to building a successful academic career (Figure 33). However, over 40% of fellows also stated that the MSCA improved their ability to access better job opportunities outside academia. MSCA fellowships are primarily perceived as an academic achievement in their career progression; nevertheless, they also help fellows to find research jobs in other sectors and to diversify their career options.

Figure 33. What kind of impact has the fellowship had on your career and skills?



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=183.

Among all survey respondents, 19% (n=886) participated in intersectoral mobility, with the majority of these (68%) moving from academia to business (ITN, IF, COFUND). For nearly 70% of these fellows, intersectoral mobility occurred during their MSCA fellowship. While the overall rate of intersectoral mobility is relatively low, the MSCA successfully supported researchers who were interested in trying out and transitioning into private-sector research. The top three factors motivating fellows' choices to participate in intersectoral mobility were:

- Opportunity to expand their knowledge;
- Variety of career opportunities in the host organisation;
- Lack of academic positions/fear of poor career progression in academia.

Moreover, the **MSCA successfully promoted greater permeability between sectors by encouraging careers outside of academia.** To illustrate this, 9.2% of all survey respondents indicated that before their MSCA fellowship, their previous employer was in the private sector (ITN, IF, COFUND). After the end of the MSCA fellowship, the share of fellows who pursued careers in the private sector was 18%. Furthermore, 21% of survey respondents indicated a desire to change their employment sector after their fellowship. Among these, almost 70% shared their intention to move from academia to industry in their written responses. This includes fellows who wanted to move back into industry after an experience in academia, as well as those who wanted to move from an academic career to industry research, those who wanted to move into industry in order to gain new skills and expertise or to experience novelty, and those who wanted to start their own business or to work at the intersection of academia and business. The main reasons for leaving academia and moving into industry are summarised in Table 3. Overall, the MSCA encouraged a greater number of fellows to combine their academic expertise with applied research and to work on practical solutions to societal challenges.

Table 3. The main reasons for MSCA fellows to leave academia and move into industry

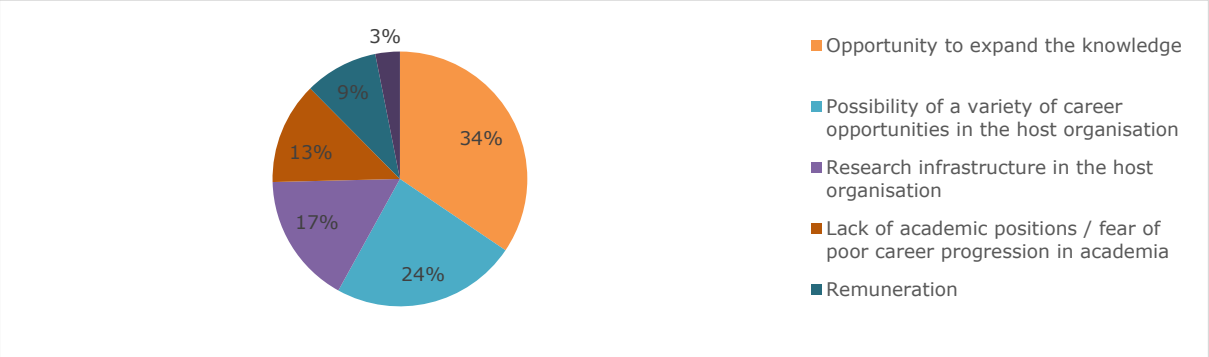
Main reasons for leaving academia	Main reasons for moving to industry
- Academic careers being too competitive; - Precarious; - Unstable; - Low pay; - Too demanding, especially for female researchers, who struggle to combine work with family; - Poor working conditions for researchers; - Lack of, or difficulty in obtaining, funding; - Research not being sufficiently practical and applicable; - Difficulty finding academic jobs in one's home country.	- Less competition; - More job opportunities; - Higher pay; - Greater job stability and security; - Better long-term career prospects; - Better working conditions; - Better balance between demands and salary; - Easier to combine work with family; - Research being more applied and practical; - Working on real-life projects; - Easier to find a job in one's home country.

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=452.

Individual-level determinants of good permeability between sectors are linked to the organisational capacity and strengths of the researcher's research ecosystem. The top three factors impacting researchers' mobility decisions, as reported by MSCA host organisations, researchers, and staff, were the same. These are: (i) working with leading scientists and leaders in the field; (ii) the quality of training offered; and (iii) the research infrastructure in the host country and institution. Thus, the capacity of the host organisation and country directly influences their ability to attract and retain MSCA fellows. This capacity also influences researchers' decisions with regard to where to pursue their mobility period and build their research career.

Furthermore, fellows hosted in private for-profit entities explained that their choice of participating in intersectoral mobility was mainly influenced by the opportunity to expand their knowledge and explore a variety of career opportunities, as well as access the research infrastructure in the host organisation (Figure 34). Likewise, the main factors that positively influenced MSCA fellows' mobility experiences in the private sector were related to having access to international networking, the level of remuneration, the training offered, as well as to research facilities and equipment. These findings partly explain the success of non-widening countries in attracting MSCA fellows. Private enterprises in these countries invest and focus more on research and development, which helps to create a more enabling environment for researchers to thrive.

Figure 34. What motivated your choice to participate in intersectoral mobility? (from business to academia/from academia to business)?



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=167.

In summary, **the MSCA successfully promote intersectoral mobility among researchers and the diversity of research careers that extend beyond academia**. Individual-level determinants of MSCA researchers' decisions in terms of intersectoral mobility depend on the R&I capacities of host countries and host organisations. This includes offering quality training, the presence of leading scientists, providing high-quality research infrastructure, long-term career prospects, high remuneration, and the opportunity to build an international network. **While the MSCA IF, ITN and COFUND actions foster alternative paths for research careers, RISE supports a more balanced brain circulation and knowledge transfer between sectors and countries**.

Several factors also limit permeability between sectors. **One challenge is linked to the 'one-way' nature of mobility**, **in which researchers often move from academia to industry, but rarely move back from industry into academia**. The lack of high-ranked scientific publications produced by industry often prevents researchers from returning to an academic position.[77] These researchers become less competitive in applying for academic jobs, as they lack the necessary track record of scientific publications. As is further discussed in the case study on the career paths of researchers who spend their mobility periods in business, some academic employers preferably hire younger researchers with fewer years of postdoctoral experience, who are still eligible to apply for ERC grants.[78] This may limit MSCA researchers' ability to gain recognition for mobility in business and (re)enter academia. Given the increasing need for careers to be interoperable between sectors, and the need for diverse career opportunities for researchers, researchers must develop transferable skills and improve their employability during their MSCA fellowship.

Likewise, **differences in the recognition of researchers' merits and achievements are another factor limiting the permeability between sectors**.[79] In academia, there is a strong emphasis on making research outcomes public and publishing research results promptly, to maximise citation impact. Meanwhile, in industry, the goal is to commercialise the research results, meaning that research outcomes may not be disclosed publicly, or may be disclosed only after the company has applied for a patent.[80] Lack of clarity regarding the intellectual property rights (IPR) ownership was also mentioned during the

[77] *European Science Foundation. 2013. 'New Concepts of Researcher Mobility – a comprehensive approach including combined/part-time positions.' http://archives.esf.org/uploads/media/spb49_ResearcherMobility.pdf*
[78] *Study on mobility flows of researchers in the context of the MSCA. Annex 3. Case study 3: Career paths of researchers who spend their mobility period in business.*
[79] *European Science Foundation. 2013.*
[80] *Technopolis group, 2019. 'Analysis of Intersectoral Mobility.' https://www.technopolis-group.com/report/analysis-of-intersectoral-mobility/*

interview programme as a factor hindering intersectoral mobility. Hence, the MSCA should provide greater clarity on IPR ownership in projects that involve creating novel products.

During the interview programme, one RISE host organisation highlighted two further factors limiting intersectoral mobility. First, staff participating in RISE are expected to work full-time in their host organisation, even if they had been working part-time at their home organisation due to family commitments or childcare. This particularly discourages working mothers from participating, as the programme is not flexible enough to accommodate their needs. Second, for private sector staff, the secondment is conducted on a voluntary basis, while university staff who participate in the secondment still receive their basic salary. Addressing such concerns would encourage more staff to participate in mobility, promoting the permeability of talent between sectors.

Another limiting factor concerns perceptions of failure associated with transitioning out of academic research. Many of the MSCA fellows interviewed regarded not obtaining a permanent position in academia as an underperformance. Research careers outside academia should be encouraged, instead of being perceived as a sign of failure by postdoctoral researchers or their academic supervisors.[81] One way to counter such perceptions is to create and publish evidence regarding doctorate holders' labour market outcomes, their career satisfaction, and the value and application of their skills in different sectors.[82]

Moreover, permeability of talents between sectors is limited because **researchers do not feel competent enough to pursue careers outside academia.** The skills and experience of PhD holders can be applied in diverse sectors, including industry, public and social sectors, entrepreneurship, or self-employment. However, many PhD graduates do not feel competent enough to pursue jobs in other sectors.[83] On the other hand, the MSCA fellows interviewed suggested that they had received sufficient, regular and integrated training in the development of soft skills, as well as career guidance as part of their fellowships. This suggests that MSCA fellows are more successful (compared to the general researchers' population) in engaging in intersectoral mobility and research careers beyond academia.

4 Impact of MSCA mobility on brain circulation

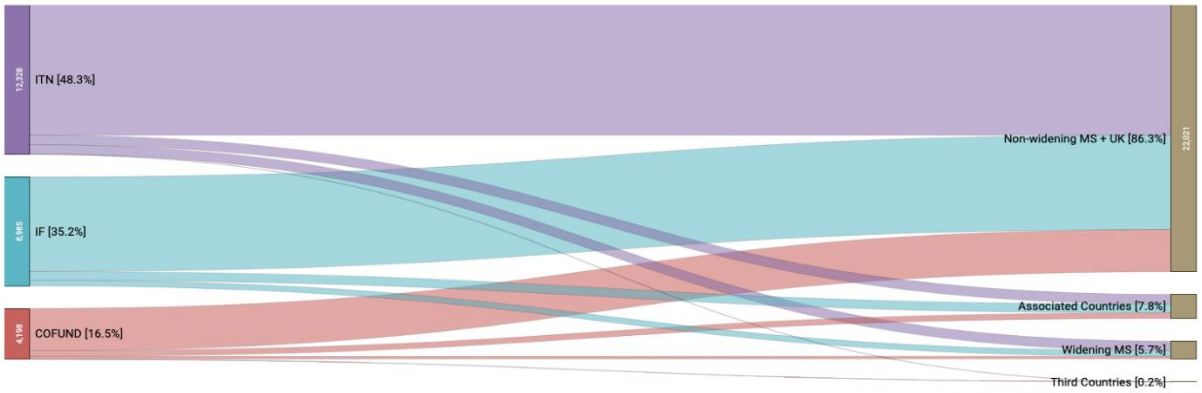
4.1 Retaining excellent European talents

The retention of European researchers is crucial to strengthening the scientific competitiveness of the EU. The MSCA contribute to this by fostering intra-EU mobility.

Data regarding the MSCA mobility flows of ITN, IF and COFUND researchers of different nationalities per host location (see Figure 35) indicate that **the EU27+UK received the largest share of researchers (92% of all researchers, consisting of 74.6% in the EU27 and 17.4% in the UK), as compared to the associated (AC) and third countries (TC) (7.8% and 0.2%, respectively).** While ITN is the largest contributor to the EU27+UK share of fellows, ITN and IF both stand on an almost equal footing with regard to their contribution to the associated countries' share of long-term mobility fellows, at 40% and 36% respectively.

[81] *OECD (2021). Reducing the precarity of academic research careers. OECD Science, Technology and Industry Policy Papers, No. 113, OECD Publishing, Paris, https://doi.org/10.1787/0f8bd468-en.*
[82] *Ibid.*
[83] *Ibid.*

Figure 35. Mobility flows of ITN, IF and COFUND fellows per type of action and host destination

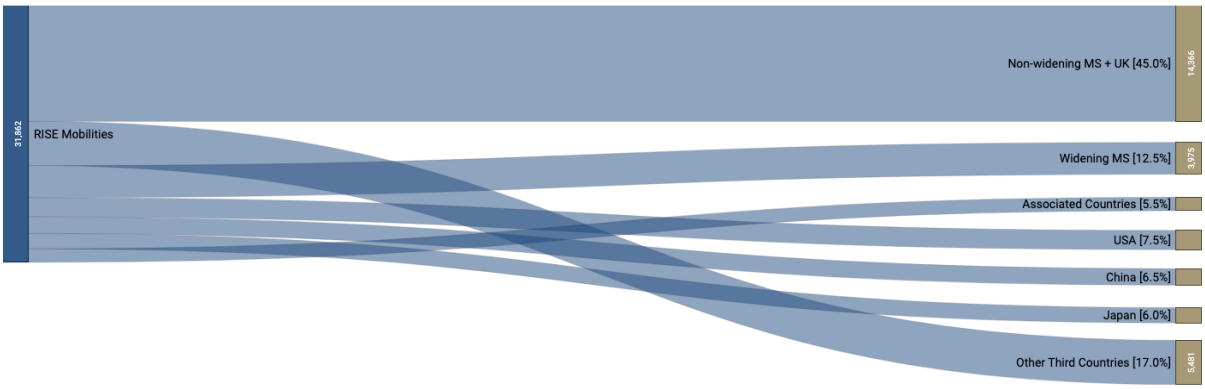


Source: CORDA database.

RISE data show that 57.5% of all mobilities were undertaken in the EU27+UK, 37% in third countries, and only 5.5% in associated countries (see Figure 36). There were 3.6 times more RISE mobilities to non-widening Member States, compared with the number of RISE mobilities undertaken in widening Member States (45% and 12.5%, respectively). Out of those RISE mobilities undertaken in third countries, the USA, China, and Japan received the largest shares of mobilities at 7.5%, 6.5%, and 6%, respectively –more than all other third countries combined.

Short-term mobility (RISE) is the major contributor to MSCA mobility towards non-European countries. A considerable share of RISE researchers, particularly EU nationals hosted in associated and third countries, eventually return to the EU upon completing their short-term mobility[84]. In this regard, RISE contributes to attracting and retaining researchers from both Europe and third countries.

Figure 36. RISE mobilities per host destination



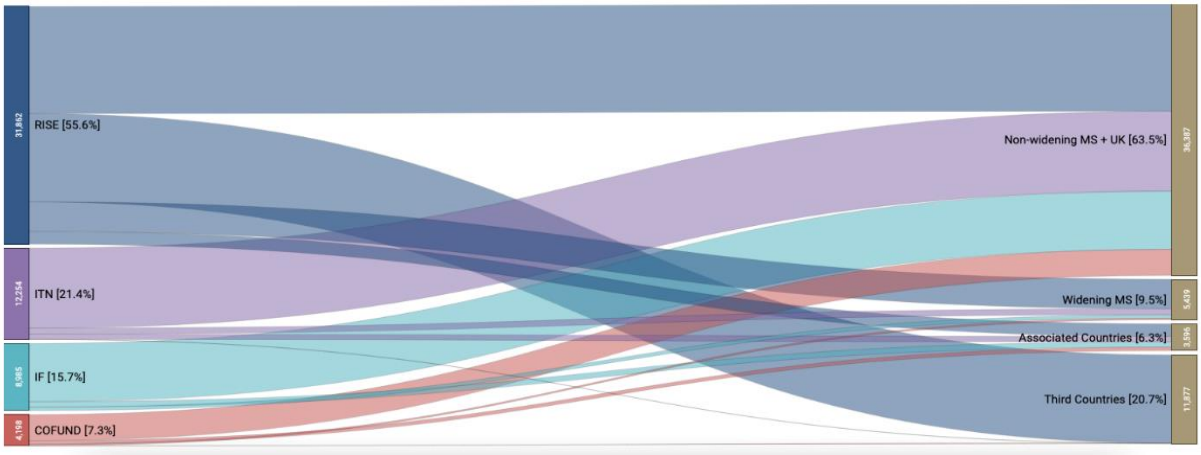
Source: CORDA database.

To illustrate how RISE mobility fits into the context[85] of overall MSCA mobility, Figure 37 below summarises the mobility flows for all actions.

[84] *This is a requirement of the programme. RISE staff remains employed in the sending institution and therefore has to return after the mobility period.*

[85] *It is important to bear in mind that RISE mobilities are, by their nature, different from IF, ITN and COFUND mobilities. RISE mobilities are short-term mobilities and allow the same person to participate in multiple mobilities/secondments. The data indicate that 31,862 mobilities were undertaken by 12,920 RISE fellows. To ensure an accurate comparison, RISE mobilities have been presented in a separate chart to prevent them from inflating the total mobility flows of MSCA fellows.*

Figure 37. Mobility flows of RISE, ITN, IF, COFUND fellows per type of action and host destination



Source: CORDA database.

Moreover, the analysis of long-term mobility data for EU27+UK nationals offers relevant insights into the potential of the MSCA to retain European researchers within the EU (or to attract them back) (see Figure 38). The data show that 92.6% of EU27+UK nationals were hosted in the EU27+UK (for EU27 nationals hosted in the EU27 Member States, the share was 82.4%). **With the inclusion of the two largest European associated countries (Switzerland and Norway), 99.8% of long-term mobility fellows (EU27+UK nationals) were hosted in Europe**.

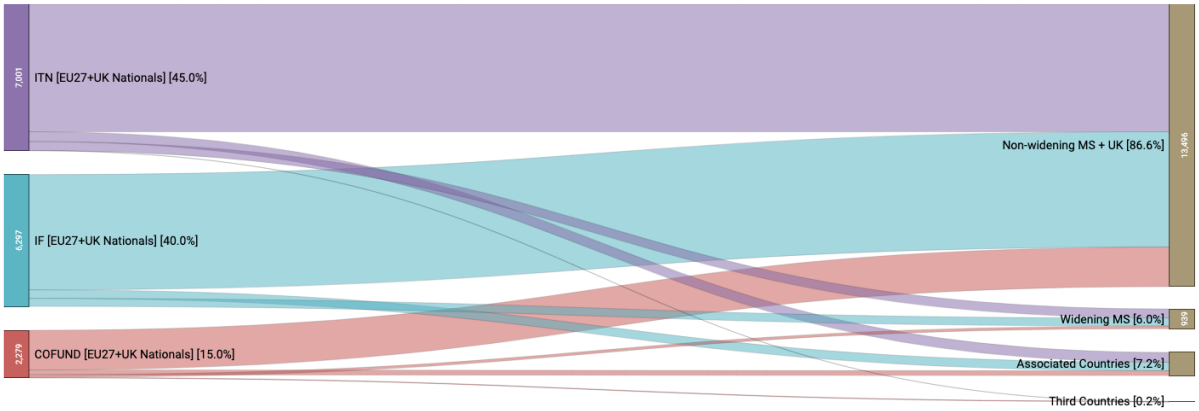
Nevertheless, the same data also indicate differences between widening and non-widening Member States in terms of their ability to attract EU fellows. As shown in Figure 38, widening Member States' share of ITN, IF and COFUND fellows stands at just 6% of all EU27+UK fellows, and 6.5% of those hosted within the EU27+UK Member States. The UK alone hosted almost three times the number of fellows hosted in all widening Member States combined.

Figure 38. Mobility flows of ITN, IF and COFUND fellows (EU27+UK nationals) per host destination

Source: CORDA database.

The contributions of the different actions to the total number of ITN, IF and COFUND researchers hosted follows almost the same pattern for both widening and non-widening Member States (see Figure 39).

Figure 39. Mobility flows of ITN, IF and COFUND fellows (EU27+UK nationals) per action and host destination



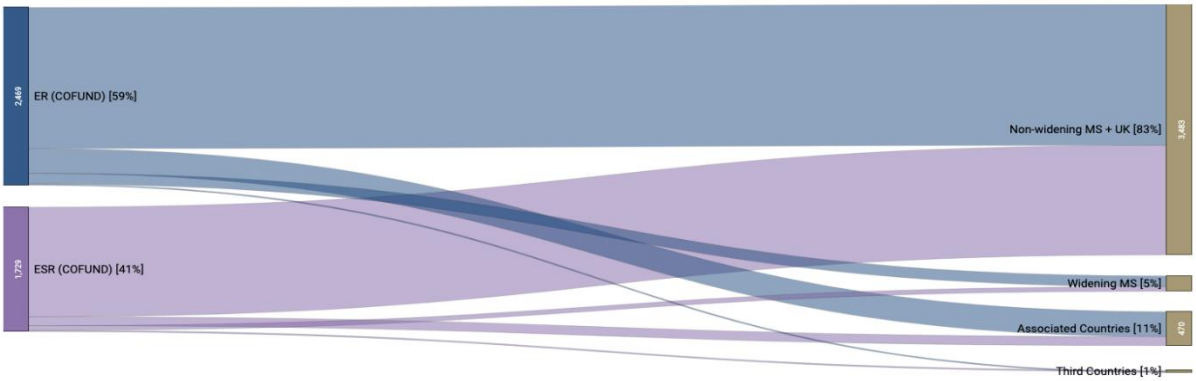
Source: CORDA database.

Looking at ITN, IF, and COFUND fellows according to their career stages, the analysis reveals that the distribution of experienced researchers (ER) and early-stage researchers (ESR) out of the total share of researchers hosted follows a similar pattern for both widening and non-widening Member States. On average, early-stage researchers represent 56% of all fellows hosted in these countries. However, experienced researchers represent a slightly higher share (53%) of all fellows hosted in associated and third countries.

When it comes to COFUND, which is the only long-term MSCA mobility scheme with a combination of both ER and ESR researchers, the share of ER COFUND fellows appears to be higher, at 59%, whereas the share of ESR stands at 41% of all COFUND fellows (Figure 40). Non-widening countries in the EU27+UK received a higher share of ESR fellows (88% of all ESR COFUND fellows, and 96% of those hosted in the EU27+UK) compared with non-widening countries' share of ER fellows, at 79.4% of total fellows and 93% of those hosted in the EU27+UK. Non-widening EU27+UK Member States hosted 6% of total ER COFUND fellows, and 7% of those hosted in the EU27+UK, compared with 3.7% of total ESR COFUND fellows and 4% of those hosted in the EU27+UK.

This shows that **experienced researchers are comparatively more willing to carry out their fellowships in widening countries. In contrast, early-stage researchers are more likely to look for host institutions in non-widening countries.** One possible explanation is that early-stage researchers are at a point in their careers at which they are more interested in polishing their scientific credentials and acquiring research experience at prestigious universities under the guidance of leading scientists in their fields. In contrast, experienced researchers have already established good professional networks and acquired greater knowledge of their research fields and of where the best host institutions and leading scientists are in many widening Member States. Furthermore, existing cooperation links with institutions are one of the determinants of MSCA mobility (see Section 6). This is likely to be the case for experienced researchers who already have the experience and professional connections required to establish such links with host institutions in widening countries.

Figure 40. Mobility flows of ER and ESR COFUND fellows per host destination and type of MS

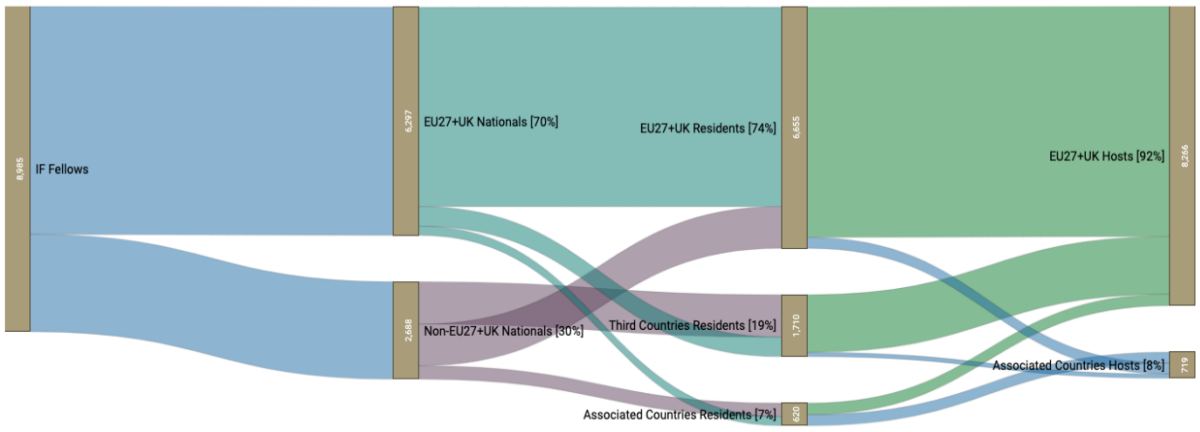


Source: CORDA database.

The data[86] regarding the residency locations of IF fellows at the time they submitted their fellowship applications offer strong evidence of the ability of the MSCA to both retain and attract both European and third-country research talents. The overall mobility flows of IF fellows of all nationalities (see Figure 41) show that **74% were already residing in the EU27+UK before their MSCA fellowship**. Moreover, 17.3% of these fellows (EU27+UK residents) were nationals of associated or third countries (constituting 42.8% of non-EU27+UK nationals). Meanwhile, 57.2% of non-EU27+UK nationals were residents of third countries and associated countries. In addition, 12.6% of EU27+UK nationals were living abroad before they accepted their fellowships, either in third countries (8.6%) or in associated countries (4.0%).

Eventually, 92% of all IF fellows ended up being hosted in the EU27+UK, with only 4.5% of EU27+UK residents going to associated countries. This offers a general indication that MSCA potentially retained a substantial number of European researchers within Europe, while attracting European and third-country researchers living abroad (26% of all IF fellows).

Figure 41. Mobility flows of IF fellows (all nationalities) per location of residency and host destination



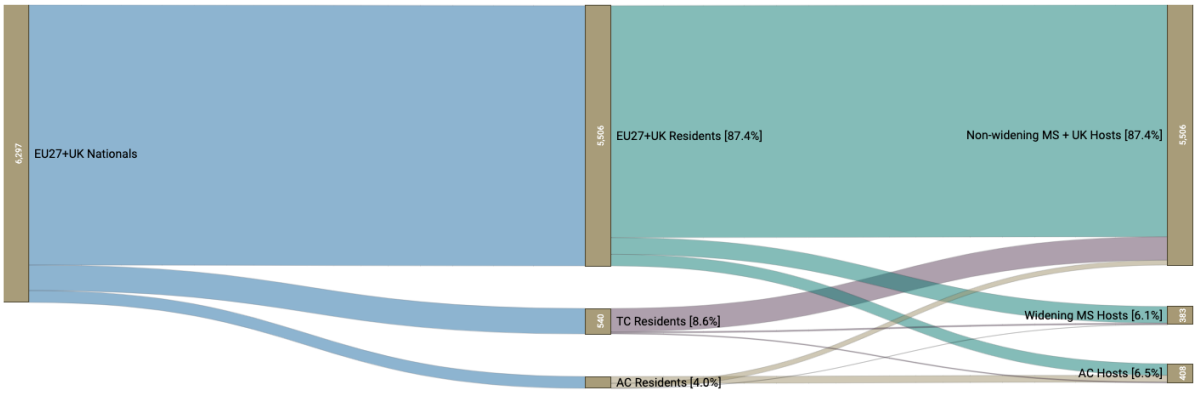
Source: CORDA database.

A closer look at the mobility flows of EU27+UK nationals (IF fellows) offers a much better view of the potential of the MSCA to attract and retain (see Figure 42). **Prior to their**

[86] *The dataset with residency information is only available for IF fellows.*

MSCA fellowships, 87.4% of EU27+UK nationals (IF) resided in the EU27+UK. The MSCA IF scheme retained 95.5% of these in the EU27+UK (89% in the non-widening Member States and 6.5% in widening Member States). Moreover, out of the 791 fellows living outside the EU27+UK (in either third countries or associated countries), 79% were attracted to EU27+UK host organisations.

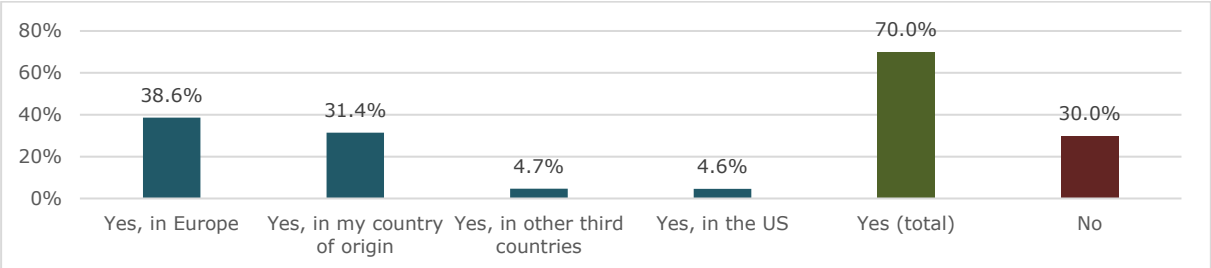
Figure 42. Mobility flows of IF fellows (EU27+UK nationals) per location of residency and host destination



Source: CORDA database.

Another way to examine the impact of the MSCA on the retention of excellent European research talents is to look at the alternative pathways that European MSCA fellows may potentially have pursued had they not received and accepted their fellowship offers. As indicated in Figure 43, **70% of European (EU27+UK nationals) ITN, IF, and COFUND fellows hosted in the EU27+UK confirmed in the MSCA fellows' survey that other offers/opportunities were available to them at the time they accepted the MSCA fellowship offer**. While the majority of these opportunities were available in Europe, 4.6% of respondents reported having offers/opportunities available in the US, and another 4.6% in third countries. An 8.9% share of EU27+UK nationals had offers/opportunities available in either the US or other third countries, or both. It is likely that those researchers might have accepted offers from third-country institutions if it had not been for their MSCA fellowship. Meanwhile, when it comes to the factors that impacted the choices of this particular group of fellows in terms of host country and host institution, they reported that "proximity to the home country" was an important factor, either to a large extent (40%) or to some extent (20%). This is a much higher level than is reported by the general population of MSCA fellows and suggests that **the MSCA therefore offered these researchers an opportunity to remain close to their home countries**.

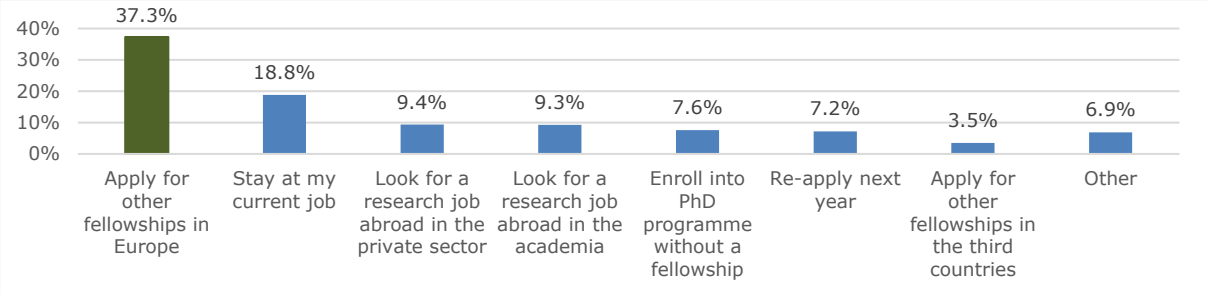
Figure 43. When you accepted the fellowship offer, did you already have other offers/opportunities available to you elsewhere? Please select all that apply.



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=2,525.

In the same survey, respondents were asked to indicate the second-best option they would have considered in the event that they had not been awarded the fellowship (see Figure 44): 18.7% of those fellows intended to look for a research job abroad, either in academia or in the private sector. Moreover, 3.5% indicated that they would have applied for other fellowships in third countries. Meanwhile, Europe was the top potential destination at 37.3%, which highlights the tendency of MSCA fellows, and European researchers in general to consider Europe one of their top destinations for carrying out excellent science.

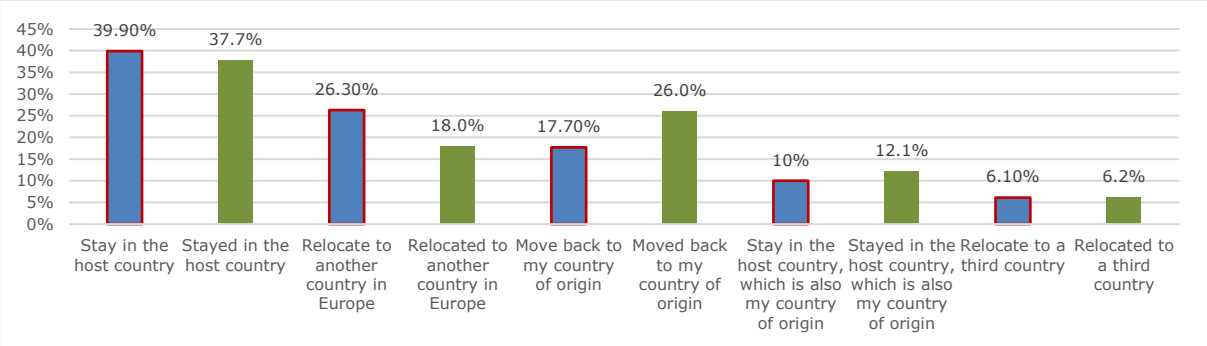
Figure 44. When you applied to the MSCA, what was the second-best option you considered for your career if you had not received a fellowship?



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=2,430.

The impact of the MSCA on the retention of researchers can also be illustrated by looking at the destinations of ITN, IF, and COFUND fellows of different nationalities upon completing their fellowships. Figure 45 shows both actual destinations (ITN, IF and COFUND fellows who had completed their fellowships) and planned mobilities post-MSCA (ITN, IF and COFUND fellows who were continuing their fellowships at the time they completed the survey).

Figure 45. Where did you continue your career after the fellowship? / What are your plans for the near future after your fellowship ends?



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=1,939 actual mobilities; 2,429 planned.

The data show that remaining in the host country appears to be the first preference for MSCA fellows with regard to actual/realised (green bars) and planned (blue bars) mobility, indicating that the MSCA contribute to the retention of talents.

4.2 Attracting foreign researchers to Europe

The analysis of mobility flows of third-country ITN, IF and COFUND fellows demonstrates a relatively similar pattern of distribution to that seen for EU27+UK nationals, with

widening Member States receiving a slightly lower share of fellows (5%) (see Figure 46) compared with their share of the EU27+UK nationals (6%) (see Figure 38).

Figure 46. Mobility flows of ITN, IF and COFUND fellows (third-country nationals) per type of MS

Source: CORDA database.

Examining the destinations of third-country nationals based on their locations of residence offers valuable insights into the ability of the MSCA to attract third-country nationals to Europe. As seen in Figure 47, **51.1% of IF fellows who are nationals of third countries were residing in third countries prior to their MSCA fellowships, while 4.5% were residing in associated countries. Of these fellows, 88.6% were attracted to the EU27+UK**, with 97% of them ending up in host institutions located within non-widening Member States.

Figure 47. Mobility flows of IF fellows (third-country nationals) per location of residency and host destination

Source: CORDA database.

The MSCA also attracted nationals of associated countries (see Figure 48). In total, 71% of them chose to do their fellowships in the EU27+UK. The majority of them were residents of EU27+UK and associated countries. Moreover, the programme retained 89.6% of associated-country nationals already residing within the EU27+UK before their MSCA fellowship.

Figure 48. Mobility flows of IF fellows (associated-country nationals) per location of residency and host destination

Source: CORDA database.

4.3 Attracting European researchers back to Europe

Attracting European researchers back to Europe is perhaps one of the most revealing indicators of the success of the MSCA in enhancing the Union's research and innovation capacity, by strengthening its competitive position in terms of talent acquisition. Those potential 'returnees' bring to the EU their scientific acumen, international scientific mobility experiences, understanding of and familiarity with foreign research and innovation ecosystems, along with the networks of potential collaborators that they have built over the years.

As shown in Figure 42, prior to their MSCA IF fellowship, **8.6% of EU27+UK nationals were living in third countries, and 4% resided in associated countries. The MSCA managed to attract back 79% of those IF fellows to the EU27+UK.** Of these returnees, 95% were hosted by non-widening Member States.

In line with this, 89% of the 2,757 ITN, IF, and COFUND fellows indicated that they had been engaged in research activities before they accepted their MSCA fellowships offers.[87] Of these fellows, 9% were conducting research activities in third countries.

Furthermore, the available residency data on IF fellows highlight yet another dimension of the impact of the MSCA on bringing the best European research talents back to Europe. Out of the 628 EU27+UK nationals living in non-EU27+UK countries (associated countries or third countries), and who ended up being hosted in the EU27+UK, 290 (46%) were hosted in their countries of origin. This demonstrates that **the MSCA programme is seen by many European researchers living abroad as a tool for them to return to their countries of origin.** The fellows we interviewed also expressed such a view.

The reintegration panel (RI) of the European fellowships (IE-EF) specifically targets EU and associated-country nationals and long-term residents. They must move or have moved directly from a third country to the EU or Horizon 2020 associated country in which their host organisation is located. The CORDA database of fellows provides data on 570 EF-RI EU27+UK nationals who benefitted from this scheme. **Out of these, 335 fellows (58.8%) used the scheme to return to their home countries.**

However, several fellows interviewed regarded third countries with high-performing research and innovation systems, such as the US, as offering better availability of career opportunities, a greater diversity of career options, and more accessible research grants. This is also consistent with the findings of the MORE4 study, which found that European researchers living in the US perceived it as a much better place for doing science, with the

[87] *2022 survey of MSCA fellows (ITN, IF, COFUND).*

exception only of social and job security and quality-of-life aspects.[88] Therefore, attracting European researchers back from third countries can be considered a task that goes way beyond the ability of a single programme to achieve. As highlighted in the interviews with NCPs and fellows, it requires affirming the EU's position as an attractive environment in which researchers can conduct excellent research, aspire to stable and rewarding career opportunities, and enjoy a high quality of life, potentially along with their families. Nevertheless, as evidenced by the analysed quantitative and qualitative mobility data, **the MSCA are successful in attracting European researchers back to Europe, by offering them a valuable instrument for low-risk reintegration into European research and innovation systems.**

5 Assessment of the impact of the Widening Fellowships

5.1 Policy context and analytical approach

The Widening Fellowships (WF) were introduced in 2018 for the final three years of Horizon 2020, with the objective to incentivise brain circulation towards widening countries. The WF had three calls (in 2018, 2019 and 2020and funded 118 fellows going to widening countries. Under Horizon Europe, these WF have been rebranded as ERA Fellowships.

The Widening Fellowships funded proposals with a host organisation located in a widening country, submitted to the MSCA-IF-EF call (European Fellowships), which received a high score but could not be funded due to a lack of budget. The WF only included proposals in which: 1) applicants agreed to have their proposal submitted to the Widening Fellowships call; and 2) the proposals obtained a score of at least 70% in the MSCA-IF-EF under the Career Restart (CAR), Reintegration (RI), Society and Enterprise (S&E) or Standard (ST) panels.

Only researchers who applied for a European Fellowship were eligible for Widening Fellowships. When assessing the impact of Widening Fellowships on mobility flows, this study focuses on how the WFs contributed to more balanced mobility flows under the MSCA-IF-EF action.[89]

As Widening Fellowships have not yet received many evaluations, we focused on gathering additional data via interviews and surveys. In total, we received 46 survey responses from fellows, representing **a response rate of 42.6% out of the 108 projects**. This is an excellent response rate.

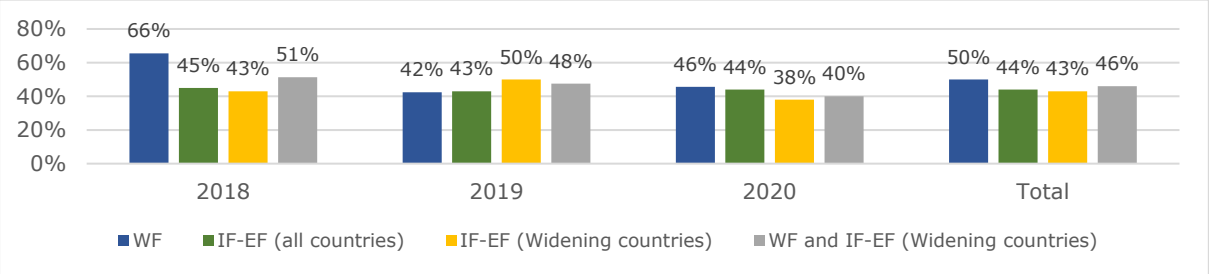
5.2 Composition of widening fellows by background variables

The majority of widening fellows (92 fellows, 85.2%) participated in the Standard panel. Fifteen fellows (13.9%) participated in the Reintegration panel, and one (0.9%) in the Career Restart panel. Over a comparable period, the Widening Fellowships supported a significantly higher percentage of Standard panel participants when compared with IF-EF (66.3% of IF-EF fellows going to widening countries participated in the Standard panel).

[88] *European Commission, Directorate-General for Research and Innovation, MORE4: support data collection and analysis concerning mobility patterns and career paths of researchers, Publications Office, 2021, https://data.europa.eu/doi/10.2777/645537*

[89] *The challenges involved in assessing the impact and performance of WFs were that only 14 projects had ended by November 2021, and 16 projects would only commence in 2022. For this study, we focused on analysing 108 projects.*

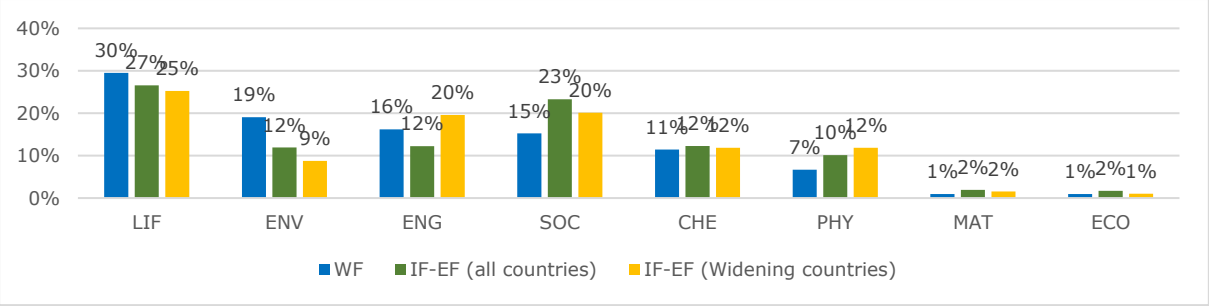
Figure 49. Gender balance of IF-EF and Widening Fellowships: share of female researchers (%)



Source: CORDA database. WF total n=108; IF-EF (all countries) total n=8,051; IF-EF (widening countries) total n=390.

The Widening Fellowships positively impacted the gender balance of mobility to widening countries. Although the share of female researchers was lower in 2019, this is clearly compensated for by the fact that in 2018, two-thirds of widening fellows were women. Notably, **half (54 out of 108) of widening fellows were women,** a higher percentage than in European Fellowships.

Figure 50. Distribution of IF-EF and widening fellows by scientific panel, 2018-2020



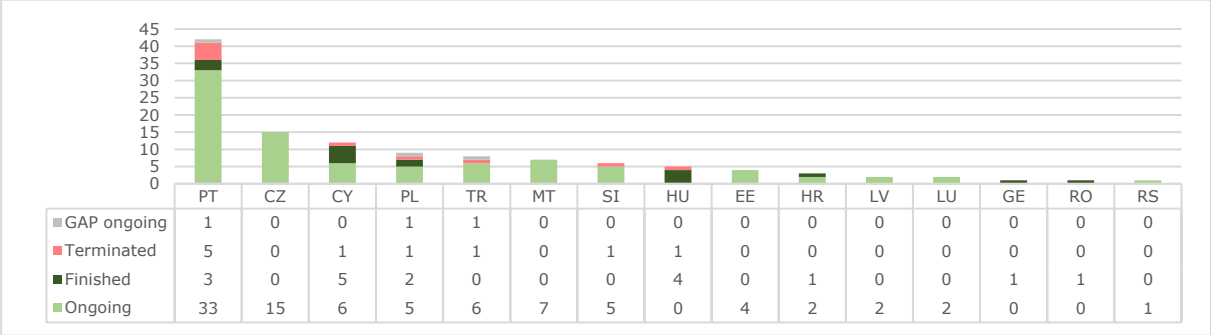
Source: CORDA database. WF total n=108; IF-EF (all countries) total n=8,051; IF-EF (widening countries) total n=390.

Notable differences can be seen in the distribution of Widening and European Fellowships by scientific panel. Proportionally, more widening fellows are in Life Sciences and Environment and Geosciences than IF-EF fellows. Social Sciences, Humanities and Physics are the scientific areas in which the proportion of widening fellows is below that of IF-EF fellows in all countries combined. In other scientific areas, there are no major differences.

5.3 Mobility flows of widening fellows

Figure 51 shows the distribution of WFs by country. Portugal has been the main beneficiary, with a total of 42 projects (out of which five have been terminated). Czechia and Cyprus are the two other Member States with more than 10 incoming fellows. Three Member States did not host any widening fellows (Bulgaria, Lithuania and Slovakia), while only three associated countries (Turkey, Georgia, and Serbia) hosted incoming widening fellows.

Figure 51. Distribution of Widening Fellowships by country and project status[90]



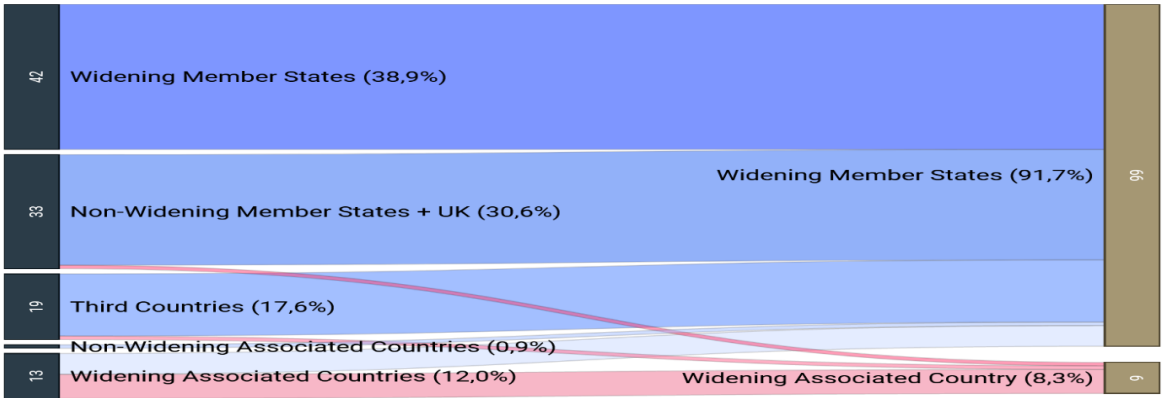
	PT	CZ	CY	PL	TR	MT	SI	HU	EE	HR	LV	LU	GE	RO	RS
GAP ongoing	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Terminated	5	0	1	1	1	0	1	1	0	0	0	0	0	0	0
Finished	3	0	5	2	0	0	0	4	0	1	0	0	1	1	0
Ongoing	33	15	6	5	6	7	5	0	4	2	2	2	0	0	1

Source: CORDA database; CORDIS.

Certain imbalances can be seen in the distribution of Widening Fellowships. **The three countries with the highest number of widening fellows make up more than half of all Widening Fellowships funded**. Portugal (34.3%), Czechia (13.9%) and Cyprus (10.2%) account for 58.3% of the 108 funded, non-terminated fellowships. Countries with more than five widening fellows make up a further 20.4% – Poland (7.4%), Turkey (6.5%), Malta (6.5%) and Slovenia (6.5%). The remaining eight countries make up for the remaining 21.3%.

Figure 52 below presents the mobility patterns of widening fellows. These fellows have been grouped into five categories, based on their country of citizenship.

Figure 52. Widening Fellowship inflows by country of origin and destination



Source: CORDA database, n=108.

As Figure 52 shows, the vast majority of fellows (91.7%) travelled to widening Member States. Out of the 42 fellows who were citizens of a widening Member State, **32 (76.2%) went to the country of which they were citizens.** This indicates that Widening Fellowships are relevant to researchers' return mobility.

There is a significant gap in mobility to widening Member States, compared with associated countries. This difference is also evident in the general mobility patterns within the MSCA. Furthermore, out of the nine fellows who went to widening associated countries, seven went to Turkey. Of these seven, six were returning Turkish researchers. This is consistent with the fact that out of all IF-EF fellows going to Turkey during Horizon 2020, 96.2% were Turkish citizens.

[90] *Status of the project in November 2021.*

Aside from returning Turkish researchers, researchers from widening associated countries tend to go to countries other than their country of origin or another widening associated country. The performance of associated countries is currently closely dependent on inflows to Turkey.

The Widening Fellowships have supported return mobility to almost all countries receiving widening fellows. The exceptions were Hungary, Luxembourg, Serbia, Romania and Georgia. This indicates that **the Widening Fellowships are important for attracting foreign researchers and promoting the return mobility of experienced researchers**.

5.4 Impact of the Widening Fellowships on mobility flows

Table 4 summarises the number of Widening and European Fellowships by country and call year, also indicating the respective increases in grants by country. This table also includes countries with incoming European fellows, but no incoming widening fellows.[91]

Table 4. IF-EF and Widening Fellowship grants in widening countries, and the impact of Widening Fellowships on overall grants, 2018-2020

		PT	CZ	TR	CY	SI	PL	LU	HU	EE	HR	MT	SK	RS	LV	LT	RO	BG	AL	GE	Total
2018	IF-EF (n=)	20	4	7	3	4	2	1	2	2	1	0	0	0	0	0	1	0	0	0	47
	WF (n=)	10	3	0	5	1	1	0	2	2	1	1	0	0	1	0	1	0	0	1	29
2019	IF-EF (n=)	18	8	6	5	6	3	8	3	2	1	0	2	2	1	2	0	2	1	0	70
	WF (n=)	11	7	4	2	1	3	0	0	1	0	3	0	1	0	0	0	0	0	0	33
2020	IF-EF (n=)	12	15	9	8	10	6	4	3	1	3	1	2	1	0	1	1	0	0	0	77
	WF (n=)	16	5	3	4	3	4	2	2	1	2	3	0	0	1	0	0	0	0	0	46
Total	IF-EF (n=)	50	27	22	16	20	11	13	8	5	5	1	4	3	1	3	2	2	1	0	194
	WF (n=)	37	15	7	11	5	8	2	4	4	3	7	0	1	2	0	1	0	0	1	108
	Increase in grants (%)	74%	56%	32%	69%	25%	73%	15%	50%	80%	60%	700%	0%	33%	200%	0%	50%	0%	0%	0%	56%

Source: CORDA database.

Widening Fellowships contributed to an average increase of 56% in the number of grants to widening countries. If this figure is calculated only for those countries with incoming widening fellows, it rises to 59%. This is a significant impact on the number of proposals retained.

In terms of the increase in the number of grants (measured in relative terms), the main beneficiaries of the Widening Fellowships scheme were Malta and Latvia. This is explained by their low numbers of European fellows compared with widening fellows during the 2018-2020 period. Still, the increase in grants would be remarkable, even if we consider the whole period of Horizon 2020. Under Horizon 2020, host organisations in Malta and Latvia had two incoming IF-EF fellows in total, respectively. In particular, Malta's performance under the Widening Fellowships shows considerable improvement compared with IF-EF.

Cyprus, Estonia, Hungary, Portugal and Poland are the other main beneficiaries of the Widening Fellowships, as the increases in funded grants to these countries were higher than the average ratio. Georgia can also be included in this group, as without the Widening Fellowships, it would have received no incoming researchers.

[91] *The countries with no incoming widening or European Fellows were all associated countries: Armenia, Bosnia and Herzegovina, the Faroe Islands, the Republic of Moldova, Montenegro, North Macedonia, Tunisia and Ukraine.*

At the same time, differences clearly exist in how well various countries benefitted from the Widening Fellowships. Table 5 looks at the number of proposals and funded grants under IF-EF and Widening Fellowships. The table presents the average success rates for IF-EF and Widening Fellowships, and the average increase in percentage points due to Widening Fellowships for all countries included in the table. Individual countries' success rates and increases have been compared against these averages: where they are colour-coded red, the success rate and/or increase was lower than the average for all countries; where they are colour-coded green, the success rate and/or increase was higher than the average for all the countries.

Table 5. Number of proposals, funded grants and success rates in widening countries (IF-EF and Widening Fellowships)

		PT	CZ	TR	CY	SI	PL	LU	HU	EE	HR	MT	SK	RS	LV	LT	RO	BG	AL	GE	Total
n=	IF-EF, all proposals	729	337	277	121	175	254	101	106	77	35	48	43	19	35	31	48	27	4	11	2478
	IF-EF, funded grants	50	27	22	16	20	11	13	8	5	5	1	4	3	1	3	2	2	1	0	194
	WF, funded grants	37	15	7	11	5	8	2	4	4	3	7	0	1	2	0	1	0	0	1	108
	IF-EF and WF funded grants	87	42	29	27	25	19	15	12	9	8	8	4	4	3	3	3	2	1	1	302
%	IF-EF success rate	6,9%	8,0%	7,9%	13,2%	11,4%	4,3%	12,9%	7,5%	6,5%	14,3%	2,1%	9,3%	15,8%	2,9%	9,7%	4,2%	7,4%	25,0%	0,0%	7,8%
	IF-EF and WF success rate	11,9%	12,5%	10,5%	22,3%	14,3%	7,5%	14,9%	11,3%	11,7%	22,9%	16,7%	9,3%	21,1%	8,6%	9,7%	6,3%	7,4%	25,0%	9,1%	12,2%
	Increase (%-point)	5,1%	4,5%	2,5%	9,1%	2,9%	3,1%	2,0%	3,8%	5,2%	8,6%	14,6%	0,0%	5,3%	5,7%	0,0%	2,1%	0,0%	0,0%	9,1%	4,4%

Source: CORDA database; Analysis of consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020.

Czechia, Cyprus, Croatia and Serbia consistently outperformed other countries in funded IF-EF fellowships and Widening Fellowships.

Table 6. Number of eligible Widening Fellowships proposals, 2018-2020

	2018	2019	2020	Total
IF-EF submitted proposals	752	832	921	2505
Proposals eligible for Widening Fellowships	402	444	498	1344
Percentage of eligible Widening Fellowships out of IF-EF applicants applying for Widening Fellowships proposals	53.5%	53.4%	54.1%	53.7%
Number of funded Widening Fellowships	29	33	46	108
Percentage of Widening Fellowships funded (out of eligible proposals)	7.2%	7.4%	9.2%	8%

Source: CORDA database; Analysis of consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020.

In 2020, 22.5% more IF-EF proposals were submitted than in 2018, which is a substantial increase. As discussed in detail later in this chapter, the number of submitted proposals is a strong determinant of the number of funded projects. MSCA fellows across all actions show considerable interest in applying for a fellowship in a widening country.

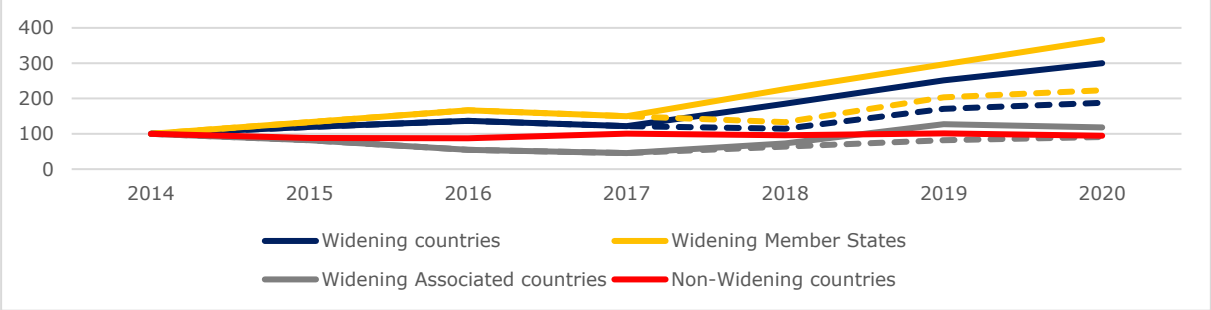
Both the survey results and the interviews conducted support the notion that Widening Fellowships had a beneficial impact on the number of IF-EF applications. **Of the widening fellows surveyed, 54.5% stated that the existence of the Widening Fellowships**

contributed positively to their decision to apply for MSCA funding.[92] The NCPs and representatives of host institutions interviewed also stated that Widening Fellowships had contributed to their increased interest in applying to widening countries.

A total of 1,344 (53.7%) of IF-EF proposals were eligible for Widening Fellowships, meaning that this number of fellows wanted their proposal to be considered for funding under the Widening Fellowships. This indicates that there was significant demand for Widening Fellowships. Furthermore, the **funded proposals were of excellent quality**, with funded proposals receiving average scores of 91.02 in 2018, 91.62 in 2019, and 92.07 in 2020.[93] **This shows an increasing trend in the quality of proposals.**

Figure 53 shows the trends in inflows to widening countries and non-widening countries, with and without the Widening Fellowships (the dotted lines indicate inflows without the Widening Fellowships). These figures are normalised by using the inflows in 2014 as a baseline.

Figure 53. Development of IF-EF and Widening Fellowships inflows, 2014-2020 (2014=100)



Source: CORDA database. WF total n=108; IF-EF (all countries) total n=8,051; IF-EF (widening countries) total n=390.

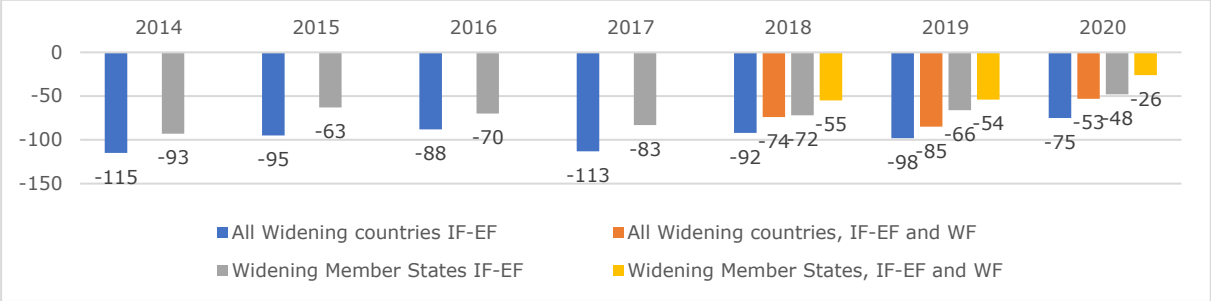
Inflows to non-widening countries have remained relatively stable throughout the whole Horizon 2020 funding period. Compared with this trend, it is clear that widening Member States managed to improve their performance by a considerable margin relative to non-widening countries. **Mobility inflows to widening Member States were 3.6 times higher in 2020 than in 2014** (2.2 times higher without the Widening Fellowships).

Without the Widening Fellowships, widening associated countries would have performed worse across the whole Horizon 2020 funding period than they had in 2014. The pilot ensured that associated countries could reverse the negative trend and improve their incoming mobility flows to a higher level than at any previous point during the Horizon 2020 period.

This increase in incoming mobility contributed to more balanced brain circulation, as seen in Figure 54. The statistics account for mobility flows from non-widening countries to widening countries, and from widening countries to non-widening countries (mobility statistics between widening countries are not accounted for in this figure). This shows mobility flows both with and without the Widening Fellowships.

[92] *2021 survey of MSCA fellows (widening fellows). n=46.*
[93] *Analysis of the consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020. Ref.Ares(2021)4461643 – 06/07/2021.*

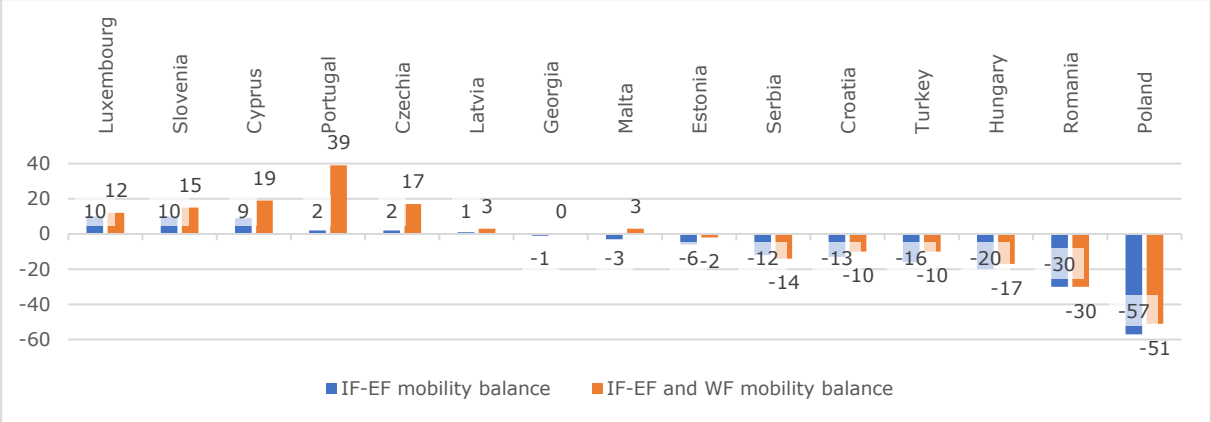
Figure 54. Impact of Widening Fellowships on the balance of mobility flows to and from widening countries, 2014-2020



Source: CORDA database. WF total n=108; IF-EF (all countries) total n=8,051; IF-EF (widening countries) total n=390.

When looking at the IF-EF action, it is clear that widening countries have experienced significant negative brain circulation throughout Horizon 2020. While they have not turned negative brain circulation into a positive one, **the Widening Fellowships significantly contributed to limiting the phenomenon of negative brain circulation**, **particularly for widening Member States**. Figure 55 presents the impact of the Widening Fellowships on mobility at country level.

Figure 55. Impact of Widening Fellowships on balanced mobility by countries receiving widening fellows, with return mobility



Source: CORDA database. WF total n=108; IF-EF (widening countries) total n=390.

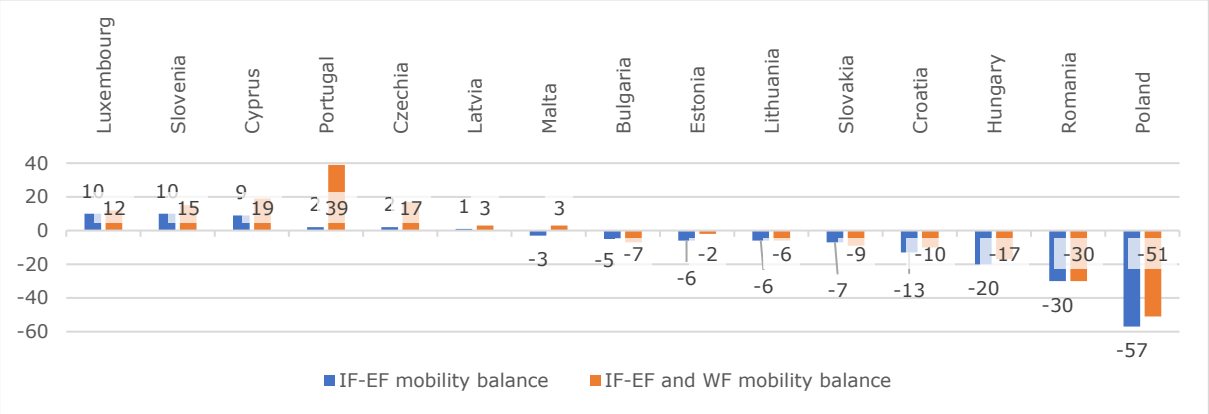
The Widening Fellowships pilot significantly increased the inflow of researchers to widening countries. It also contributed to reducing the total negative brain circulation to and from those widening countries that received at least one widening fellow, from -124 researchers down to -26 researchers. Thus, it contributed to ensuring almost balanced brain circulation to and from those widening countries that received widening fellows.

Figure 56 shows the balances and the impact of the Widening Fellowships for all widening Member States; Figure 57, for all widening associated countries. In widening Member States, the Widening Fellowships reduced the total negative brain circulation from -113 to -24. In widening associated countries, the effect was more limited, with the corresponding figure falling from -59 to -57.

In a recent report, the European Research Executive Agency (REA) found that the Widening Fellowships contributed to turning what would have been a negative mobility flow out of widening countries (-53 researchers) into a positive one (+65 researchers). The report determined the fellows' point of origin as being their last place of residence at the time of

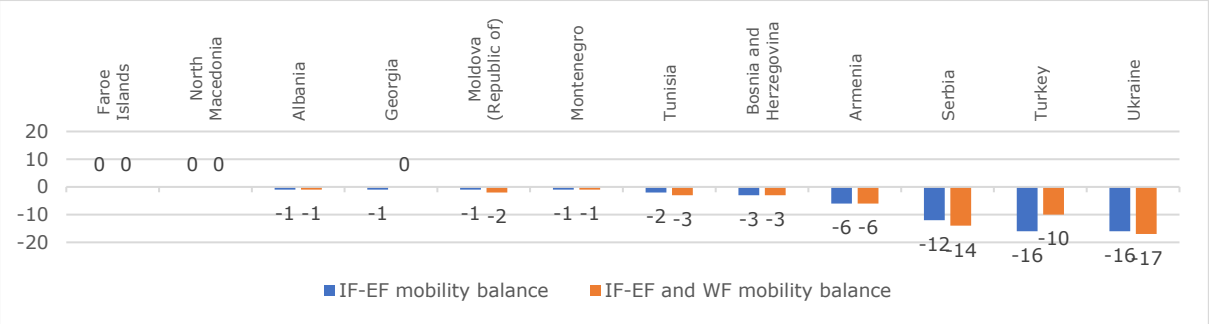
application.[94] This difference in methodologies explains the differences in figures, but **both studies show that the Widening Fellowships have positively impacted brain circulation**.

Figure 56. Impact of Widening Fellowships on balanced mobility in widening Member States, including return mobility



Source: CORDA database. WF total n=108; IF-EF (widening countries) total n=390.

Figure 57. Impact of Widening Fellowships on balanced mobility in widening associated countries, including return mobility



Source: CORDA database. WF total n=108; IF-EF (widening countries) total n=390.

Our analysis indicates that the Widening Fellowships have been particularly effective with regard to widening Member States. However, the impact has been much more limited for widening associated countries. This is reflected in overall mobility patterns, as discussed in Section 3.1, which shows that widening associated countries tend to be less attractive overall. As we will discuss in Section 6, this largely relates to the strength of countries' research systems: even when fellows choose to go to a widening country, they prefer to go to those countries with stronger research systems.

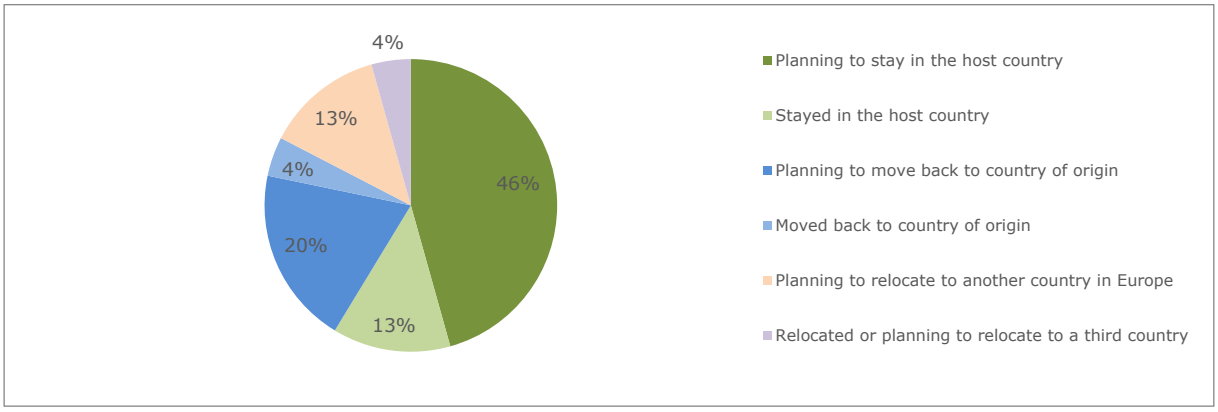
Given that the Widening Fellowships had a budget of EUR 18 million, and 118 fellows were funded under the pilot, the unit cost for each individual fellow was EUR 152,000 (at current prices). Based on this, **balancing IF-EF mobility flows to and from *widening Member States* would have cost an additional EUR 3.65 million over 2018-2020**. From an implementation perspective, funding a total of 150-160 widening fellows (an additional 30-40 fellows) over a three-year period would have ensured balanced mobility to widening Member States. This corresponds to an additional budget of between EUR 4.5 million and EUR 6.1 million.

[94] *Analysis of the consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020. Ref. Ares(2021)4461643 – 06/07/2021.*

Balancing mobility flows to all widening countries (which had a negative mobility balance of 81 fellows in total) would have cost an additional EUR 12.3 million on top of the original budget of EUR 18 million. Therefore, an estimated total budget of EUR 30 million over 2018-2020 (EUR 10 million annually) would have been enough to balance European fellows' mobility flows to widening countries (an increase of 67% in the Widening Fellowships budget). However, even significant additional funding for the Widening Fellowships may not achieve the goal of balancing mobility flows to and from the widening associated countries, given that the majority of additional fellowships are likely to be used to go to widening Member States. Therefore, **it is recommended, first and foremost, to focus on increasing the budget for widening Member States.**

The Widening Fellowships also contributed to spreading talent and **retaining talents,** as shown in Figure 58.

Figure 58. Planned and realised mobility after the end of Widening Fellowships



Source: survey of MSCA fellows (widening fellows) (2021), n=46.

'Realised mobility' refers to mobility that has taken place after the end of the fellowship. Nine widening fellows have finished their projects. Out of these, six remained in the host country. Of these six, four were citizens of another country. Although this sample size is small, it indicates that **the Widening Fellowships contribute to attracting and retaining both foreign and returning talent.** Furthermore, two fellows moved back to their respective countries of origin, and one relocated to a third country.

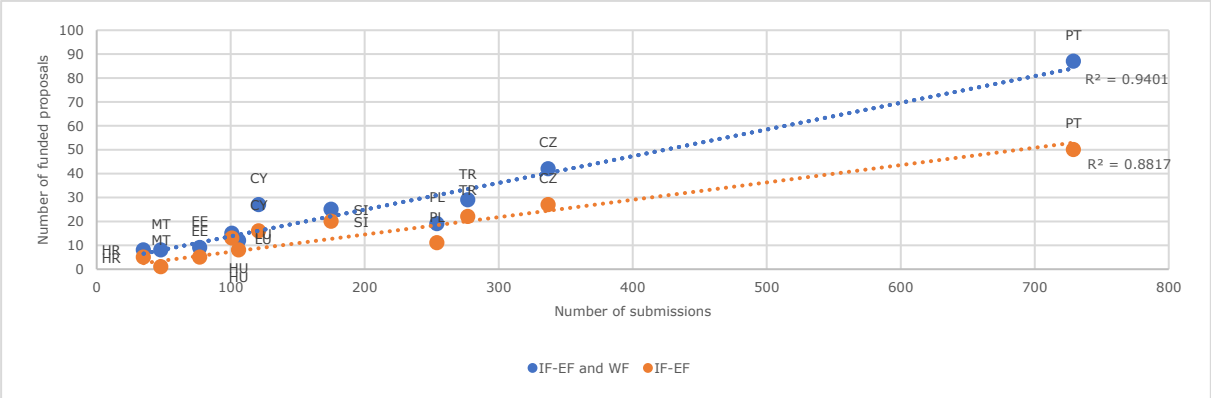
The survey data show that 59% (27 respondents) of widening fellows are either planning to stay, or have stayed, in the host country after their fellowship. Of the 27 respondents who indicated they were staying or planning to stay, 52% (14 respondents) were returning researchers, and 48% (13 respondents) were citizens of other countries. 24% of respondents were planning to move or have moved back to their country of origin after the fellowship. When focusing specifically on returning researchers, we can note that a significant share (87.5%) of returning researchers were staying or planning to stay in their countries of origin (14 out of 16 respondents who used the Widening Fellowships to go to their countries of origin). This demonstrates that the Widening Fellowships **contributed to return mobility and to retaining talent in fellows' countries of origin**.

5.5 Widening Fellowships and determinants of mobility

Below is an analysis of the various determinants that contribute to the performance of different countries with regard to mobility under MSCA and the Widening Fellowships.

Figure 59 assesses the relationships between the number of submissions and funded proposals for IF-EF and Widening Fellowships.

Figure 59. Number of submissions and funded proposals (IF-EF and Widening Fellowships)



Source: CORDA database; Analysis of the consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020.

This analysis shows that the number of proposals submitted strongly correlates with the number of proposals funded (the number of submissions explains roughly 95% of the number of proposals funded). The funded projects are a consequence of the submissions received. This shows that **the determinants contributing to differences in inflows of researchers predate the MSCA.**

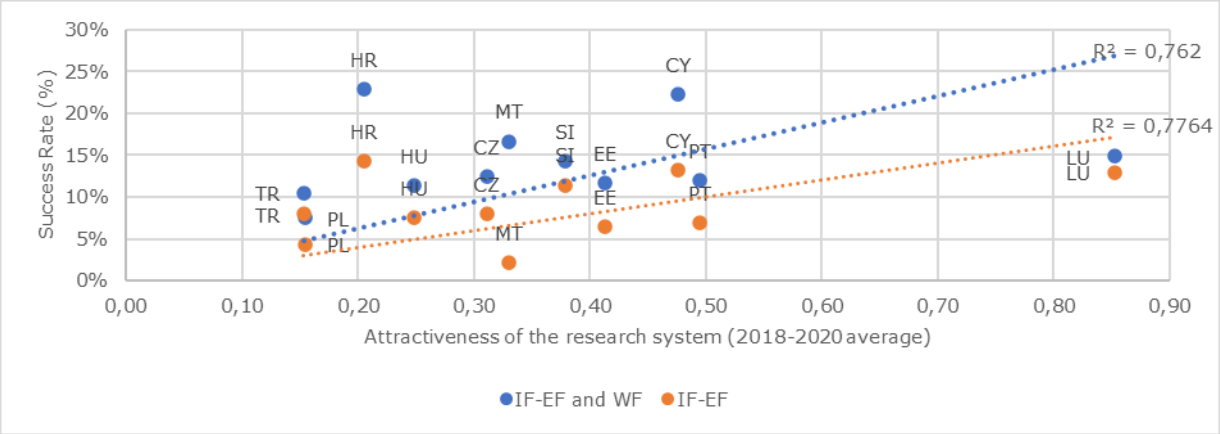
The analysis reveals that Portugal accounts for significantly more submissions than any other country, with more than twice the number of submitted proposals of second-placed Czechia. Both countries are the main beneficiaries of Widening Fellowships in terms of absolute numbers. Turkey and Poland also stand out in terms of the number of submissions and rank high in the number of incoming widening fellows. Because the Widening Fellowships are awarded to ranked IF-EF submissions, it is to be expected that **the same countries that show a high number of successful IF-EF proposals would attract a high number of successful Widening Fellowships**.

Figure 59 also shows the R^2 values with and without the Widening Fellowships. Without the Widening Fellowships, the number of submissions explains 95% of the number of projects funded. With the Widening Fellowships, this number is 94%. This indicates that the Widening Fellowships slightly contributed to increased differences between countries in terms of the numbers of proposals funded. However, these differences are not statistically significant and are effectively negligible.[95]

Figure 60 highlights the impact of the attractiveness of a research system on accepted IF-EF and WF proposals. Countries with a low number of observations have been excluded from the analysis. All things being equal, countries should have a similar ratio of successful proposals.

[95] *R^2 indicates the percentage variance in the dependent variable that the independent variable explains.*

Figure 60. Impact of the attractiveness of research systems on the success rate of IF-EF and Widening Fellowships



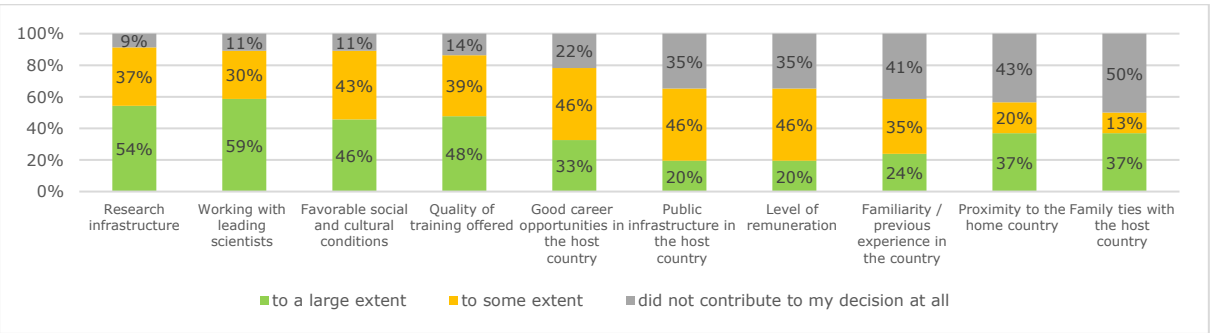
Source: CORDA database; Analysis of the consolidated results of widening countries' participation in the MSCA-IF and WF calls 2018-2020; European Innovation Scoreboard 2021.

As shown in Figure 60, both R^2 values are higher than 0.7, indicating a strong fit of the model. If Luxembourg is removed as an outlier, the R^2 values are 0.76 for IF-EF and 0.85 with the Widening Fellowships. This would indicate that the Widening Fellowships have contributed to success rates which are more in line with the attractiveness of the research system, meaning that countries are better positioned to benefit from their research systems with Widening Fellowships.

Unsurprisingly, this indicates that the attractiveness of a country's research system impacts the capacities of its host institutions to attract excellent researchers. The quality of universities is another measure of attractiveness and excellence. Portugal has four universities ranked in the top 500 universities in the world, while Czechia has three. Both countries enjoy high inflows of researchers. Poland has two universities in the top 500, while Estonia and Cyprus have one each. This demonstrates that **the quality of universities matters for MSCA fellows, who are excellent researchers.**

Figure 61 looks at the various factors that influence widening fellows' choice of host country and host institution and provides a more detailed assessment of mobility determinants. This figure is based on survey data.

Figure 61. To what extent do the following factors contribute to the choice of a host country and host institution?



Source: survey of MSCA fellows (widening fellows) (2021), n=46.

The **two main determinants of mobility are the ability to work with leading scientists and the quality of research infrastructure.** These factors were considered

as contributing to a large extent to their choice of destination by 59% and 54% of respondents, respectively. This finding is consistent with the interviews and the results of earlier studies, as well as with the findings presented in Section 6.1 of this report. Amongst the determinants affecting the opportunity to conduct excellent research and developing one's skills, the quality of training offered also ranks highly.

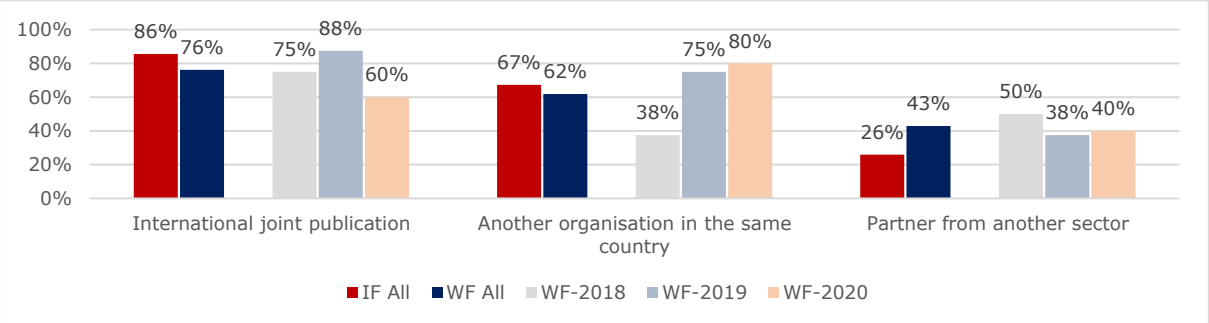
Favourable social and cultural conditions influenced mobility to a large extent for 46% of fellows, and to some extent for 43%. This suggests that, while opportunities for conducting research are the main determinants of scientific mobility, social and cultural conditions are an important secondary consideration when researchers choose their destination country and host institution.

If we consider return mobility, there are notable differences in the relative importance of determinants. In terms of factors that contribute to mobility decisions to either a large or to some extent, family ties are 67 percentage points more important for returning researchers compared with non-returning researchers, while proximity to the researcher's home country is 46 percentage points more important (see also Section 6.1.1). This comes at the expense of the ability to work with leading scientists, which was 25 percentage points less important for returning researchers than for non-returning researchers. **This indicates that family reasons are among the main considerations for returning researchers. Meanwhile, non-returning researchers rate factors linked to their ability to conduct research and to personal development more highly than returning researchers.**

5.6 Performance of Widening Fellowships, and their impact on widening fellows

When assessing the creation of research and collaboration links through publication data, widening fellows compare favourably with the recipients of Individual Fellowships. Figure 62 presents a comparison between individual and widening fellows who have publications as a result of their fellowship. **The figures are not directly comparable and should be treated as indicative findings** as individual fellows assessed the contribution made by the MSCA to their publications two years after the end of their fellowship. While individual fellows have a higher percentage of publications in international joint publications and with other organisations in the same country, the publication patterns of widening fellows are expected to improve as their research progresses, and a fair comparison can only be provided two years after the end of these fellowships.

Figure 62. Publication patterns of IF-EF and widening fellows



Source: survey of MSCA fellows (widening fellows) (2021), n=46; MSCA Follow-up Questionnaire – two years after the end of the fellowship, IF All n=1,213.

Yet, even when looking only at the distribution patterns of fellows who have already published, it is clear that widening fellows already fare well in comparison to individual fellows. Publication collaboration is fairly similar with regard to international joint

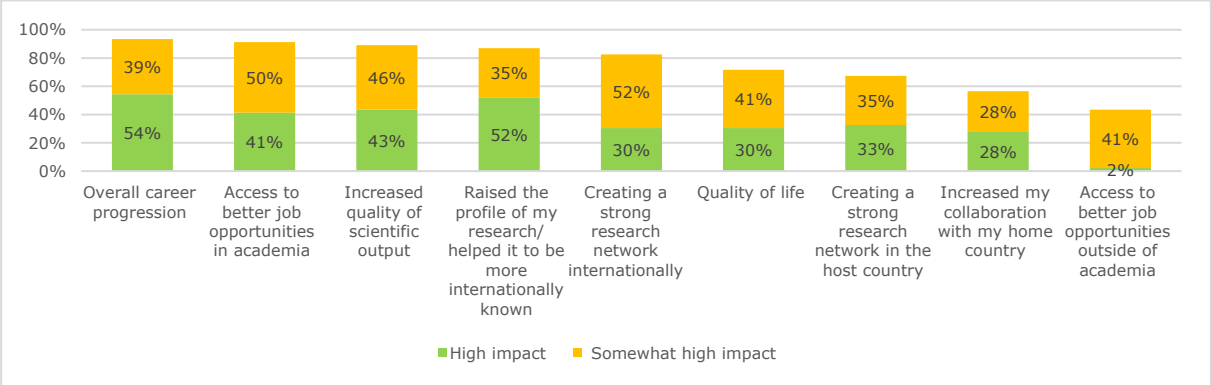
publications and with other organisations in the same country. **Widening fellows have been considerably more active in terms of intersectoral publications than have individual fellows.** These results clearly indicate that Widening Fellowships support the creation of collaborative research links at a level comparable to Individual Fellowships. In the interviews conducted for this study, interviewees also stressed that there is no difference between MSCA fellows and widening fellows. All were excellent researchers. Based on both quantitative and interview data, the performance of widening fellows has been excellent.

The interviewees also stressed that the Widening Fellowships contributed to the creation of new research and collaboration links, increasing the reputation and visibility of host institutions and research systems, and helping host institutions to become better acquainted with the MSCA in general. **The Widening Fellowships have important spill over effects on both the host institutions and the countries of the host institutions.**

In terms of satisfaction, **widening fellows themselves are satisfied with their experiences**, with 95.5% stating that the fellowship matched or exceeded their expectations. Only 4.4% of fellows said that the fellowship did not meet their expectations.

Out of the 34 fellows who assessed whether or not the fellowship met all their needs, 30 answered yes (88.2%), while only four (11.8%) reported that the fellowship did not meet their needs. Their reasons for dissatisfaction were a lack of soft skills training and opportunities to lead group activities; a lack of support from their supervisor; high taxes in the host country; and a lack of protection from harassment at the host institution.[96] Fellows were also satisfied with the impacts of Widening Fellowships on their overall career progression, as illustrated in Figure 63.

Figure 63. Impact of Widening Fellowships on career and skills



Source: survey of MSCA fellows (widening fellows) (2021), n=46.

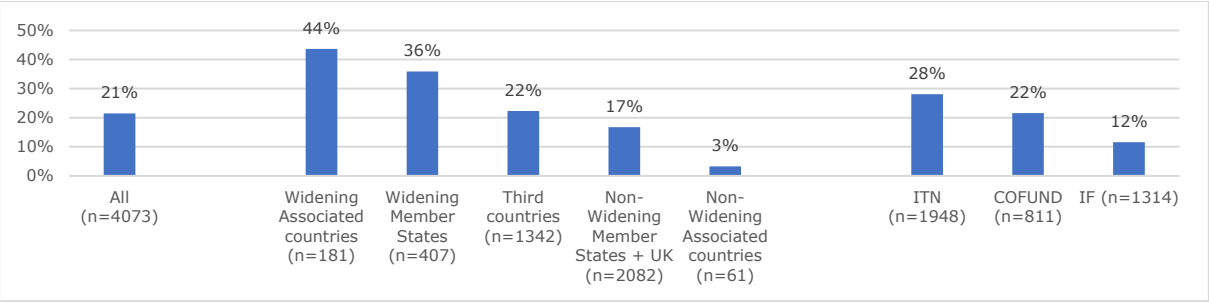
The fellows considered the impact of the pilot to be particularly high in relation to their overall career progression (54%), and to raising the profile of their research (52%). In general, fellows felt that their fellowships had contributed to better opportunities for academic career progression, increased the quality and visibility of their scientific output, and helped to create strong international research networks.

Looking at the general level of interest and how the attractiveness of widening countries could be further increased, it is clear that there is further potential to attract incoming researchers from non-widening countries. Out of all MSCA fellows who conducted their

[96] *2021 survey of MSCA fellows (widening fellows), n=46.*

fellowship in a non-widening country, 21% had considered applying for an MSCA fellowship in a widening country (see Figure 64).

Figure 64. Share of fellows conducting their fellowship in a non-widening country, but who considered applying to a widening country, by country of origin



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

The figure above illustrates the potential to attract researchers to widening countries. While fellows from widening countries are, as expected, more likely to consider a widening country as a destination, it is notable that over one-fifth of researchers from third countries, and almost one-fifth of researchers from non-widening Member States and the United Kingdom also considered applying to a widening country.

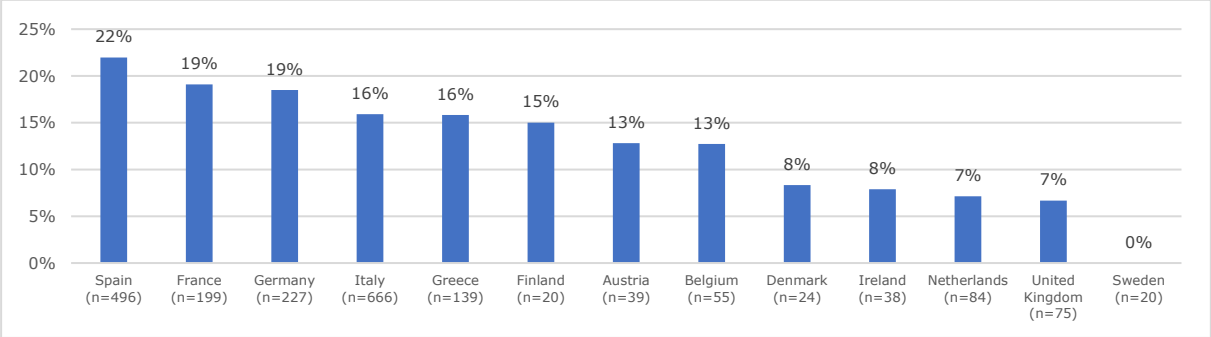
At the same time, it is notable that almost one-third of ITN participants who conducted their fellowship in a non-widening country considered a widening country as a destination, whereas only 12% of IF fellows considered going to a host institution in a widening country. This may be explained by the finding that experienced researchers are more willing to carry out their fellowships in widening countries than early-stage researchers (see Section 3.1.2 and Section 4.1). Additionally, as shown in Section 5.4, the Widening Fellowships have increased the number of IF-EF applications to widening countries.

The reason for the difference between the willingness of ITN and IF fellows who conducted their fellowship in a non-widening country to apply for a fellowship in a widening country may be that the Individual fellowships better enable experienced researchers to conduct their fellowship in a widening country (i.e. experienced researchers have better opportunities to go to widening countries than early-stage researchers). Additionally, as early-stage researchers consider international experience a fundamental requirement for their future career prospect, they prioritise training and career opportunities in addition to research excellence.[97] Based on the findings presented in Section 6.1.1, those opportunities contribute to mobility decisions to a larger extent in non-widening than widening countries.

Figure 65 illustrates the level of interest in conducting a fellowship in a widening country, among researchers conducting their fellowships in the non-widening Member States and the United Kingdom.

[97] *Study on mobility flows of researchers in the context of the MSCA. Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows. For additional details, see Section 2.2.*

Figure 65. Share of fellows conducting their fellowship in a non-widening country, but who considered applying to a widening country, by country of origin (non-widening Member States+UK)

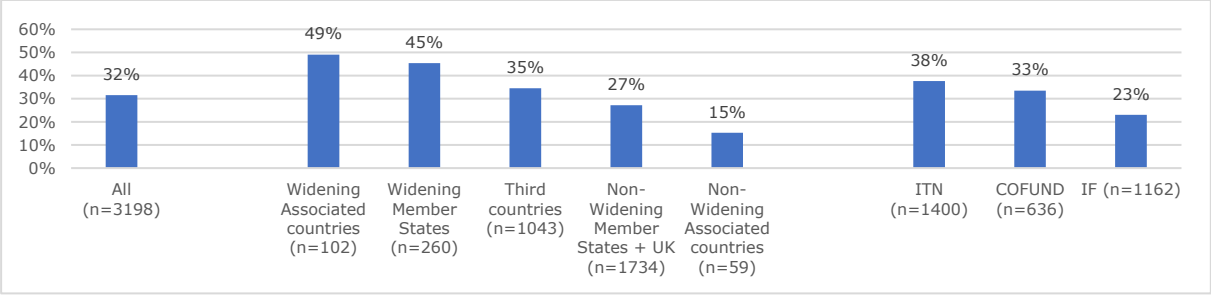


Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

This interest may partially be explained by having a widening country in close proximity to the country of origin (e.g. researchers from non-widening countries such as Spain, Italy, Greece) or by having many people with cultural or family ties to widening countries (e.g. researchers in France, Germany). Apart from the United Kingdom, people from larger Member States (as measured by population) appear to be more willing to consider a widening country as a mobility destination.

Figure 66 shows the share of fellows, out of those who did not at any stage consider a fellowship in a widening country, who would have considered going to a widening country if additional funding opportunities had been available.

Figure 66. Share of fellows who did not consider a fellowship in a widening country, but would have done so if additional funding opportunities had been available (by country of origin)

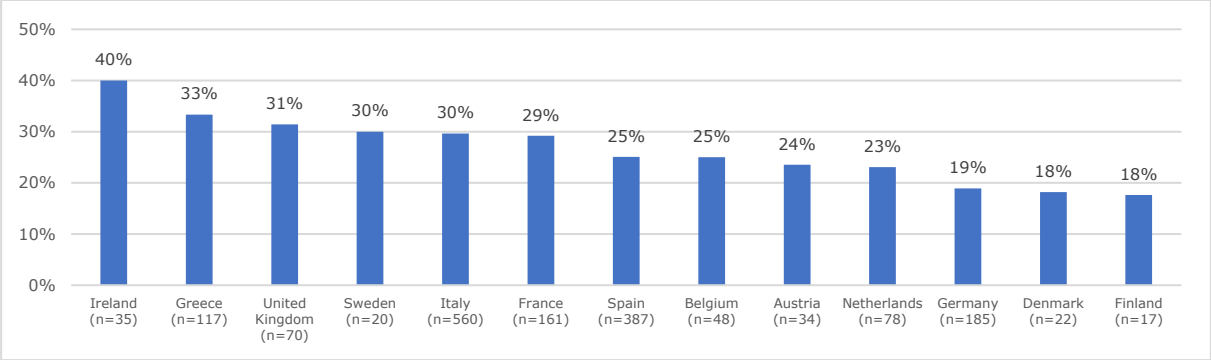


Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

Across all country groups and actions, additional funding opportunities would increase the likelihood of researchers going to widening countries. It is notable that over one-third of researchers from third countries, and over a quarter of researchers from non-widening Member States and the United Kingdom, would be willing to consider a widening country as a destination if more funding opportunities were available.

Almost a quarter of IF fellows would consider a widening country if additional funding opportunities were available for actions. This also indicates that there is a large potential pool of researchers who would benefit from the opportunities offered by the Widening/ERA Fellowships, indicating a strong demand for such fellowships.

Figure 67. Share of fellows who did not consider a fellowship in a widening country, but who would have considered one if additional funding opportunities had been available (by country of origin, non-widening Member States+UK)

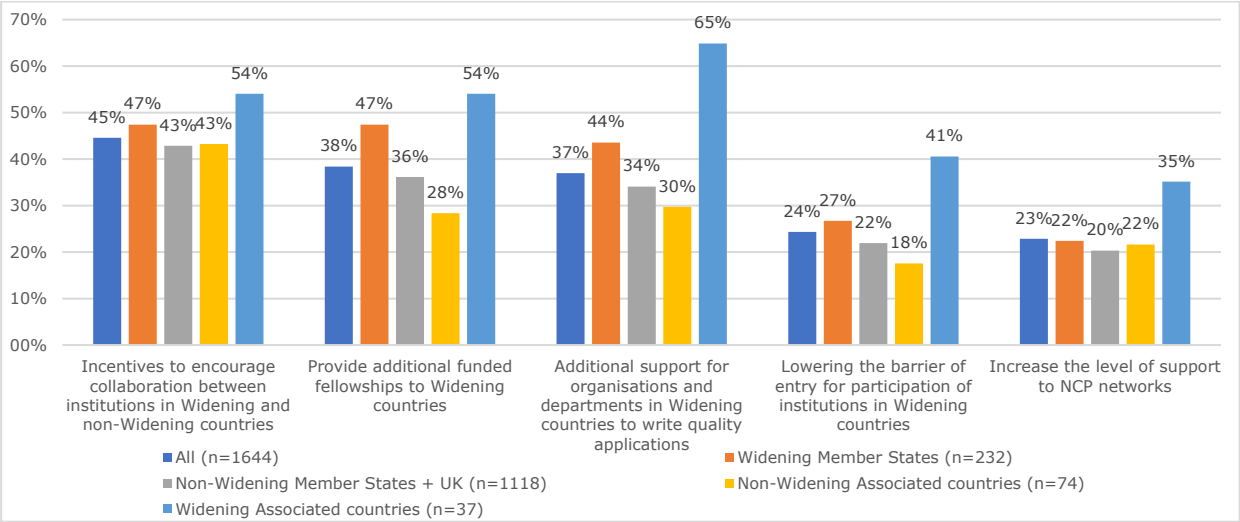


Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

Additional funding opportunities would also encourage widening countries to be considered as a possible destination by researchers from countries in which widening countries are currently less likely to be considered a destination. This effect is the most pronounced among researchers from Ireland, the United Kingdom and Sweden.

From the perspective of institutions participating in the MSCA, providing additional fellowships was considered the second-best option, as illustrated in Figure 68.

Figure 68. What could the MSCA do to increase the number of fellows going to widening countries, and to ensure balanced brain circulation?



Source: survey of MSCA organisations (2022).

Institutions in widening associated countries mentioned that additional support for writing quality applications would be the main factor in increasing the number of fellows going to widening countries. Other than this, incentives to encourage collaboration between institutions in widening and non-widening countries were considered the most effective way to increase incoming mobility to widening countries. However, widening countries considered the provision of additional funded fellowships to be equally important.

Increasing the level of support to NCP networks was considered to be the least effective way to increase incoming mobility. This may be because NCP networks are already considered effective; however, institutions in widening associated countries ranked this

option considerably higher than institutions in other countries, indicating that it is likely that a lack of capacity exists in the local NCP networks in those countries.

5.7 Summary and conclusions

In general, **Widening Fellowships have positively impacted the number of researchers going to widening countries and can be considered a success.** Furthermore, the study shows that no major changes to the scheme are needed. Many interviewees stated that one of the key strengths of the Widening Fellowships was the **easy application procedure**. By submitting a single application, researchers were able to apply to two different calls and thus increase their likelihood of being funded in a competitive funding scheme. Being able to apply for the Widening Fellowships through the MSCA evaluation procedure made the process simple and streamlined; and contributed to increasing the overall number of IF-EF applications to widening countries.

During the interview programme, most interviewees acknowledged that the Widening Fellowships were beneficial. Two points of criticism that arose were 1) the limited scope of the pilot; and 2) the fact that the Widening Fellowships are not MSCA fellowships. The second aspect relates to the fact that Widening Fellowships lack the MSCA 'quality stamp', and widening fellows may be considered 'second-rank' researchers because they had not been selected for funding in the first instance.[98] However, in practice, the only difference lies in the name of the fellowship. The evaluation process is the same for both widening and MSCA fellows; the grants are the same; and, as discussed earlier, funded widening fellows received evaluation scores which are comparable to funded MSCA fellows.

Stakeholders in the second expert workshop expressed the opinion that the ERA Fellowships should be better promoted to applicants to ensure the programme's success. Communications through official channels should stress two aspects: 1) ERA Fellowships and MSCA fellowships are of equal importance and prestige; and 2) ERA Fellowships are a stable and continuous programme.

As shown by this study, **differences in the quality of proposals between the MSCA and widening fellows are, in practice, negligible.** In addition, given that thresholds change between call years and the margins are small, it is easy to envision a situation in which a widening fellow might have received a MSCA grant in another call year. Therefore, widening fellows should not be considered second-rank researchers but as excellent researchers, similar to MSCA fellows. This view was echoed by stakeholders during the second expert workshop and acknowledged by many interviewees.

Attention should be paid to clearly communicating the fact that recipients of Widening/ERA Fellowships are not second-rank fellows. Based on the above analysis, they are excellent researchers whose performance does not differ from that of MSCA fellows. **The quality of Widening and ERA Fellowships should be communicated to relevant institutions.** In at least one instance, a recipient of a Widening Fellowship later received an MSCA-IF-EF from the reserve list. One of the main reasons for the researcher switching to the IF-EF Fellowship was because researchers supported by Widening Fellowships are not formally considered MSCA fellows. They were uncertain if the WF would be recognised as a certificate of excellence at institutional level in the same manner as an MSCA fellowship.

The previous point relates to **an additional challenge** that was identified during the study. This relates to the fact that Widening Fellowships are not yet necessarily well-known. This can be seen at the level of researchers, organisations, and, to some extent, NCPs.

[98] *See, for example: LERU's views on Marie Skłodowska Curie Actions (MSCA) in Horizon Europe (June 2017).*

While the ERA Fellowships were only launched very recently (2021), it is important that they establish their own identity.

Because **the reasons for a particular country's attractiveness as a destination for mobile researchers predate the MSCA**, developing further ways to inform and help fellows during the application procedure could help to increase the quality of the applications received. Many interviewees stressed the importance of learning how to write successful MSCA applications in order to receive funding.

Based on the scores received by widening fellows in their evaluations and their performance, as well as the beneficial impact achieved by the pilot, there is also room to expand the scope of the pilot without compromising the principle of excellence. Given that the pilot was designed to fund just 120 fellows, even a slight increase in the scope of the ERA Fellowships could have great tangible impacts. **With a budget of EUR 22.5 to 24.0 million** (a 25-33% increase in the original budget of EUR 18 million, corresponding to funding 150-160 widening fellows in total), **the Widening Fellowships would have balanced the mobility flows towards widening Member States.** Because Widening Fellowships have increased the visibility of host institutions and contributed to an increase in the number of IF-EF proposals to widening countries, the increased capacity to attract researchers to widening countries may lead to less financial support being required in the long term.

As discussed in Sections 5.4 and 5.5, there are clear differences between inflows to widening countries and the impact that Widening Fellowships have on their mobility balances. As noted, Widening Fellowships have not entirely altered the pre-existing differences between countries. If the goal is to help host institutions in countries with weaker research systems to perform better in the long term, and to help balance mobility flows, differences at the level of widening countries should also be accounted for. As noted by stakeholders in the second expert workshop, widening countries are a heterogeneous group with their own different challenges.[99]

One possible way of developing the ERA Fellowships is to better account for differences in the quality of research systems. As noted in Section 6, the quality of research systems contributes to differences in the attractiveness of widening countries. Accounting for the quality of research systems in the geographical distribution of grants would ensure that the benefits of ERA Fellowships would be more evenly spread across all widening countries. This would help participating institutions in all widening countries increase their research capacities. As noted in Section 5.6, Widening Fellowships have contributed to creating collaboration links, increasing the reputation and visibility of host institutions. Helping host institutions in countries where the level of participation is low, in particular, to become better acquainted with the MSCA, is likely to prove beneficial and to help them develop long-term capacities that support further participation.

The ERA Fellowships could be developed by classifying widening countries into those which are, for example, 'catching up' and 'lagging behind', based on the relative strengths of their research systems. Such a classification could be based on their ranking in the European Innovation Scoreboard or another objective measurement tool. Both sub-groups would receive the same number of ERA Fellowships. The selection criteria would be otherwise maintained but fellows would be funded under different quotas, depending on whether they are going to a leading or to a catching-up widening country.

[99] *See also: Study on mobility flows of researchers in the context of the MSCA. Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries.*

Stakeholders participating in the expert workshop also noted the need for an international network for widening and/or ERA fellows. A suggestion was made to include them into the Marie Curie Alumni Association. In addition, similar to the MSCA, online courses could also be considered for ERA Fellowships.

To summarise the main findings:

- Widening Fellowships significantly **increased the number of incoming researchers to widening countries** and the number of researchers going to widening countries with European Fellowships. **Widening Fellowships helped widening countries balance their mobility flows.**
- Widening Fellowships contributed both to return mobility and to retaining talents within the fellows' countries of origin.
- MSCA fellows indicate **a strong interest in applying for fellowships in widening countries**, particularly if this is supported by additional funding. This shows **that the ERA Fellowships are needed, and that the action would benefit from increased budget.** The evidence shows that funding around 30-40 additional widening fellows (making a total of around 150-160 fellows) over three years would provide the possibility of fully balancing the mobility flows to and from the widening Member States.
- Based on responses to the survey, **over half of widening fellows said that Widening Fellowships contributed positively to their decision to apply for MSCA funding.**
- **Widening fellows are excellent researchers – a fact that needs to be communicated more effectively**. There is no sign of a gap between MSCA fellows and widening fellows in terms of performance or output. In this regard, the pilot has supported the spread of excellence.
- Inflows by country are **dependent on factors that predate the MSCA**. In line with the findings from Section 6, the main factors contributing to mobility decisions are directly linked to the excellence of the research system (e.g. the ability to work with leading scientists, the quality of research infrastructure, the quality of the training provided).
- While there are differences in countries' performance, **the introduction of Widening Fellowships has not altered the pre-existing differences between countries.**

6 What determinants affect MSCA mobility flows and explain the various trends, strengths, and weaknesses?

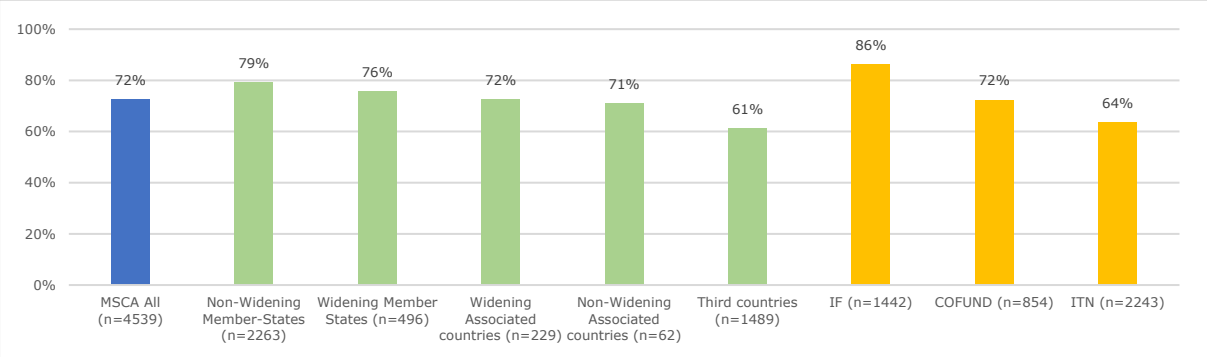
6.1 Individual-level determinants

The following section assesses individual-level determinants that impact MSCA fellows' mobility decisions. The choice of determinants analysed is based on the literature review (see Section 2) and focuses on the drivers (e.g. increasing one's research capacities and productivity, career advancement, national and cultural identity) and enablers of mobility (e.g. previous mobility experience, career stage). We first look at long-term mobility (IF, ITN and COFUND) before moving on to analyse the mobility determinants for RISE.

6.1.1 IF, ITN and COFUND

Prior experience of international mobility is a strong predictor of future international mobility. This is also true for MSCA fellows. Almost three-quarters of MSCA IF, ITN and COFUND fellows surveyed had previous international mobility experience before their fellowship, as shown in Figure 69.

Figure 69. Did you have previous international mobility experience before your fellowship? (Breakdown by country of origin and action)

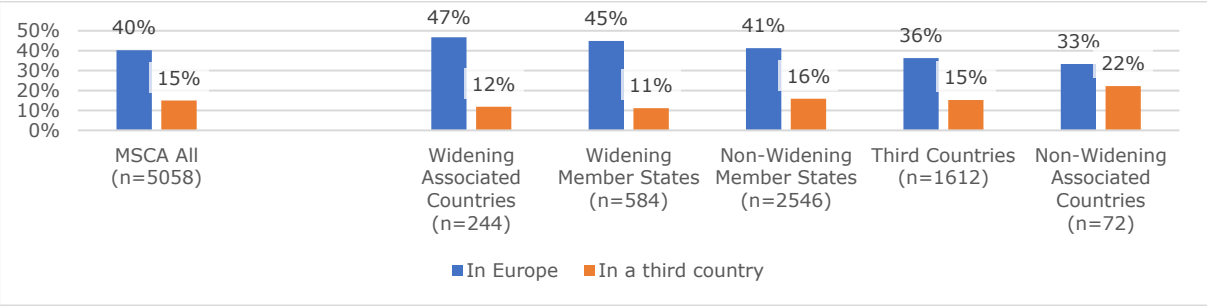


Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

Fellows from non-widening Member States were the most internationally mobile prior to their fellowship (79%). By contrast, 61% of fellows from third countries had international mobility experience before their fellowship. In other words, the MSCA enable the first international mobility experience for almost 30% of researchers coming from associated countries and almost 40% of researchers coming from third countries. This represents a significant contribution towards supporting international mobility and attracting talents to Europe.

Unsurprisingly, experienced researchers (IF) had more prior mobility experience than early-stage researchers (ITN), with COFUND fellows falling in between these two categories. The MSCA are especially important in giving ITN fellows international mobility experience, as 36% of ITN fellows had no prior mobility experience. Figure 70 shows that most researchers with prior international research experience conducted their research activities in Europe.

Figure 70. Share of researchers with international research experience prior to the MSCA fellowship, by country of origin and destination



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

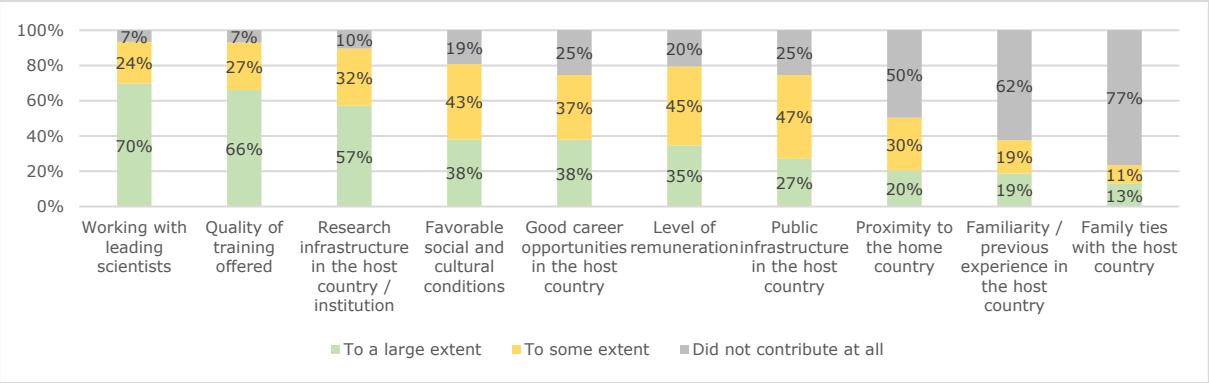
In all categories, over half of fellows had conducted research activities in a country other than their country of origin, and in all instances, the main destination countries had been in Europe. Fellows from widening countries are particularly likely to have had prior research experience in other European countries. Similarly, over one-third of fellows from third countries had prior experience in Europe. This indicates that previous experiences and ties with European countries strongly support MSCA mobility from third countries to Europe.

Looking at associated and third countries in detail, many MSCA fellows have prior international research experience, specifically in Europe. Among third-country nationals, Colombians and Australians show a high degree of international research experience in Europe prior to their MSCA mobility. This is likely to be linked to language and cultural similarities: 39% of the Australians who answered the survey conducted their MSCA mobility in the United Kingdom or Ireland, while 27% of Colombians went to Spain. This

indicates the importance of a fellow's knowledge of language and culture as a partial determinant when considering their mobility destinations.

Figure 71 shows which determinants MSCA fellows consider to be the most important when choosing their host country and host institution.

Figure 71. To what extent did the following factors contribute to your choice of a host country and host institution?



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,398.

The opportunity to work with leading scientists emerges as the main determinant, with 70% of fellows saying that it contributed to their decision to a large extent, and a further 24% stating that it contributed to some extent. **The quality of the training offered and the research infrastructure were the other two important determinants**. It is clear from the survey results that in choosing their host institution and country, MSCA fellows are primarily motivated by excellence and the availability of factors that are conducive to producing quality research and improving their skills.

Factors that involve external conditions – social and cultural conditions, career opportunities, public infrastructure – contribute either to the quality of everyday life or to future career possibilities. These emerge as secondary determinants. As the MORE4 study has shown, researchers are willing to trade off short-term comfort for improved long-term prospects, indicating that improving their immediate quality of life is not the main determinant for scientific mobility.[100]

The third category of determinants relates to links to home or to the host country. Proximity to and familiarity with the host country, or family ties with the host country, appear to affect MSCA fellows' decisions only to a limited extent. The majority said such links had not contributed to their decisions. This further indicates that MSCA fellows attach the greatest importance to the contribution that the MSCA can make to their careers. However, as discussed in Section 5.5, these determinants are important for returning researchers. The differences in determinants for returning and non-returning researchers will be discussed in detail below.

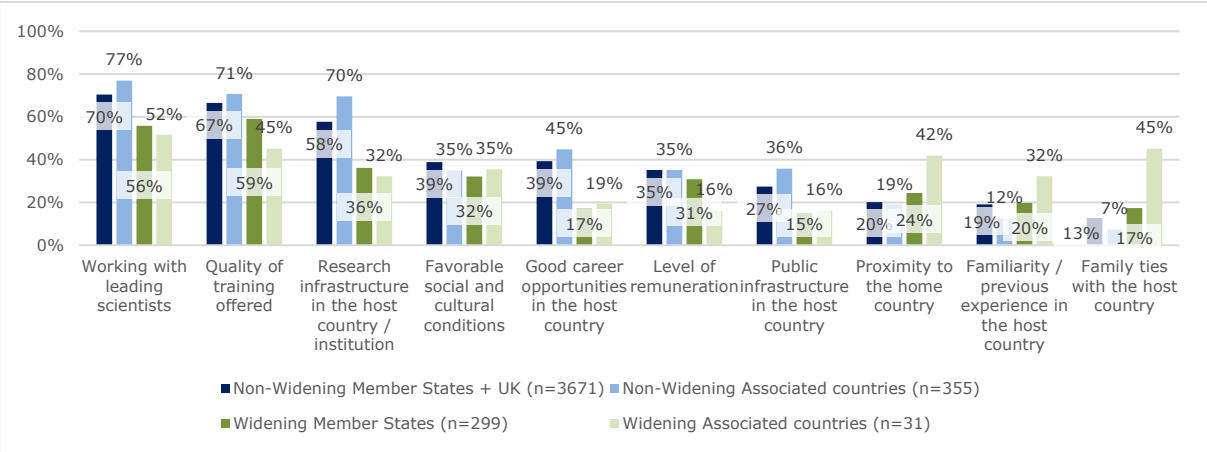
Better job perspectives and opportunities for rewarding research careers are closely related to the economic aspects that determine researchers' decisions to participate in the MSCA programme, and their choice of host destination. The MSCA provide competitive financial

[100] *European Commission, Directorate-General for Research and Innovation (2021). MORE4. Support data collection and analysis concerning mobility patterns and career paths of researchers. Survey on researchers in European higher education institutions.*

compensation for researchers, which is one of the factors enabling excellent researchers from the EU-15 or other less wealthy countries to become mobile.[101]

Figure 72 provides a further breakdown of determinants by destination country group. Only fellows who said that the factors contributed to a large extent are considered in this breakdown.

Figure 72. To what extent did the following factors contribute to your choice of a host country and host institution? (Contributed to a large extent, by destination countries)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

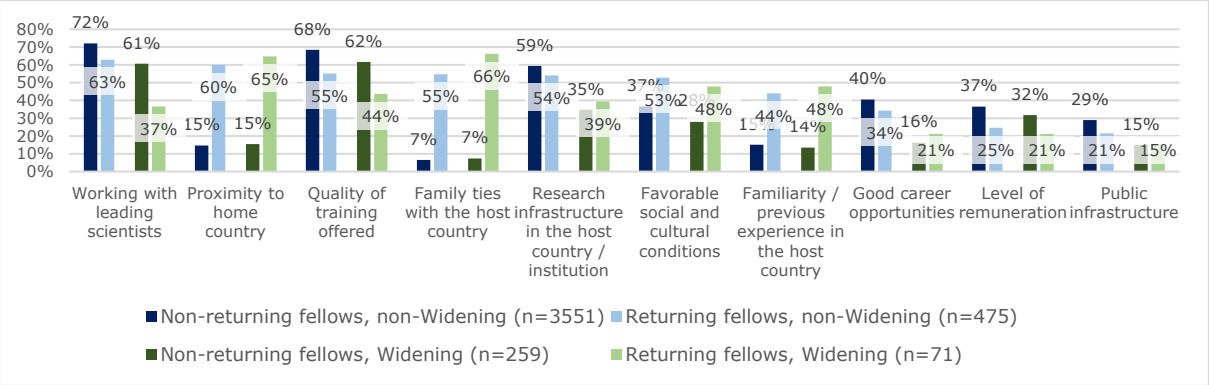
Fellows going to widening countries ranked the importance of the three main determinants (working with leading scientists, quality of training offered and research infrastructure) considerably lower than fellows going to non-widening countries. A similar pattern appears when discussing career opportunities and public infrastructure in the host country.

For fellows going to widening associated countries, links to the researcher's home or host country were considerably more important than for other categories. This is explained by the fact that 61% of researchers going to widening associated countries used the MSCA fellowship to return to their countries of origin; however, the relatively small sample size constrains the results.

Different groups of researchers perceive the importance of determinants differently. Figure 73 illustrates such differences between non-returning (those going to a country other than their country of origin) and returning researchers (those going to their country of origin), and the destination country (widening vs non-widening).

[101] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Pupinis, M., Brožaitis, H., Navikas, V., et al. (2020). Review of Marie Skłodowska-Curie actions unit costs in preparation for Horizon Europe: final report, Publications Office.*

Figure 73. To what extent did the following factors contribute to your choice of a host country and host institution? (Contributed to a large extent, returning and non-returning researchers by destination country groups)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

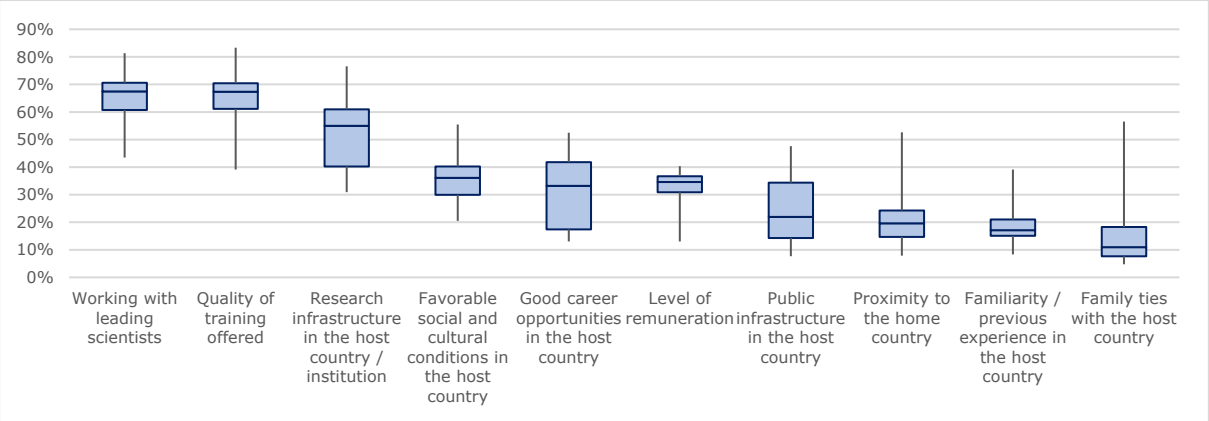
Returning researchers rank two of the three main determinants (working with leading scientists and quality of training) lower than non-returning researchers. While these remain important determinants for returnees to non-widening and widening countries, their decisions are influenced to a greater extent by other factors. Proximity to their home country and family ties emerge as some of the main determinants for returnees, while they also rank familiarity with the host country and favourable social and cultural conditions higher than non-returnees. Comparing MSCA fellows by gender and family status reveals that there are no significant differences in how the importance of determinants is perceived. Female researchers tend to rank the quality of training offered and favourable social and cultural conditions slightly higher than men (5 percentage points higher for both answers), whereas male researchers rank both public and research infrastructure slightly higher (4 and 3 percentage points, respectively). Family status does not significantly affect researchers' evaluations, with the exception that those with families consider family ties with the host country to be a more significant determinant (15% for researchers with family, compared with 9% for researchers without family).

The differences in responses by action are not striking, but some observations can be made. For IF fellows, the ability to work with leading scientists ranks considerably higher than for ITN and COFUND fellows. IF and COFUND fellows consider research infrastructure to be more important than ITN fellows. IF fellows also consider the level of remuneration to be a less important factor in their mobility decisions than fellows from other actions.

ITN fellows consider the quality of training offered to be the most important determinant of their mobility decision. The level of remuneration and good career opportunities also rank higher for ITN fellows than for other groups. This would indicate that ITN fellows place greater importance on factors that will help them to develop their careers and be rewarded at the end of their fellowship. IF fellows focus more on factors that contribute more directly to their capacity to produce excellent research.

Figure 74 shows the country-level summary analysis of differences in the way fellows responded to the question regarding the main determinants. The analysis shows how the responses differed between all host countries that had an inflow of at least 10 fellows, based on survey responses. The upper edge of the box shows the upper quartile of the distribution of the answers, and the lower edge shows the lower quartile, meaning that 50% of the answers were within the box's range. The line in the middle shows the median of responses.

*Figure 74. To what extent did the following factors contribute to your choice of a host country and host institution? (Contributed to a large extent, differences in the share of researchers, country-level summary analysis)**



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022). *Countries with n<20 are excluded from the analysis.

The length of the box indicates how similarly the respondents replied to the question: the shorter the box, the more similar the answers were (and conversely, the longer the box, the more disparate the responses). The lines, or whiskers, represent responses outside the middle 50%, showing the maximum and minimum values of responses.

While there is a strong differentiation in the minimum and maximum values for all questions, the box plots for the majority of the questions are comparatively short, suggesting that a high level of similarity exists between different countries regarding the perceived importance of factors contributing to mobility decisions. Three determinants stand out in which the answers are less unified: research infrastructure, career opportunities in the host country, and public infrastructure in the host country.

Looking at the distribution of answers by scientific panel, no significant difference emerges, and the level of variance in responses is low. The main differences are that MAT, ECO, and PHY fellows consider working with leading scientists (77%, 76% and 75%, respectively) to be more important than SOC (66%) and ENG (66%) fellows. MAT, ECO, and LIF fellows also consider the quality of training offered to be more important than other groups (72%, 70% and 70%, respectively).[102]

With regard to research infrastructure, two groups can be identified: those who rank it highly as a determinant (LIF, ECO, PHY and CHE, with between 57% and 60% regarding it as having impacted their choice to a large extent), while the rest (MAT, ENV, SOC, ENG, with between 45% and 52% regarding it as having impacted their decision to a large extent). Below, we provide an analysis of how the three main determinants relate to mobility inflows. In conducting this analysis, we identified three country groups based on the inflows of researchers and their capacity to attract fellows. We also ran the analysis separately for each country group.[103] Widening countries were also analysed separately, but no significant relationship emerged in this analysis.

[102] *The scientific panels are: MAT (Mathematics), ECO (Economic Sciences), PHY (Physics), SOC (Social Sciences and Humanities), ENG (Information Science and Engineering), LIF (Life Sciences), CHE (Chemistry) and ENV (Environmental and Geosciences).*

[103] *Countries that are considered high performers: the United Kingdom, Spain, Germany, France, Italy and the Netherlands (inflows to all countries higher than 1,700 researchers). Moderate performers: Switzerland, Denmark, Belgium, Ireland, Austria and Sweden (inflows between 787 and 1,254 researchers). Weak performers: Portugal, Norway, Greece, Poland, Finland, Czechia, Israel, Slovenia, Turkey, Hungary and Croatia (inflows between 38 and 421 researchers).*

*Table 7. Relationship between main determinants and country inflows, by country group (fellows who responded that the determinants contributed to a large extent to their decision)**

Indicator	Correlation coefficient (correlating with mobility inflows)			
	All countries	High performers	Moderate performers	Weak performers
Working with leading scientists	0.50 (moderate)	0.83 (strong)	0.77 (strong)	0.05 (no correlation)
Quality of training offered	0.12 (no correlation)	0.65 (moderate)	0.19 (no correlation)	0.03 (no correlation)
Research infrastructure in the host country / host institution	0.57 (moderate)	0.67 (moderate)	0.60 (moderate)	0.33 (weak)

Source: CORDA database; survey of MSCA fellows (ITN, IF, COFUND) (2022).
*Countries with n<10 are excluded.

Interestingly, if the moderate and weak performers are grouped together when analysing inflows and research infrastructure, the value of the correlation coefficient rises to 0.80, which indicates a strong relationship. This would indicate that research infrastructure contributes more to inflows to other countries than to high-performing countries, as measured by the number of incoming fellows. This does not indicate that research infrastructure would be considered better in other countries; rather, the lower level of research infrastructure may explain the lower number of mobilities to these countries, and the differences in research infrastructure may be more meaningful for incoming mobilities for these countries.

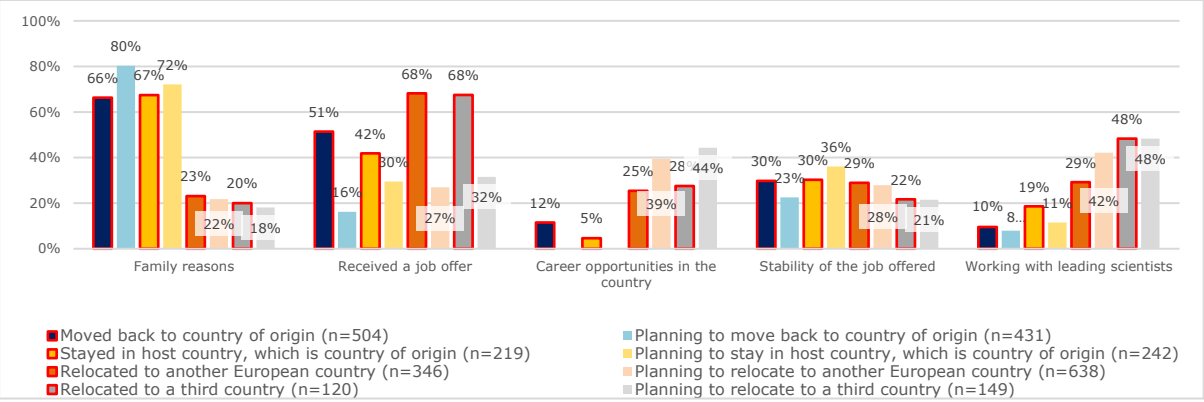
We also analysed how the fellows' evaluations regarding the importance of the determinants correspond with indicators measuring the same aspects at country level. This was carried out to assess the extent to which fellows' perceptions correspond with reality. The ability to work with leading scientists was correlated with data on scientific publications among the top 10% most cited (based on the assumption that leading scientists publish frequently in top-ranking journals). Research infrastructure was compared with R&D expenditure in the public sector, using this as a proxy to evaluate the strength of research infrastructure.[104] The correlation coefficients were 0.57 and 0.62, respectively. Both figures indicate a moderate relationship.

The above analysis indicates that researchers' perceptions of the factors that contribute to excellence can be related to inflows, particularly for countries with high inflows. While some relationships could be established for moderate performers, practically none exist for countries with lower inflows. These could be considered as areas for future development for the host institutions in these countries.

With regard to determinants after the MSCA mobility, Figure 75 shows that **family reasons are the most influential factor shaping the decision to either move to the country of origin or to remain within it** (when this is the same as the host country). Receiving a job offer seems to play an important role in fellows' decisions and plans to return to their countries of origin. However, it plays an even more influential role in fellows' decisions to relocate to other European countries or third countries. Meanwhile, when it comes to MSCA fellows who have not yet finished their fellowships, working with leading scientists is the most influential factor in planned relocations either to other European countries or to third countries, followed by the availability of career opportunities.

[104] *Data derived from the European Innovation Scoreboard. The EIS values used were averages for the years 2014-2020.*

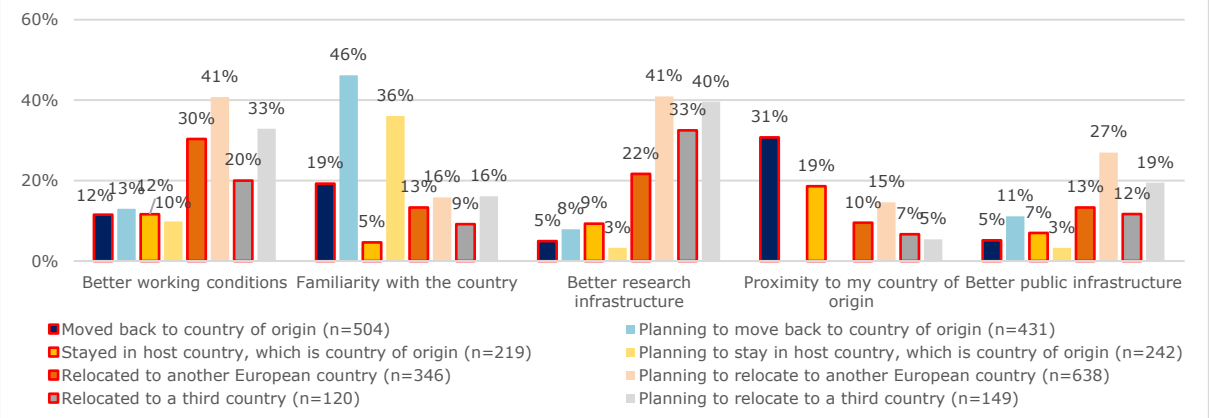
Figure 75. What are the reasons that contributed to decision (or willingness) to move? / You indicated that you have returned (or plan to return) to your country of origin to continue your research/career. Which factors contributed to this decision? (Primary determinants per mobility destination).



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n= 2,292.

A similar pattern emerges in relation to working conditions, research infrastructure and public infrastructure, where these determinants play an influential role in decisions and plans to relocate either to a European or to a third country. This suggests that when it comes to living abroad, researchers look for the added value of such mobility, whether in another European country or in a third country. Such added value can be found in the opportunity to work with and learn from some of the best scientists in their field, the existence of advanced research infrastructure, the availability of adequate employment opportunities, or the desire to enjoy a better quality of life. Meanwhile, when it comes to the decisions or plans to return to their countries of origin, researchers are willing to compromise and forego some of those influential factors for the sake of returning home due to certain other non-scientific considerations such as family and personal relationships, job stability, and familiarity with their local contexts (see also Section 2).

Figure 76. What are the reasons that contributed to the decision (or willingness) to move? / You indicated that you have returned (or plan to return) to your country of origin to continue your research/career. Which factors contributed to this decision? (Secondary determinants per mobility destination).



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n= 2,292.

6.1.2 RISE

In RISE, differences appear in the number of short-term mobilities an individual undertakes, and the length of these mobilities.

Table 8. Number and length of RISE mobilities by nationality

Nationalities by country group	Share out of all mobilities (%)	Average number of mobilities	Average individual mobility length (days)	Average total length of all mobilities (days)
Widening Member States (n=1,895)	16.0	2.70	42.9	115.8
Third countries (n=3,911)	25.6	2.08	55.1	114.8
Widening associated countries (n=965)	7.7	2.54	44.0	111.9
Non-widening Member States + UK (n=6,005)	49.6	2.63	41.3	108.7
Non-widening associated countries (n=144)	1.1	2.34	27.0	63.2
All nationalities	**100.0**	**2.46**	**45.1**	**111.3**

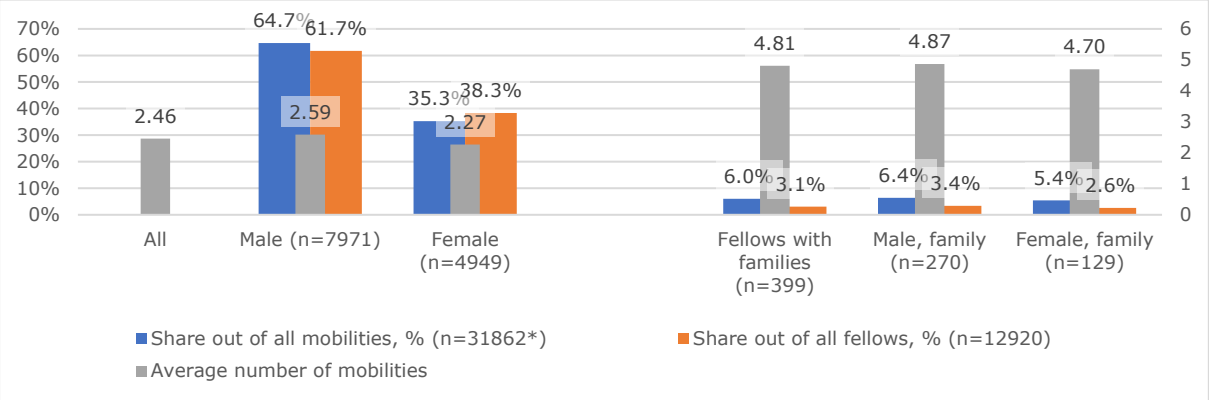
Source: CORDA database. Values for n represent the number of individuals.

For all nationalities, except for non-widening associated countries, the average total length of all mobilities was relatively similar. Nationals of third countries undertook the fewest individual mobilities, but tended to have the longest mobility lengths, which is expected as the distance between countries makes it impractical to conduct more, but shorter, mobilities.

RISE is especially effective in promoting mobility for nationals of third countries. For third countries, the average number of mobilities is highest for countries that are close to Europe, although it must be highlighted that Japanese and Australian fellows make considerably greater use of multiple short-term mobilities than nationals of third countries on average, indicating that they are active participants in RISE.

Notable differences emerge in mobility patterns when we look at mobilities based on gender and family status, as shown in figure below.

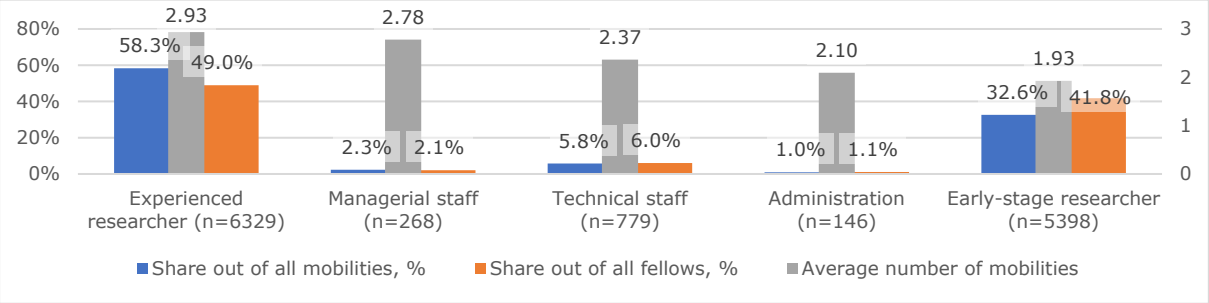
Figure 77. Share of RISE fellows and number of mobilities by gender and family status



Source: CORDA database. *Values for n represent the number of individuals, except for n=31,862, which is the total number of mobilities.

A significant majority of RISE fellows are men. Men are also slightly more mobile than women, as measured by the number of mobilities. This also holds true in situations where fellows have a family. Notably, having a family is, on average, linked to a considerably higher number of mobilities compared with the RISE average. This finding indicates that short-term exchanges and flexibility under RISE are attractive to people with families. These mobilities are also shorter than average: while the average length of mobility is 45.1 days, for fellows with families, it is 30.1 days.

Figure 78. Share of RISE fellows and number of mobilities by staff profile

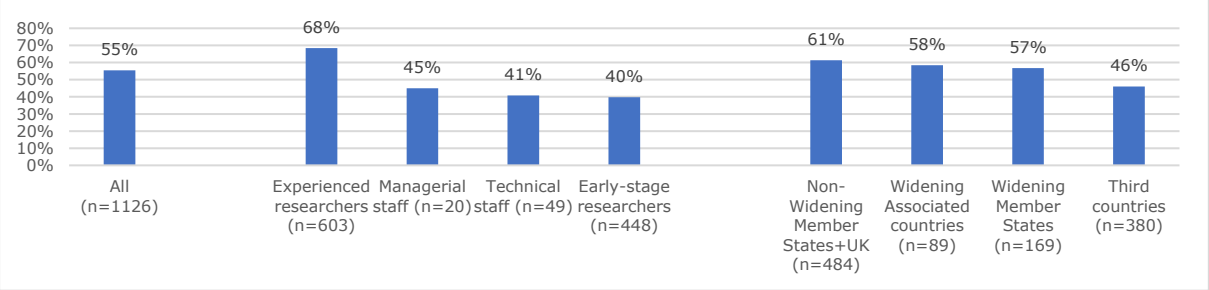


Source: CORDA database.

Looking at differences based on the profiles of fellows, we note that experienced researchers are the most active participants in RISE and undertake the highest number of mobilities. Early-stage researchers are the second-largest group of participants, but they undertake the lowest number of mobilities.

While more than half of RISE fellows stated that they had previous international mobility experience prior to their RISE secondments, this is mainly due to the experienced researchers taking part in the action (see Figure 79). The overall level of prior mobility experience is lower than for IF, ITN and COFUND actions. Notably, for third countries, RISE appears a particularly beneficial way of helping people to gain international experience. This is also true for managerial and technical staff and early-stage researchers.

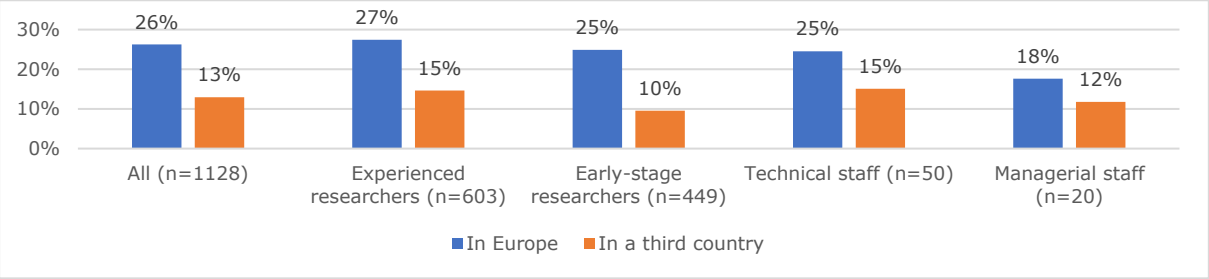
Figure 79. Did you have previous international mobility experience before your RISE secondments? (By staff profile and country of origin)



Source: survey of MSCA RISE staff (2022). Administrative staff and non-widening associated countries not shown due to small sample.

When looking at prior international research experience, roughly a quarter of early-stage and experienced researchers and technical staff had prior international mobility experience in Europe, as shown in Figure 80.

Figure 80. Share of RISE fellows with international research experience prior to MSCA, by staff profile and destination

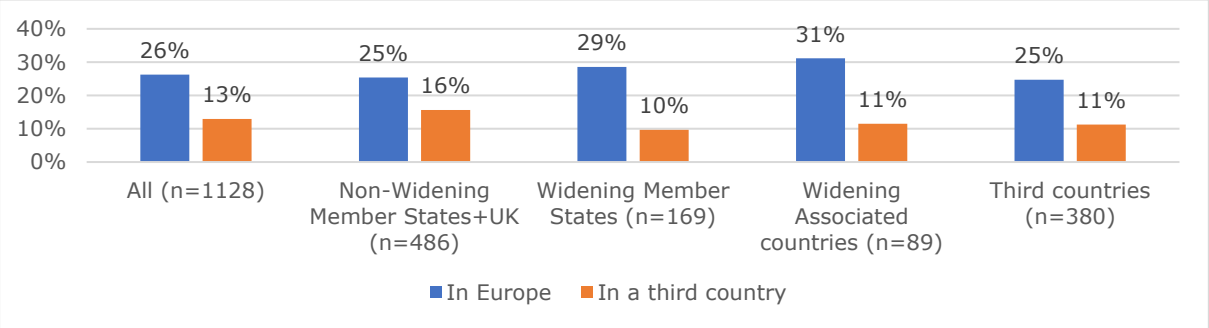


Source: survey of MSCA RISE staff (2022). Administrative staff not shown due to small sample (n=6).

When looking at fellows with prior international research experience, as shown in Figure 81, Europe is the most attractive destination for RISE participants. However, a significantly

smaller share of RISE participants (26%) have prior international research experience in Europe compared with the share of IF, ITN, and COFUND fellows who do (40% – see Figure 71). RISE therefore appears to enable mobility and research for many participants even without prior international mobility experience.

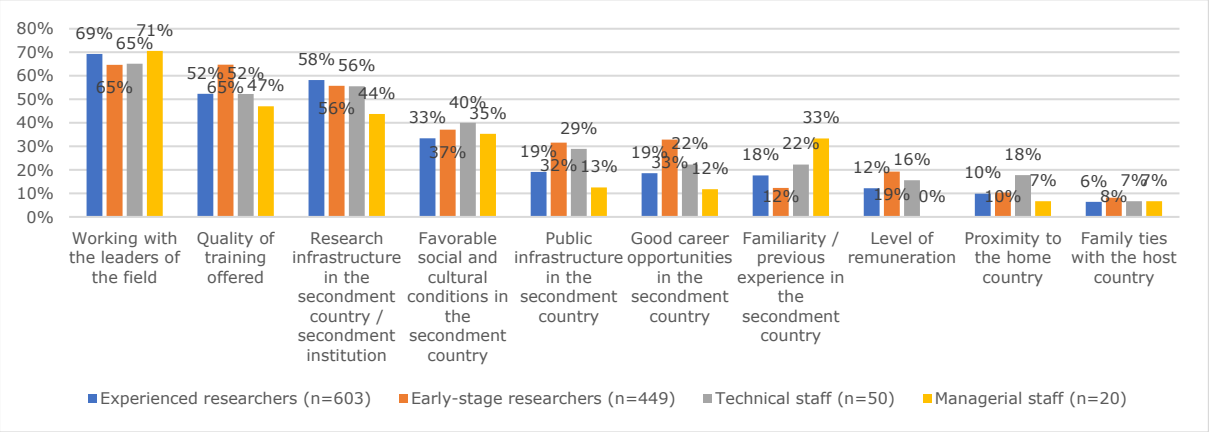
Figure 81. Share of RISE fellows with international research experience prior to MSCA, by country of origin and destination



Source: survey of MSCA RISE staff (2022). Non-widening associated countries not shown due to small sample (n=4).

In Figure 82, we examine the factors that contributed to the choice of a secondment country and institution by job profile.

Figure 82. To what extent did the following factors contribute to the choice of countries and institutions for your secondments? (Contributed to a large extent, breakdown by staff profile)



Source: survey of MSCA RISE staff (2022). Administrative staff not shown due to small sample (n=6).

In a similar manner to ITN, early-stage researchers highly value the quality of training offered. They also consider good career opportunities and public infrastructure in the secondment country as being more important than other variables.

Experienced researchers value factors that contribute to their ability to produce high-quality research, which is consistent with the findings relating to IF, ITN and COFUND. The most diverse opinions come from managerial staff, although this may be related to the small sample size. Managerial staff place significantly greater value than other groups on being familiar and having previous experience in the country, while factors such as research and public infrastructure and good career opportunities are ranked lower by this group.

Some differences are also evident when looking at determinants on the basis of the participant's country of origin. Strong differences can be seen with regard to the importance of the quality of training offered: participants from the Member States and the UK consider training to be significantly more important than participants from widening

associated countries and third countries. Researchers from non-widening Member States and the UK also value the ability to work with leaders in a particular field more than other country groups (71% for non-widening Member States and the UK, 63% for widening countries and third countries, respectively).

6.2 Organisational-level determinants

Falk and Hagsten[105] investigated the potential of European universities as hosts for MSCA grantees. Their research reveals that the probability of hosting MSCA grantees significantly increases with excellence (research performance), the size of the university, and the country group or European region in which it is located. In addition, a deepening of excellence (citations), international orientation, and the teaching burden (student-staff ratio) are significant predictors of the extent of grantees. These findings can be further expanded, as host institutions (universities) which rank highly in international rankings are more attractive to researchers. Research on international student mobility[106] also indicates that the reputation of the host country and its institutions is of critical importance. Personal recommendations are also likely to have an influence on mobility decisions.

Indeed, the data in the table below show that **the top MSCA participating universities (with at least 200 participations) are all among the most prestigious universities in their respective countries and in the world**.

Table 9. MSCA participating universities with at least 200 participations

University	Participations	Ranking in the world, 2021 (Shanghai rankings)	National ranking, 2021 (Shanghai rankings)
University of Copenhagen	396	30	1
University of Cambridge	364	3	1
University of Oxford	283	7	2
KU Leuven	253	87	7
Imperial College of Science, Technology and Medicine	237	25	4
University College London	232	17	3

Source: CORDA database and Shanghai ranking.

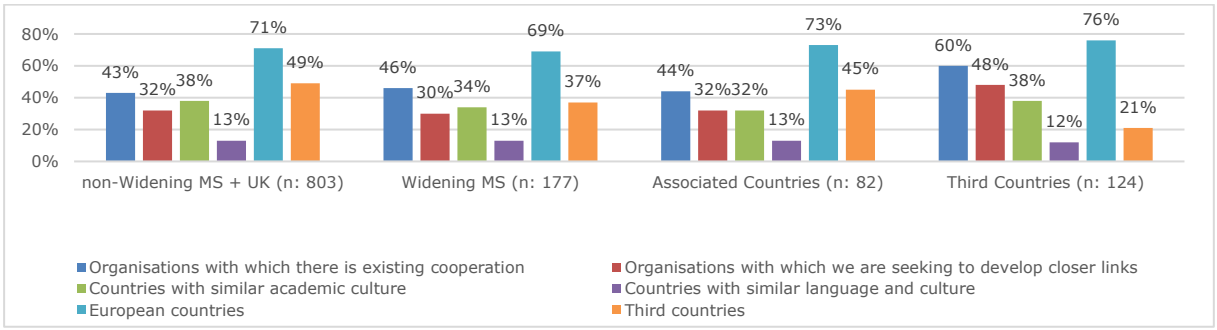
Falk and Hagsten[107] also explain that some high-ranking universities participate less frequently in the MSCA, as they provide other grants for individuals, which reduces the pressure to attract MSCA funding and fellows.

Another important aspect of organisational-level determinants is the visibility and reputation of participant organisations. Such an idea was expressed by several MSCA stakeholders during the expert workshop. Myklebust (2021) also regarded this a factor behind MSCA grant wins.[108] He also found indications that certain institutions, such as KU Leuven and the University of Copenhagen (some of the most active participants in MSCA) are particularly eager to promote MSCA grants. They also offer assistance with the application process by organising masterclasses for potential grantees. The importance of an institution's visibility and the support offered in the application process were also highlighted by interviewees as key factors for success.

[105] *Falk, M.T., Hagsten, E. Potential of European universities as Marie Curie grantee hosts. High Educ 81, 255–272 (2021). https://doi.org/10.1007/s10734-020-00540-3*
[106] *Mazzarol, T. & Soutar, G.N. (2002). '"Push-pull"' factors influencing international student destination choice", International Journal of Educational Management, Vol. 16 Iss: 2 pp. 82 – 90 (2002).*
[107] *Falk, M.T., Hagsten, E. (2021).*
[108] *Myklebust, J. Factors behind Marie Sklodowska-Curie Action grant wins. University World News, 27 February 2021.https://www.universityworldnews.com/post.php?story=20210226064557540#:~:text=Under%20its%20successor%2C%20Horizon%20Europe,rate%20of%2014%25%20this%20year*

Success in promoting international mobility within Europe also relates to the profile of the fellows hosted. As shown in Figure 83, 'researchers coming from European countries' is the dominant profile of MSCA fellows across different groups of host countries. Furthermore, the same data on researchers' profiles point towards another important determinant of mobility: **existing cooperation links with other organisations.** As indicated by our survey respondents, a substantial group of fellows come from organisations with which cooperation links have already been established. This is also consistent with the findings from the interview programme, in which several fellows affirmed the importance of prior cooperation in their choice of host organisation.

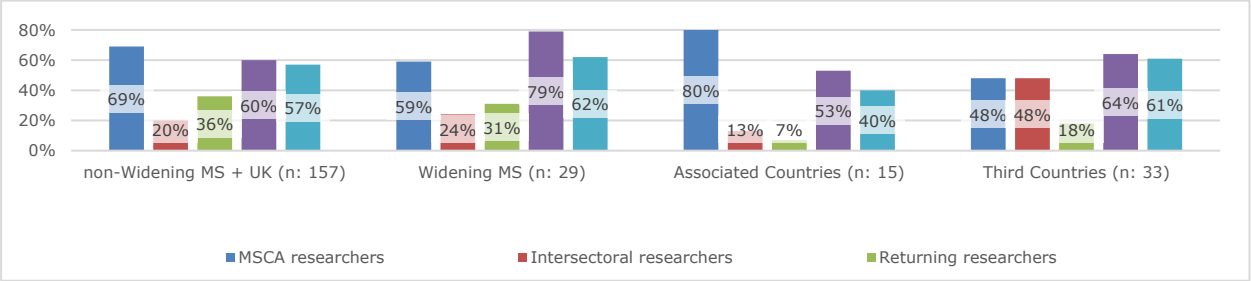
Figure 83. Please describe the profile of the MSCA researchers you have hosted. Do they tend to come from…



Source: survey of MSCA organisations (2022), n=1,186.

In addition, around **19.5% of survey respondents (organisations) indicated that they had a coordinated action plan to attract mobile researchers**. Those plans target MSCA and European researchers, followed by international (non-European) researchers. Intersectoral researchers and returning researchers, on the other hand, did not receive the same level of attention. Organisations in both widening (31%) and non-widening (36%) Member States expressed greater interest in returning researchers, compared with those in either associated (7%) or third countries (18%). This is consistent with EU-level policy goals to attract European researchers back to Europe and to aim for more balanced brain circulation within the EU. Widening countries appear to be the group most interested in European researchers, which is consistent with the aim of rebalancing their inflow/outflow ratios of hosted researchers.

Figure 84. What kind of researcher mobility does the action plan target?



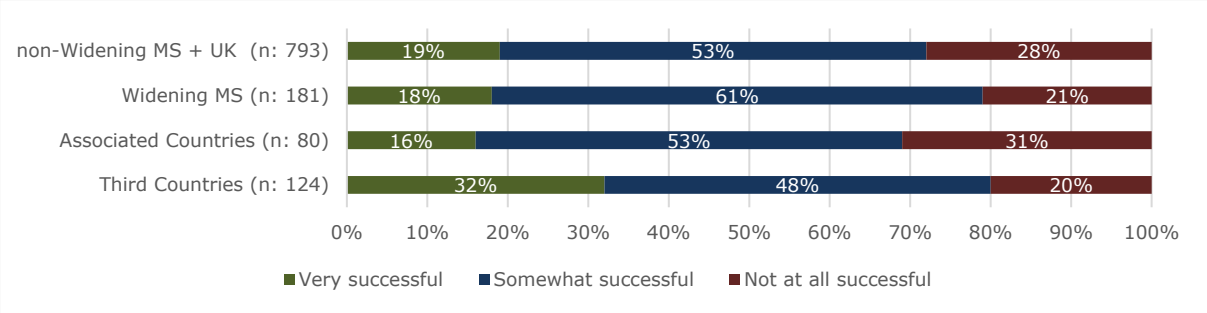
Source: survey of MSCA organisations (2022), n=234.

Nevertheless, the decision to participate in the MSCA is not the only way host organisations can impact the mobility decisions of their hosted fellows. Retaining MSCA fellows after they have completed their fellowships is another endeavour on which many host organisations could embark. Among the respondents to the survey of MSCA organisations, **only 20% indicated that their organisations were very successful in retaining their hosted MSCA researchers** after they had completed their fellowships (see Figure 85). Moreover,

26% indicated a complete lack of success in this regard. This is in line with the findings of the MSCA fellows' survey (2022), in which 32% (632 fellows) of survey respondents (ITN/IF/COFUND fellows) and 30.5% of EU27+UK nationals (409 fellows) indicated that they had continued to work at the same MSCA host organisation.

Moreover, **host organisations in third countries report the greatest success in retaining their hosted MSCA fellows, at 32%**. This compares with non-widening Member States (19%), widening Member States (18%), and associated countries (16%). This is consistent with insights from the interview programme and the findings of the MORE4 study, which indicated that European researchers living in the US perceive the US as being a better place for doing science. Thus, it is conceivable that fellows hosted in third countries that have advanced research and innovation systems, such as the US, Canada, China or Japan, become more inclined to continue their research activities in their host institutions abroad.

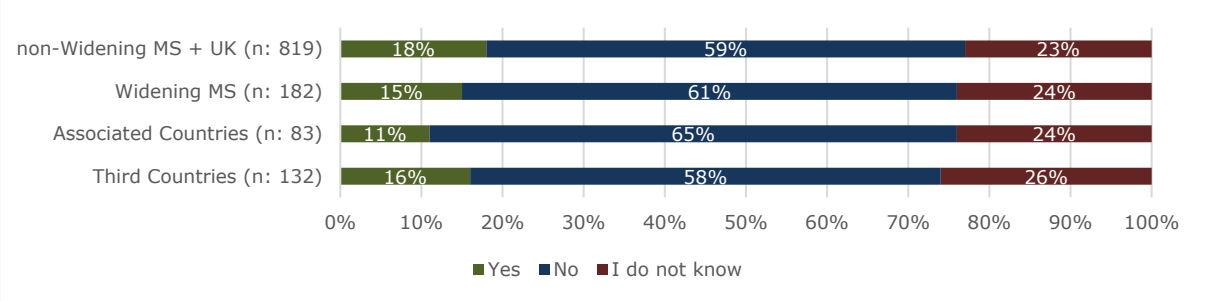
Figure 85. How would you assess the success of your organisation or department in retaining MSCA researchers after they have completed their fellowships?



Source: survey of MSCA organisations (2022), n=1,178.

When asked if their organisations had specific measures in place to help retain their hosted MSCA researchers, only 17% of survey respondents confirmed the existence of such measures, while the majority (60%) reported the absence of any relevant organisational measures (see Figure 86). Of organisations in non-widening Member States, 18% reported having retention measures, followed by 16% of those in third countries.

Figure 86. Do you have any specific measures in place to help retain MSCA researchers in your organisation or department after their fellowship?

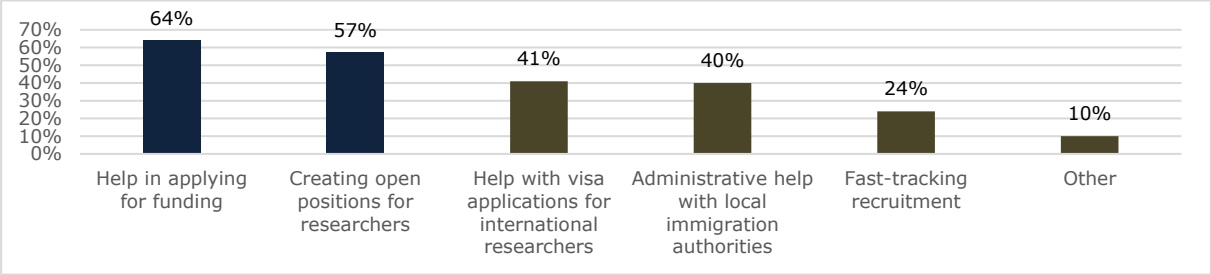


Source: survey of MSCA organisations (2022), n=1,216.

Looking more closely at those organisations that reported having specific measures in place, **the two main interventions undertaken by host organisations to retain MSCA fellows** are **offering help in applying for further research funding and creating open positions for researchers.** These were reported by 64% and 57% of respondents, respectively (see Figure 87). Other measures include supporting visa

applications of international researchers (41%), assisting with local immigration authorities (40%) and fast-tracking recruitment (24%).

Figure 87. What measures do you have in place?

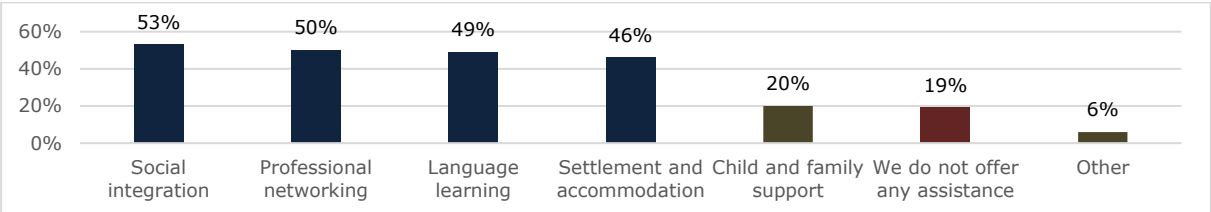


Source: survey of MSCA organisations (2022), n=208.

As highlighted by several MSCA fellows interviewed, proper integration into the host countries and organisations is a key factor not only in ensuring a smooth mobility experience, but also in shaping the fellows' mobility decisions after the end of their fellowships. Proper integration can incentivise researchers to remain after their fellowships, to build professional networks and explore new career opportunities, as well as enhance their general quality of life, particularly among researchers with families. Researchers also highlighted the role that host organisations can play in offering much-needed integration support.

As seen in Figure 88, **81% of host organisations reported that they offer some kind of integration assistance to MSCA researchers and their families during their fellowships**. Among other organisations, integration assistance was offered mainly in relation to social integration (53%), professional integration (50%), language learning (46%), and settlement and accommodation (46%). However, only 20% of organisations reported offering child and family support to their hosted fellows – an area of support that is crucial to any foreign researcher with a family.

Figure 88. Do you offer integration assistance (other than foreseen by MSCA unit cost allowances) to MSCA researchers and their families during their fellowships? If yes, please specify in what area(s).



Source: survey of MSCA organisations (2022), n=1,212.

6.3 System-level determinants

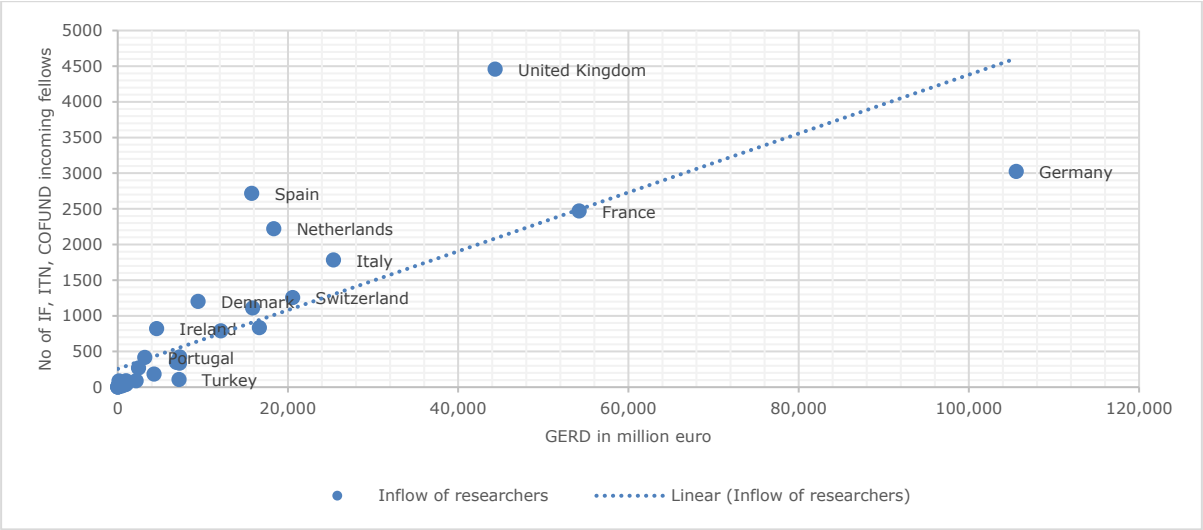
System-level determinants are among the most important factors influencing fellows' choice of a host country. As discussed in the earlier sections of this report (see for example Figure 72), one of the most important factors is the available research infrastructure in the host country/host institution. Depending on the action, 50% to 65% of MSCA researchers claimed that this factor influences to a large extent their choice of host country/host institution.

In addition, data on mobility flows, as described in Section 3.1, also reveal a trend of MSCA researchers somewhat favouring countries that are wealthier and higher performing in terms of R&I. For example, countries that had a positive balance of MSCA researchers (IF,

ITN, COFUND) are mostly EU-13 countries. **The most attractive MSCA countries also appear to be those with the most attractive research systems**.

Further analysis confirms that the strength of a country's research system is related to its choice by fellows as a host country. The figure below illustrates a strong (and linear) correlation (r=0.79) between the number of fellows (IF, ITN and COFUND) hosted in a country, and the country's gross domestic expenditure on research and development (GERD).

Figure 89. The correlation between researcher inflows (IF, ITN and COFUND) and GERD in the EU and associated countries

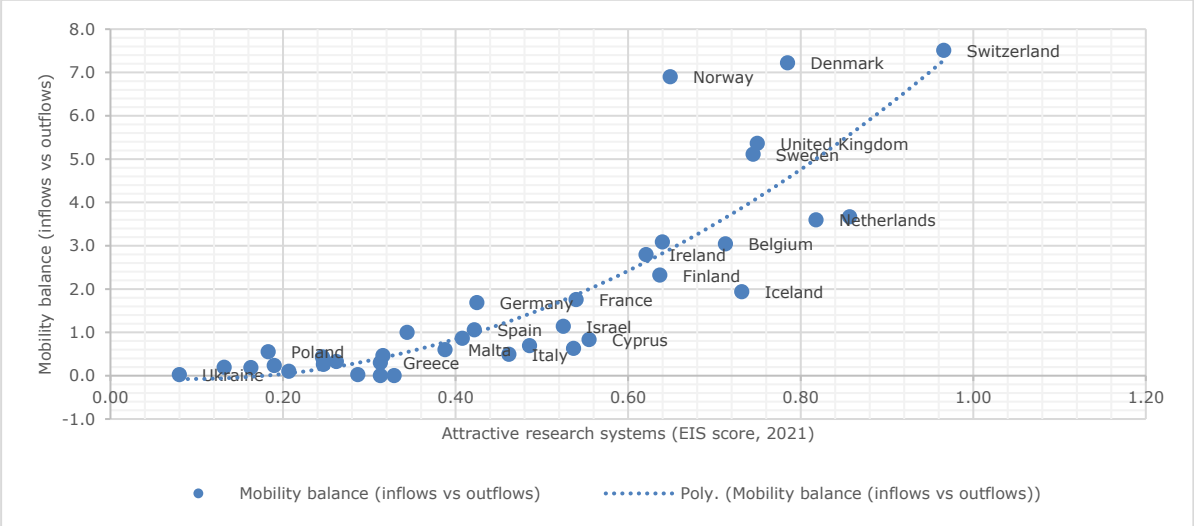


Source: CORDA database and Eurostat (2020), r=0.79.

At regional level, researcher inflows correlate only moderately with GERD (r=0.50). This suggests that the regional expenditure on R&D may not be a strong factor in determining MSCA researcher inflows, as long as the country's overall gross domestic expenditure on research and development is perceived as sufficient.

Attractive research systems not only attract the best researchers, but also retain their own nationals. The analysis shows that the more attractive a system is (based on the European Innovation Scoreboard), the more this observation holds true. In the figure below, we also illustrate the strong correlation between a host country's researcher mobility balance (inflows vs outflows) and the attractiveness score of its research system. In this case, the trend is polynomial, meaning that after a country's research system reaches a threshold in terms of its level of attractiveness, the mobility balance increases at a faster rate.

Figure 90. The correlation between researcher mobility balance (IF, ITN and COFUND) and a country's score for the attractiveness of its research system (EIS, 2021)



Source: CORDA database and European Innovation Scoreboard (2021), r=0.83.

Given the polynomial nature of the correlation above, it is evident that non-widening countries show a strong correlation between research system attractiveness and their MSCA mobility balance (r=0.80). Widening countries lie at the bottom of the curve, and do not correlate (r=0.16). **This suggests that fellows who choose to go to widening countries are driven by factors other than the attractiveness of the country's research system.**

In addition, the analysis shows that inflows of RISE researchers into non-widening countries correlate negatively with the attractiveness of the research system (r=-0.56). This means that the more attractive the research system, the fewer RISE researchers are hosted there. **This result supports our observation in Section 3.1.1 that RISE works as a bridge between widening and non-widening countries.**

To understand the driving forces behind such correlations, we tested all three individual components of the 'Attractive research systems' score. These are: international scientific co-publications; scientific publications among the top 10% most cited; and foreign doctoral students as a percentage of all doctoral students.

Table 10. Correlation between 'Attractive research systems' score component and MSCA mobility balance (inflows vs outflows)

Indicator	Correlation coefficient (vs mobility balance)	Interpretation
International scientific co-publications	r=0.16 'no correlation'	The number of international scientific co-publications in a country does not affect the MSCA mobility balance and vice versa.
Scientific publications among the top 10% most cited	r=0.80 'strong correlation'	The volume of scientific publications among the top 10% most cited correlates strongly with the MSCA mobility balance.
Foreign doctorate students as a % of all doctorate students	r=0.65 'moderate correlation'	The concentration of foreign doctoral students in a country correlates moderately with the country's MSCA mobility balance.

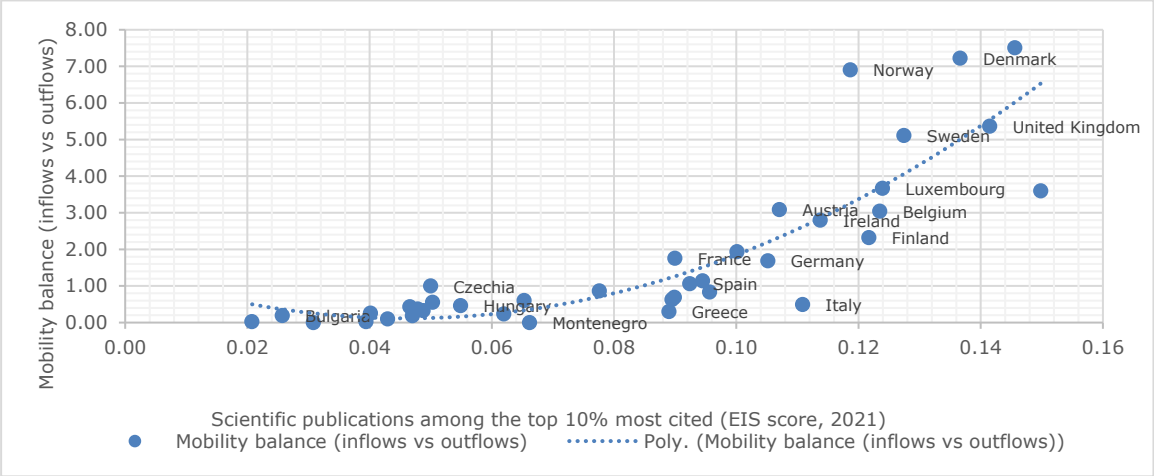
Source: CORDA database and European Innovation Scoreboard (2021).

As presented in the table above, the number of international scientific co-publications (in other words, the extent of international scientific collaboration) does not appear to correlate with the mobility balance in EU and associated countries (r=0.16). Further

analysis shows that this is only the case among countries with advanced research systems. In widening countries, there is a strong positive relationship between the extent of international scientific collaboration and the MSCA mobility balance within a country. This means that it is likely that the extent of international scientific collaboration is one of the systemic factors defining MSCA mobility balance for these countries. Widening countries that collaborate more often in the international scientific arena are likely to be more attractive to both foreign and domestic researchers.

The volume of scientific publications among the top 10% most cited can be considered a proxy for excellent research. Given that the MSCA are an excellence-driven programme, it is unsurprising that this indicator correlates strongly with the MSCA mobility balance in participating countries. This, along with the analysis in the sections above, suggests that there is a symbiotic relationship between these indicators. MSCA fellows prefer to carry out research in countries in which they can contribute to the highest tier of science and, at the same time, MSCA fellows create a critical mass of excellent researchers who publish the most-cited publications. The figure below shows that the relationship between the volume of most-cited papers and mobility balance follows a polynomial trend. This means **that the higher the level of most-cited publications, the stronger the correlation with a country's MSCA mobility balance**.

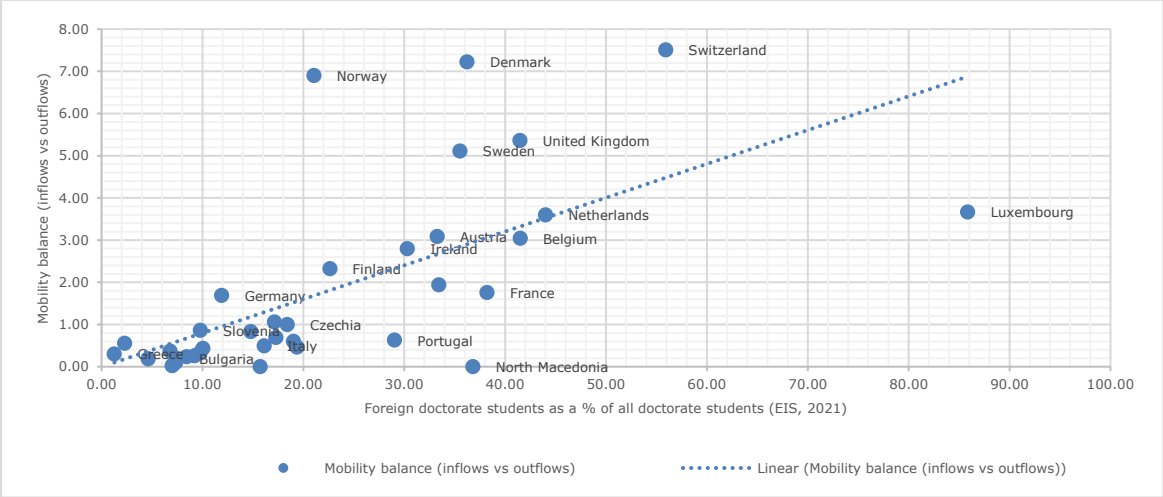
Figure 91. Correlation between researcher mobility balance (IF, ITN and COFUND) and the scientific publications among the top 10% most-cited score (EIS, 2021)



Source: CORDA database and European Innovation Scoreboard (2021), r=0.80.

As we saw in the table above, the mobility balance correlates moderately with a country's share of foreign doctoral students (r=0.65). This suggests that there is a linear relationship between these two variables – although, as can be seen from the graph below, a few outliers (e.g. Norway, Luxembourg) weaken this trend. We also tested the relationship between inflows of early-stage researchers (doctoral students participating in the MSCA) and the 'share of doctoral students': here, the correlation is weak (r=0.28). The combination of these two correlation coefficients suggests that MSCA fellows might go to certain host countries because there is already a community of foreign researchers there; perhaps there are already developed networks that facilitate the mobility.

Figure 92. Correlation between researcher mobility balance (IF, ITN and COFUND) and foreign doctoral students as a percentage of all doctoral students (EIS, 2021)



Source: CORDA database and European Innovation Scoreboard (2021), r=0.65.

On the other hand, the EIS (2021) indicator 'new doctoral students' correlates strongly with the MSCA mobility balance. Both overall researcher inflows and early-stage researcher inflows correlate moderately with the relative score for new doctoral students in a country. These figures suggest that countries with larger numbers of new doctoral students are attractive destinations for MSCA fellows, as well as are good at retaining their own nationals for PhD studies. Given that the number of doctoral students in a country cannot be unlimited, it is likely that this variable affects MSCA fellows' decisions when choosing a host country.

Table 11. Correlation between 'new doctoral students' score (EIS, 2021) and MSCA researcher inflows/mobility balance

Correlation variable	Correlation coefficient
New doctoral students and MSCA researcher inflows	r=0.67 'moderate correlation'
New doctoral students and MSCA mobility balance	r=0.74 'strong correlation
New doctoral students and MSCA ESR researcher inflows	r=0.62 'moderate correlation

Source: CORDA database and European Innovation Scoreboard (2021).

In line with the literature review (see Section 2), the number of R&D personnel also correlates with MSCA mobility trends. The correlation coefficients are provided in the table below. Here, we see that the number of R&D personnel correlates strongly with the inflows of MSCA researchers from all the actions (IF, ITN, COFUND and RISE), as well as with the MSCA long-term mobility balance and RISE researcher outflows.

Table 12. Correlation between R&D personnel and MSCA researcher inflows/mobility balance

Correlation variable	Correlation coefficient
R&D personnel (in FTEs) and MSCA long-term researchers inflows	r=0.84 'strong correlation'
R&D personnel (in FTEs) and MSCA long-term mobility balance	r=0.69 'strong correlation'
R&D personnel (in FTEs) and RISE researcher inflows	r=0.73 'strong correlation'
R&D personnel (in FTEs) and RISE researcher outflows	r=0.76 'strong correlation'

Source: CORDA database and Eurostat (2020).

The literature also suggests that factors such as country size, and the availability and transparency of, and satisfaction with, research positions influence the choice of destination. We did not observe any strong and meaningful correlations for these variables (see the correlation coefficients below). The absence of correlation between the availability

of research positions and MSCA researcher inflows can be explained by the fact that incoming researchers do not need to find a place to work, as the MSCA project ensures that. Mobile researchers outside the MSCA programme do not always have such assurances. A similar logic may be applied when explaining perceived transparency and satisfaction with the recruitment process. MSCA researchers are not affected by recruitment processes in a given host country; instead, they are affected by the selection process for the MSCA.

Table 13. Correlation coefficients for various potential system-level determinants of MSCA researchers' mobility

Indicator	Correlation coefficient (correlating with the researcher inflows)	Interpretation
Population size (regional level)		
IF, ITN and COFUND	r=0.42	Moderate correlation between the size of a region and MSCA researcher inflows.
RISE	r=0.48	
Number of researcher postings advertised through the EURAXESS job portal, per 1 000 researchers in the public sector (2016), ERA progress report		
IF, ITN and COFUND	r=-0.01	No correlation between research jobs availability and MSCA researcher inflows.
RISE	r=-0.05	
Share of researchers expressing satisfaction that the hiring procedures in their institution are Open, Transparent and Merit-Based (2016), ERA progress report		
IF, ITN and COFUND	r=0.15	No correlation between transparency and satisfaction with the recruitment and MSCA researcher inflows.
RISE	r=-0.16	

Source: CORDA database, Eurostat and ERA progress report.

6.4 Analysis of the relative importance of determinants

In Table 14, we present an assessment of the relative importance of individual-level determinants according to different breakdowns. Non-widening Member States and the United Kingdom are not included as countries of host institutions, as their answers did not differ enough from the averages to be shown. The same was true of a breakdown by gender.

Plus signs indicate the overall importance of a determinant, with three plus signs indicating a strong determinant, two indicating a moderate determinant, and one indicating a weak determinant. For strong determinants, the majority of respondents considered these determinants as impacting mobility to a large extent. For moderate determinants, over one-third of respondents considered them as having a large impact, whereas for weak determinants, less than one-third considered their impact to be large.

The triangles indicate the difference between each particular determinant and all responses received from IF, ITN and COFUND fellows. A dark green triangle indicates that this difference is more than 10 percentage points higher; a light green triangle indicates that the difference is 5-10 percentage points higher. Pale red triangle, meanwhile, indicates that the difference is 5-10 percentage points lower, while dark red triangle indicates that the difference is more than 10 percentage points lower.

Therefore, a dark red triangle indicates that the mobility determinant is significantly less important for that particular group, compared with the average for all IF, ITN, and COFUND fellows. Conversely, a dark green triangle indicates that a determinant is significantly more important for that group, in relative terms, compared with the average.

Table 14. Relative importance of individual-level determinants

Determinant	All	Country of host institution			Return mobility destination		Action			
		Non-widening associated	Widening Member State	Widening associated	Non-widening	Widening	IF	ITN	COFUND	RISE (compared to IF, ITN, COFUND)
Previous mobility / international research experience	+++			▼			▲	▼		▼
Working with leading scientists	+++	▲	▼	▼	▼	▼	▲			
Quality of training offered	+++		▼	▼	▼	▼			▼	▼
Research infrastructure in host country / institution	+++	▲	▼	▼		▼	▲	▼	▲	
Favourable social and cultural conditions	++		▼		▲	▲				
Good career opportunities	++	▲	▼	▼		▼				▼
Public infrastructure	+	▲	▼	▼	▼	▼				
Proximity to home country	+			▲	▲	▲				▼
Familiarity/experience in host country	+	▼		▲	▲	▲	▲	▼		
Family ties with the host country	+	▼		▲	▲	▲	▲	▼		▼

Source: Survey of MSCA fellows (ITN, IF, COFUND) (2022); survey of MSCA RISE staff (2022).

Notably, in widening countries, most factors were considered to be less important, indicating that improving the capacities in these areas can be considered important to attract MSCA fellows. One must also note that for returning researchers, external factors the MSCA cannot account for explain mobility patterns to a greater extent than in other categories.

We also ran a statistical analysis to understand the importance of the systemic determinants. Below are differently specified regression models. All suggest the same conclusion: namely, that **systemic variables are among the most important determinants of MSCA mobility, and the prestige of a research system (attractiveness, top publications) is the strongest of all.**

As can be seen in the three tables below, **all the models suggest that systemic determinants alone explain around 70-90% of MSCA mobility flows in the EU and associated countries** (see R2 statistics). This suggests that systemic variables are the most important in choosing MSCA destinations. It is also possible that researchers tend to choose stronger research systems in general, but the choice of a particular country and organisation may be based more on personal and organisational determinants.

The regression analysis suggests that the strongest determinants of researcher inflows are the number of new doctoral students in the country and the research system's attractiveness score (in particular its component 'Scientific publications among the top

10% most cited'). The regression results suggest that an increase by a percentage point in the top 10% publications would increase researcher inflow by a factor of 26. However, it is important to bear in mind that the coefficients (IRR factors) may be inflated due to a small number of observations. Nevertheless, the importance of this variable is strong.

Table 15. Poisson regression (log-likelihood model), dependent variable IF, ITN and COFUND researcher inflows (count of researchers)

Variable	Model 1 Coefficients (IRR)	Model 2 Coefficients (IRR)	Model 3 Coefficients (IRR)
GERD (in EUR million; Eurostat)	0.00*** (1)		
R&D personnel (in FTE; Eurostat)		0.00*** (1)	
Population size (Eurostat)			0.00*** (1)
New doctoral students (EIS score, 2021)	0.59*** (1.8)	0.53*** (1.7)	0.32*** (1.75)
Attractive research system (EIS score, 2021)		0.69*** (1.99)	
International scientific co-publications (EIS score, 2021; number of publications)			-0.00*** (0.99)
Scientific publications among the top 10% most cited (EIS score, 2021; percentage of all publications)	3.26*** (26.22)		9.52*** (over 3 million)
Foreign doctoral students as a percentage of all doctoral students (EIS, 2021)	0.00*** (1)		0.01*** (1.01)
Widening country (dummy of 0 and 1)	-1.82*** (0.16)	-1.75*** (0.17)	-1.82*** (0.17)
Constant term	5.73*** (310.93)	5.66*** (288.93)	5.19*** (169.14)
(pseudo) R2	0.78	0.84	0.92
Number of observations	33	33	33

***1% significance level.
Source: compiled by the study team.

The same models were re-run with the inclusion of interactions with variables indicating a widening country, to see whether the same determinants applied to widening countries. This is indeed the case, as presented in the table below. In fact, the effect these variables have is even stronger in widening countries. Such a result implies that even where fellows choose to go to a widening country, they still prefer those countries with stronger research systems.

Table 16. Poisson regression (log-likelihood), dependent variable IF, ITN and COFUND researcher inflows (count of researchers), accounting for differences between widening and non-widening countries

Variable	Model 1 Coefficients (IRR)	Model 2 Coefficients (IRR)	Model 3 Coefficients (IRR)
GERD (in EUR million; Eurostat)	0.00*** (1)		
Interaction: GERD in widening countries	0.00*** (1)		
R&D personnel (in FTE; Eurostat)		0.00*** (1)	
Interaction: R&D personnel in widening countries		0.00*** (1)	
Population size (Eurostat)			0.00*** (1)
Interaction: Population size in widening countries			-0.00 (1)
New doctorate students (EIS score, 2021)	0.56*** (1.76)	0.55***(1.74)	0.50*** (1.65)
Interaction: new doctoral students in widening countries	1.17*** (3.23)	0.76*** (2.15)	1.24*** (3.48)
Attractive research system (EIS score, 2021)		0.63*** (1.89)	
Interaction: Attractive research system in widening countries		0.98*** (2.66)	
International scientific co-publications (EIS score, 2021; number of publications)			-0.00*** (0.99)
Interaction: International scientific co-publications in widening countries			-0.00 (0.99)

Scientific publications among the top 10% most cited (EIS score, 2021; percentage of all publications)	2.04*** (7.71)		13.61*** (815279.8)
Interaction: Scientific publications among the top 10% most cited in widening countries	22.1*** (over 4 billion)		24.11*** (29 billion)
Foreign doctoral students as a % of all doctoral students (EIS, 2021)	0.00*** (1)		0.01*** (1.01)
Interaction: Foreign doctorate students as a percentage of all doctoral students in widening countries	-0.03*** (0.96)		-0.04 (0.95)
Widening country (dummy of 0 and 1)	-4.24*** (0.01)	-3.32*** (0.03)	-3.03*** (0.04)
Constant term	5.79*** (327.69)	5.69*** (298.05)	5.19*** (181.07)
(pseudo) R2	0.80	0.86	0.93
Number of observations	33	33	33

***1% significance level.
Source: compiled by the study team.

7 Investigation of the possibility of establishing return grants

As noted in the introduction, the Council requested that the Commission look into the establishment of "return grants".[109] This section, therefore, assesses the possibility of implementing a return grants scheme in the MSCA, as well as the hypothetical benefits and weaknesses of such a scheme.

In the context of this study, return grants refer to an additional funded period for researchers to return to their countries of origin after the end of their fellowships. Currently, the MSCA include a mandatory phase of Global Fellowships for researchers to return to any country in Europe, but no other operational return programmes.

When assessing the possibility of establishing a return grants scheme in the MSCA, the study addresses the following two primary criteria:

- The impact of MSCA in its current form on return mobility (i.e. the need for return grants).
- The feasibility of establishing return grants and their possible impact.

Return grants are not a new concept in the context of the MSCA. They were first introduced under the Fourth Framework Programme (1994-1998) and were reserved for researchers who wished to return and undertake research in their country of origin in a less-favoured region[110] (for up to twelve months) after the end of their postdoctoral grant or fellowship. The Fifth Framework Programme (1998-2002) included a similar return grants scheme: after the completion a two-year Individual Fellowship, fellows from less-favoured regions who wished to return to a less-favoured region in their country of nationality were able to

[109] *Council Decision (EU) 2021/764 of 10 May 2021 establishing the Specific Programme implementing Horizon Europe – the Framework Programme for Research and Innovation, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D0764&from=EN. The Council's partial general approach to the Specific Programme implementing Horizon Europe includes a compromise provision: "If appropriate and justified by a study, support for researchers to return to their country of origin within and to the Union shall be provided within the context of the existing broad lines" [the broad lines of activity being: training programmes, cooperation, and the diffusion of knowledge].*

[110] *The less-favoured regions were those which appeared in the list of the regions of Objective 1 of Council Regulation (EEC) No 2052/88, amended by Council Regulation of 19 December 1994 No 3193/94 (OJ L 337, 24.12.1994, p.l 1). They were often rural areas and areas which showed a lower economic and scientific performance compared to the average. The regions considered less-favoured changed with the accession of new Member States (e.g. Burgenland in Austria and the least densely populated regions in Finland and Sweden were included in the list of less-favoured regions, for the purposes of the implementation of the Training and Mobility of Researchers programme under the Fourth Framework Programme). See: https://cordis.europa.eu/article/id/3893-lessfavoured-regions-in-the-tmr-programme.*

apply for a Return Fellowship. These fellowships were awarded to counteract brain drain from less-favoured regions.

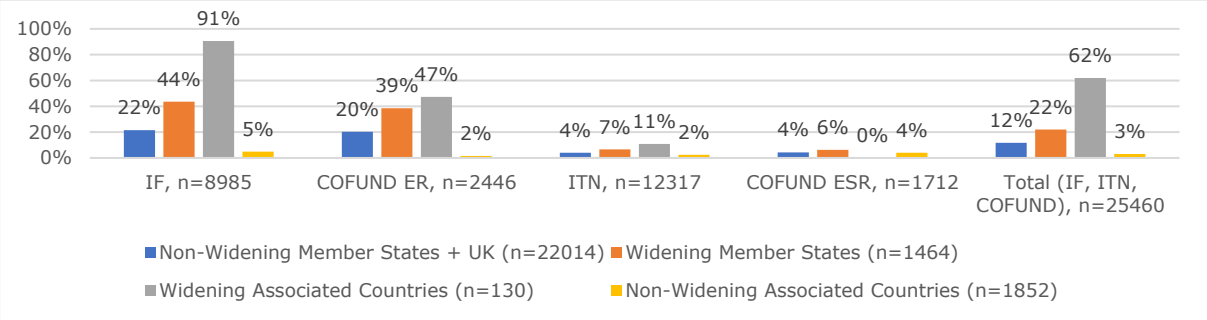
The Sixth Framework Programme (2002-2006) included European and international reintegration grants. European reintegration grants aimed to support the professional reintegration of the researcher and priority was given to reintegration in the country or region of origin. International reintegration grants supported return mobility from outside of Europe to Europe. The Seventh Framework Programme (2007-2013) continued with European and international reintegration grants with slightly different implementation rules.

Although the MSCA have a history of return grants, such return grants were deemed ineffective and were discontinued each time before being reintroduced in a different fashion under the following Framework Programme, without success. This history should be kept in mind when assessing the feasibility of return grants in the context of the MSCA.

7.1 Contribution of the MSCA to return mobility

Figure 93 shows the percentage of researchers using the MSCA to return to their countries of citizenship during Horizon 2020. The figure depicts IF, ITN and COFUND actions, with COFUND actions being further split into experienced (ER) and early-stage researchers (ESR). Destination countries have been grouped into non-widening Member States, widening Member States, widening associated countries, and non-widening associated countries.

Figure 93. Share of fellows who are citizens of the destination country by action, 2014-2020 (IF, COFUND, ITN)

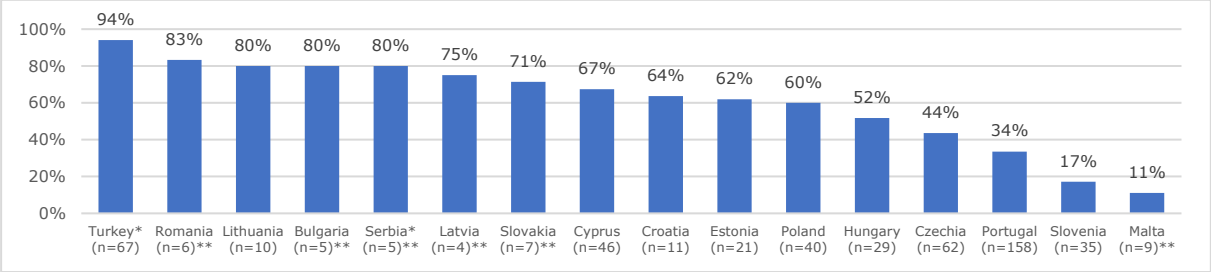


Source: CORDA database.

12% of all MSCA fellows use the MSCA to return to their country of origin. The share rises to 22% when looking only at widening Member States. Notably, many experienced researchers use the MSCA to return to their country of origin. This trend is especially notable among citizens of widening countries. Almost half of IF fellows going to widening Member States are citizens of the country of the host organisation, while the figure is even higher for widening associated countries. Over one-third of experienced researchers use COFUND to return to widening Member States. For widening associated countries, the share is even higher, at 47%.

Out of the 74 IF fellows returning to widening associated countries, 63 were returning to Turkey (a share of 85%). As Turkey is the only widening associated country with COFUND projects, all experienced COFUND researchers going to widening associated countries went to Turkey. Figure 94 presents a breakdown of return mobility for widening countries with IF return mobility.

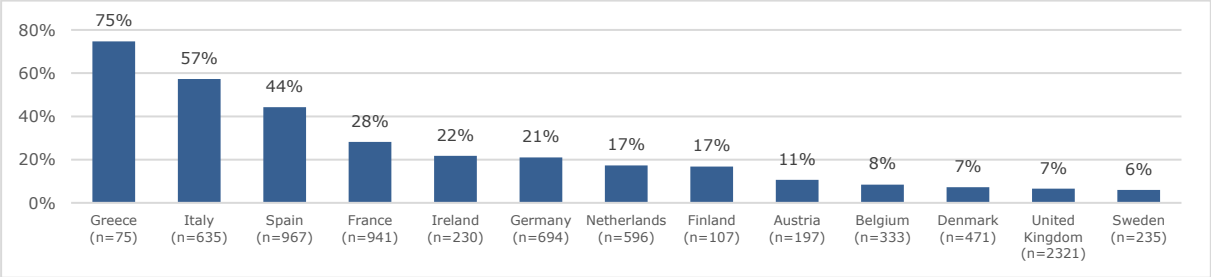
Figure 94. Widening countries' Individual Fellowship fellows who were citizens of the destination country



Source: CORDA database. *Associated country. **Small n, result indicative.

When looking at the return percentages for widening countries, **in 12 countries, more than half of all incoming IF researchers are returning to their country of origin.**

Figure 95. Non-widening Member States' Individual Fellowship fellows with citizenship of destination country



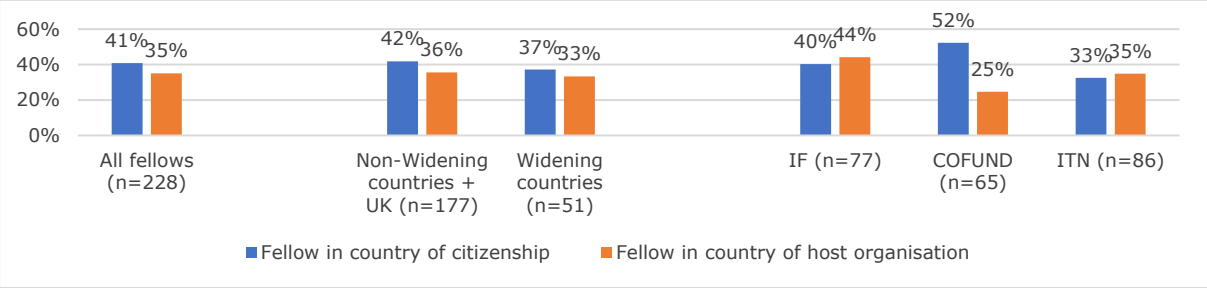
Source: CORDA database.

Italy, a non-widening country in which more than half of IF fellows are returning researchers, also experiences negative brain circulation.[111] This suggests that **the MSCA support return mobility to countries suffering from negative brain circulation.** This effect is not as pronounced in countries with positive brain circulation.

When looking at the return mobility of researchers after the end of their fellowship, a significant portion of return mobility happens naturally. Figure 96 shows that **41% of researchers who did not use the MSCA to return to their country of origin have returned to their respective countries two years after the end of their fellowship.**

[111] *Greece is considered a widening country in Horizon Europe, but not in Horizon 2020.*

Figure 96. Share of fellows not hosted by their country of citizenship who returned to their country of citizenship or remained in the host country, by country of origin and action (IF, COFUND, ITN)



Source: MSCA Follow-up questionnaire – two years after the end of the fellowship.

This trend is again more evident among experienced researchers than among early-stage researchers. **Over one-third of fellows return to non-widening and widening countries after their fellowship** (42% and 37%, respectively) – a significant percentage, and higher than the percentage of fellows who remain in the country of their host institution. As many as one-third of ITN fellows who are early-stage researchers return to their country of citizenship. There is additional evidence to support the finding. More than a quarter of surveyed fellows returned to their countries of origin after the end of their fellowships, while 12% of all respondents remained in the host country, which was also their country of origin.[112]

Based on the findings presented in Sections 5 and 6.1.1, family ties emerge as being significantly more important mobility determinants for returning researchers than for non-returning researchers. For returning researchers, familiarity with the country and favourable social and cultural conditions are also more important than for non-returning researchers. This speaks of a desire to return to their countries of origin for reasons unrelated to research. This is supported by interview evidence: researchers often want to return to their home countries, but the lack of job opportunities or research infrastructure, as well as a lack of transparent recruitment practices, act as barriers to returning.

7.2 Evaluating the success of existing return grants schemes

In order to understand return grants, their functioning and results, we analysed three existing return grants schemes implemented in Slovakia, Estonia and Poland. Overall, **the evaluation of existing return grants schemes indicates a low level of demand and limited success.**

A survey targeting the Slovak academic diaspora that assessed the Slovak Návrat domov ('Homecoming') grant scheme shows a low level of demand for return grants.[113] **Out of 197 respondents, only 18% would have considered returning to Slovakia under the Návrat domov scheme.** Out of the 50 respondents who considered returning to Slovakia at the time of the study, 66% said that they would not return under the scheme, while 34% would. Out of the 85 respondents who were not considering returning to Slovakia, only 4.7% indicated that they might consider return mobility under the scheme. The main benefit of the programme therefore seems to be in mostly attracting back researchers who were likely to return even without return grants.

[112] *Survey of MSCA fellows' (ITN, IF, COFUND) (2022) (n=1,939).*
[113] *The scheme offers a one-time subsidy of EUR 10,000 for a researcher under the age of 40 with a diploma from a top foreign university and EUR 50,000 for a senior researcher with more than 10 years' experience in a leading position. If the admission institution for a senior professional is a university or academy of sciences, then that institution may receive a grant of up to EUR 150,000 to create a research team. For information on the study and its results, please see: To Dá Rozum, https://analyza.todarozum.sk/docs/19081608050001fpp1/ (accessed 27.10.2021).*

The main reasons for Slovak researchers not wishing to return were related to the ability to produce higher-quality research abroad, which stems from better opportunities to collaborate with excellent scientists, and a higher level of funding and support for research. Salaries were also considered a barrier to returning. These factors are similar to those mentioned in interviews and highlight that **return grants do not solve the real issues affecting the attractiveness of home countries to potential returnees.**

The findings of the Slovak survey indicate that **the demand for return grants is low**, which is further supported by a review of the demand for Estonian and Polish return grants schemes. The Estonian Research Council has operated a returning researcher grant programme since 2016.[114] In total, the programme has funded 69 returning researchers. The overall success rate of applications is 53%. While this indicates that the programme is successful, at the same time it shows that demand for return grants has been low, with an estimated average of 26 applications per year.

The Polish National Agency for Academic Exchange (NAWA) has had a Polish Returns programme since 2018. This enables Polish scientists to return to their home country and take up employment in national universities or research units.[115] Although initial demand for the programme was high (108 applications were submitted in 2018), **interest in the programme declined.** In 2019, only 49 applications were submitted. The data for 2020 are not publicly available, but based on the number of projects funded, this declining trend may have continued. In 2018, 22 projects were funded. In 2019, 20 projects were funded. In 2020, 13 projects were funded, with one additional project in a specific COVID-19-related programme call. Similarly, the scoring threshold for funded proposals fell from 90% to 83% between 2018 and 2019.

This review of national schemes shows that **there is only limited demand for return grants.**

7.3 Feasibility of establishing MSCA return grants

It is important to keep in mind that the MSCA constitute a bottom-up programme that focuses on excellence. Therefore, the introduction of return grants needs to be considered in light of the nature of the programme. In this analysis, we consider both mandatory and voluntary return grants for all countries in the context of the MSCA, as well the possibility of introducing a scheme aimed only at widening countries. Finally, we address other challenges related to return grants.

Due to the nature of the programme, which is based on the principle of excellence and does not favour any geographical location, return grants implemented under the MSCA would need to be established for all participating countries.

Based on the previous findings of this study[116], **geographically undifferentiated return grants would result in a situation where the main beneficiaries would be non-widening countries** that have more advanced research ecosystems and greater capacities to integrate returning researchers. The capacities of non-widening countries to

[114] *83.5% of the programme's budget has been covered by the European Regional Development Fund. For information on the Estonian Returning Researcher Grant, please see: Estonian Research Council. Returning Researcher Grant, https://www.etag.ee/en/funding/mobility-funding/mobilitas-pluss/returning-researcher-grant/ (accessed 14.10.2021).*

[115] *For information on the Polish Returns programme, please see: Polish National Agency for Academic Exchange. Polish Returns, https://nawa.gov.pl/en/scientists/polish-returns (accessed 18.10.2021).*

[116] *See Section 6 for analysis.*

better meet researchers' needs would lead to higher return mobility to these countries, therefore deepening the divide between non-widening and widening countries.[117]

In addition to the above, introducing a mandatory return grants scheme would go against the principle of freedom of movement. Mandatory return grants could also present problems in assessing to which country a researcher would be expected to return. Even when discounting the problems presented by dual citizenships, the question remains as to how one's country of origin should be established: should an experienced researcher who conducted their doctoral studies in a country other than their country of origin be expected to return to their country of origin, or the country of their PhD? As discussed in Section 6.1, MSCA fellows have a significant amount of previous mobility experience, complicating the process of establishing clear and fair return parameters. As these lines are not easily drawn, return grants could lead to increased administrative issues and burdens. Unlike Global Fellowships, under which the researcher returns to any country in Europe, the issue cannot be as flexibly defined.

A voluntary scheme would encounter similar obstacles. Establishing the return destination for researchers would be challenging. In addition, as non-widening countries have better capacities to meet researchers' needs, a voluntary scheme would also lead to higher return mobility to these countries; while widening countries currently are the main beneficiaries of return mobility through the MSCA.

A geographically undifferentiated MSCA return grants scheme, which would only target certain countries is therefore neither feasible nor desirable.[118]

Alternatively, a return mechanism could be introduced for widening countries via the WIDERA (Widening Participation and Spreading Excellence) chapter of Horizon Europe. Such return grants targeted at widening countries would contribute to increased research and innovation capacities in those countries. This approach is also supported by several interviews with NCPs, who argue that a return mechanism should rather be implemented under the WIDERA chapter of Horizon Europe than under the MSCA.

However, introducing return grants for widening countries would not be a simple matter either. While a similar application procedure to that used for the ERA Fellowships could be implemented, as discussed in Section 5, the Widening/ERA Fellowships are already effective in promoting return mobility. Expanding the scope of the ERA Fellowships would lead to further increasing this return mobility, as well as to increasing widening countries' capacities to attract foreign talent. **Developing existing mechanisms that already create the desired results may lead to better outcomes than creating new ones.** Besides, for ITN and COFUND actions, implementing return grants would require implementing a separate application procedure under WIDERA. **Introducing return grants under the WIDERA part of the programme, therefore, does not appear to be a desirable solution either.**

In addition, return grants to any widening country (i.e. a researcher from a widening country would choose in which widening country to conduct their return mobility) may have adverse effects on mobility flows. As noted in Section 6.4, when fellows choose to go to a widening country, they prefer those countries with stronger research systems. Such return grants would therefore contribute to deepening the divide between the most and less advanced widening countries and lead to increased disparities in mobility balances.

[117] *See also: Annex 4. Case study 4: How to foster the development of ties between researchers and their home country.*
[118] *Ibid.*

Additionally, the effectiveness of return grants is significantly weakened by the often limited length and scope of the return funding period. Based on interviews, the general consensus is that in order for the researcher to achieve a sustainable reintegration and establish themselves in a competitive research system, the period for return should generally be longer than 12 months.[119] This would create additional budgetary pressure that would not be easily met in the current context. If no job opportunities are available for the researcher after the end of the return grant, the capacity to retain the researcher in the country of origin is limited. **This further supports the idea that establishing return grants, even with a possibility of returning to any widening country, is not a sustainable solution.**

Finally, while family ties are a significant reason to return to one's country of origin, other factors also contribute. This is especially true for researchers who are less likely to return unless such a return is incentivised. As discussed in Section 7.2, factors contributing to a researcher's capacity to conduct excellent research and their level of remuneration also contribute to the decision to return. The Knowledge Ecosystems in the ERA study concluded that supporting return mobility requires structural reforms (including structural reforms of the research and innovation system), which contribute to creating an attractive research and living environment. The study also noted that long-term perspectives are needed to support return mobility. A 'one-shot' grant would not convince researchers to move back to a country in which the prerequisite conditions are not sufficiently fulfilled. Researchers need to be integrated into the system and their position consolidated in the long run.[120] The findings in Section 6 support these conclusions.

Ultimately, any return mechanism should also contribute to removing career obstacles and helping with issues relating to economic, social, and cultural integration. During the second expert workshop, stakeholders expressed the view that many instruments already exist that can help with imbalanced mobility flows, and which have effects that are complementary to the MSCA. Therefore, additional synergies can and should be developed. The MSCA NCP network could contribute to this area, but additional synergies could be developed with EURAXESS and the ERA Talent Platform, for example.[121] The ERA Talent Platform seeks, through networking events, information sessions, training and other tools, to facilitate recruitment processes and to remove obstacles to return.

7.4 Summary and conclusions

The above findings clearly show that the MSCA significantly contribute to return mobility, particularly to widening countries. A strong tendency exists for researchers to return to their countries of origin, and the MSCA enable such mobility (see Section 4.3).

Based on the analysis of mobility flows in Section 2 and determinants in Section 6, the question should not be whether to establish return grants to support return mobility, but rather how to increase the attractiveness of research systems in general, which would contribute to attracting both returning and foreign talent.

[119] *After one year of being operational, the Estonian Returning Researcher Grant programme extended the return period from 6-12 months to 12-24 months. The Polish returns programme, for example, has a junior scientist track from 24 to 36 months and an experienced scientist track with projects from 36 to 48 months. The programme is designed to help researchers create their own project groups.*

[120] *Knowledge ecosystems in the new ERA. A comprehensive analysis of the state of play, the design of monitoring mechanisms, and creation of a toolbox of support measures. WP8 – Mapping brain drain and contributing to solutions (2022).*

[121] *The ERA Talent Platform is a proposed evolution of EURAXESS into a one-stop-shop for researchers, an observatory for research careers, and the European Competence Framework for Researchers. See e.g.: European Commission. DG RTD (2021): European Research Policy Agenda. Overview of actions for the period 2022-2024.*

Developing actions to promote return mobility at the level of institutions is likely to lead to better outcomes, and this approach is more in line with the bottom-up nature of the MSCA.[122] Host institutions could seek to attract returning researchers in a more comprehensive manner. As discussed in Section 6.2, only 19.5% of host institutions surveyed indicated that they had in place a coordinated action plan to attract mobile researchers. Of those institutions in widening Member States that had coordinated action plans, only 31% indicated that they targeted returning researchers. Developing more comprehensive approaches that target both non-returning and returning researchers could be prioritised. Similarly, as discussed in Section 6.1.1, receiving a job offer appears to play an important role in the fellows' decisions and plans to return to their countries of origin.

To summarise the findings above:

- **Introducing return grants under the MSCA for all participating countries** would lead to a situation in which the **primary beneficiaries are non-widening countries.** This could further increase imbalances in brain circulation.
- **Introducing return grants under the WIDERA part of Horizon Europe only for widening countries would likely increase disparities** between more and less advanced widening countries in favour of the former and **create unnecessary redundancy** with the already existing and successful ERA Fellowships.
- Return grants are **not a sustainable solution to the real challenges affecting return mobility.** The demand for return grants appears low and their success somewhat limited.

Based on the above findings, the study **does not recommend the establishment of return grants, either in the context of the MSCA or under the WIDERA part of Horizon Europe.** Instead, it is recommended to continue developing the current actions and better support bottom-up return mobility through voluntary return and the spread of excellence.

8 Conclusions and recommendations

8.1 Conclusions

Among the most pressing issues in the European Research Area are the persistent disparities in research and innovation performance among countries and regions. This leads to imbalanced mobility flows of researchers and knowledge circulation, which in turn further impedes the development of equally high-performing European, national, regional, and local research and innovation systems. In this context, the objective of this study was to assess if and how the MSCA could further contribute to strengthening the European Research Area through generating more balanced brain circulation between countries and regions. In addition, the study sought to assess the current state of play in this regard.

This study also focused on evaluating the existing measures and assessing the feasibility of other potential tools to be used in the context of the MSCA to foster a more balanced mobility of researchers. At the request of the Council of the European Union, the study analyses the feasibility of establishing a "return grant", which could provide financial support to researchers seeking to return to their country of origin. The study also delivers an in-depth evaluation of the Widening Fellowships pilot.

This section presents the main conclusions of the study and proposes corresponding recommendations.

[122] *See also: Annex 4. Case study 4: How to foster the development of ties between researchers and their home country.*

Country-level and regional-level mobility flows under the MSCA largely mirror the overall pre-existing researcher's mobility flows. The architecture of the MSCA programme does not in itself contribute either to brain drain or brain gain but reflects wider pre-existing mobility trends. The overall quality of national and regional R&I systems is the major explanatory pull factor, which explains both the overall mobility trends and MSCA mobility trends.

The study reveals that mobility flows of researchers under the MSCA are strongly influenced by different levels of quality of national and regional R&I systems. The strength of a national R&I system and the excellence of its outputs is clearly a major pull factor for MSCA fellows to decide where they want to do their doctoral or postdoctoral studies. Countries and regions with more advanced R&I systems attract a higher absolute and relative number of fellows and experience a significantly better balance between inflows and outflows of fellows. The following twelve countries (falling only into the EU14+UK group and a group of associated countries with highly advanced R&I systems) are the only ones to experience a positive balance between inflows and outflows of researchers (the list starts with the country which has experienced the highest positive ratio of mobility flows): Switzerland, Denmark, Norway, UK, Sweden, the Netherlands, Austria, Belgium, Ireland, Finland, France and Germany. Together, these twelve countries hosted over 80% of all fellows participating in Horizon 2020. All other countries experienced either negative or balanced (Spain, Israel, Czechia, Slovenia and Cyprus) mobility flows of researchers. Most widening countries (except for Czechia, Slovenia and Cyprus) experienced slightly to very negative mobility flows of fellows under the MSCA.

Regional-level analysis confirms and even strengthens the conclusion that the quality of a local R&I system is a major pull factor influencing the fellows' decisions in terms of destination country and region. A large share of the most attractive MSCA host organisations is concentrated in only a handful of European regions (according to NUTS 2 classification). In fact, 12 regions[123] hosted 30% of all fellows involved in the MSCA long-term mobility (IF, ITN and COFUND). These regions and their most prominent cities and institutions are listed in the main text of the report. The level of concentration of fellows in a handful of regions and institutions decreased in Horizon 2020 compared to FP7. In FP7, the leading twelve regions hosted around 39% of all MSCA fellows.

However, a comparison of the country-level balances of mobility flows between the MSCA and the overall mobility of researchers (as revealed by the MORE4 survey data) shows that mobility flows under the MSCA and the overall mobility of researchers are strikingly similar. The relative attractiveness of more advanced research systems (non-widening EU and associated countries) compared to less advanced research systems is largely the same under the MSCA and for the overall mobility of researchers. There is, however, a very slight tendency that a somewhat higher share of early-stage researchers (~10 percentage points) and experienced researchers (~5 percentage points) tend to go to advanced research systems under the MCSA, compared to the share of researchers going to advanced research systems outside the MSCA.

While the latter finding may stem from the MSCA's exclusive focus on research excellence, the overall conclusion is that mobility flows under the MSCA are not significantly different from the overall mobility flows of researchers in, to and from Europe. This means that a highly positive inflow of researchers to the most advanced research systems and largely negative flows of researchers from the less advanced research systems result mainly from the strength of the pull of these national and regional R&I systems and not from the characteristics of the MSCA. The architecture of the MSCA does not seem to strongly favour either more or less advanced R&I systems, as researchers' flows under the MSCA largely mirror the overall researchers' mobility flows outside the MSCA.

[123] *In total, MSCA IF, ITN and COFUND fellows were hosted in 346 regions.*

Regression models implemented as part of the study suggest that systemic determinants (such as the overall attractiveness of research systems as measured by the European Innovation Scoreboard, the quality of scientific publications coming from a specific location, the quality of doctoral training) explain around 70-90% of MSCA mobility flows to the EU and associated countries. This suggests that systemic variables are the most important for fellows in choosing their MSCA research destination. The effects of systemic variables are even stronger in the case of widening countries. Such result implies that even if fellows choose mobility to widening countries, they still prefer countries with stronger research systems. As the reader will see below, an in-depth analysis of the Widening Fellowships pilot suggests the same conclusion, i.e., widening countries with the strongest research systems benefitted the most from the Widening Fellowships pilot.

Three main organisational and systemic factors influence MSCA fellows' choice of host location (country, region and institution): working with leading scientists, the quality of training offered, and the quality of research infrastructure in the host country.

According to the survey of MSCA fellows, in all countries, and regardless of whether they have more or less advanced R&I systems, these three factors contributed the most to the fellows' choice of location. Available research infrastructure had a somewhat lower impact on the fellows' choice to move to a *widening* country (understandably, as major research infrastructures tend to be located in the most advanced research systems), while the two other factors were as important in moving either to widening or to non-widening countries. There were also differences between experienced and early-stage researchers in terms of how they selected a location for their fellowship. While the above-mentioned three factors were most important for both groups, experienced researchers tended to attach a higher value to working with leading scientists and the availability of research infrastructures, while early-stage researchers valued the quality of training the most.

On the other hand, the majority of surveyed fellows said that the following three factors did not at all contribute to their choice of location for the fellowship: family ties with the host country, familiarity or previous experience in the host country, and proximity to the home country. Only fellows who decided to return to their country of origin during or after the MSCA fellowship quoted "family reasons" as one of the main factors influencing their choice to come back to the country of origin.

The MSCA already strongly contributes to the return mobility of fellows by bringing them back to their country of origin.

In total, around 12% of all MSCA fellows (both experienced and early-stage researchers) already use the MSCA to return to their country of origin. This number is even higher for widening Member States (22%).

Experienced researchers participating in IF and COFUND are those who use the MSCA the most to return to their country of origin. This trend is especially notable for citizens of widening countries. Almost half of IF fellows going to widening Member States are citizens of the country of the host organisation, whereas the figure is even higher for widening associated countries. Furthermore, over 25% of experienced postdoctoral researchers use COFUND to go back to widening Member States, and this number rises to 50% for widening associated countries. This suggests that the MSCA already support the return mobility of experienced researchers, especially to widening countries.

In 12 widening countries (Turkey, Romania, Lithuania, Bulgaria, Serbia, Latvia, Slovakia, Cyprus, Croatia, Estonia, Poland, Hungary)[124], over half of incoming IF researchers used

[124] *Countries are listed starting with the one that received the highest share of returning fellows and ending with the one that received the lowest share, but still above 50%.*

the scheme to return to their country of origin. This also supports the finding that the MSCA is an important enabler of return mobility to widening countries.

Additionally, when looking at the return mobility of researchers after the end of their fellowship, there is a significant portion of additional return mobility happening naturally. A significant share of researchers (41% of all fellows, including IF, ITN and COFUND) who did not use the MSCA to return to their country of citizenship, have anyway returned to their respective countries two years after the end of their fellowship.

Based on the above findings, there is currently no need to establish return grants in the MSCA as the programme already significantly supports return mobility, especially to widening countries. There is also a considerable amount of return mobility that occurs naturally after the end of the fellowship. Additionally, introducing return grants under the MSCA for all participating countries would lead to a situation in which the primary beneficiaries are non-widening countries; therefore further increasing imbalances in brain circulation.

Introducing a return grants scheme under the WIDERA part of Horizon Europe only for widening countries would likely increase disparities between the more and less advanced widening countries in favour of the former and create unnecessary redundancy with the already existing and successful ERA Fellowships.

Another challenge relates to the length and scope of the return funding period. Based on the information stemming from the interviews, the general consensus is that a sustainable reintegration in a competitive research system requires a return period of at least 12 months. This would create additional budgetary pressure.

The study also takes note of the introduction of various types of return schemes under the previous Framework Programmes; and of the fact that these schemes have not delivered significant results and were discontinued. This supports the overall conclusion that return grants are not a sustainable solution to the real challenges affecting return mobility and that their success appears very limited. The analysis of the return schemes that currently exist at the national level further revealed a very low demand for such type of funding.

The Widening Fellowships pilot provided significant support to widening countries to balance their mobility flows.

The Widening Fellowships pilot significantly increased the inflow of researchers to widening countries and therefore significantly improved the balance of mobility flows to and from widening countries, with the highest impact on widening *Member States*. The Widening Fellowships pilot contributed to reducing the total negative brain circulation (i.e., a difference between incoming and outgoing fellows) to and from widening Member States from minus 113 to minus 24, therefore ensuring a nearly balanced brain circulation to and from widening Member States. Portugal, Czechia, and Cyprus were the main beneficiaries of the Widening Fellowships scheme. Malta can be included in this category as well, considering its size and previous performance in attracting researchers through the MSCA.

The positive impact of the Widening Fellowships pilot was much higher on widening *Member States* than on widening *associated countries*. While the Widening Fellowships helped to almost balance the mobility flows to and from widening Member States, they had a very limited impact on balancing the mobility flows to and from widening associated countries. Almost all (92%) widening fellows went to widening Member States.

The Widening Fellowships also contributed both to return mobility and to retaining talents in the fellows' countries of origin. The survey data show that 59% of widening fellows are either planning to stay or have stayed in the host country after the end of their fellowship. The evidence shows that 14 out of 16 (87.5%) respondents who used their Widening Fellowship to return to their country of origin either stayed or are planning to stay in the

country. In total, out of the 27 respondents who indicated they were staying or planning to stay, 52% were returning researchers and 48% were citizens of other countries.

Out of the widening fellows' survey respondents, over half of widening fellows said that the existence of the Widening Fellowships encouraged them to apply for the MSCA funding due to a larger chance of receiving a fellowship for their research mobility (be it an MSCA or a Widening Fellowship). The survey of all MSCA fellows also revealed that there is a high number of fellows who did not go to widening countries but would in principle be open to spending their mobility period in a widening country. It is likely that an increased budget for the ERA Fellowships would encourage such researchers to choose widening countries due to an overall higher chance of receiving a fellowship.

Overall, the introduction of the Widening Fellowships pilot did not significantly alter the pre-existing relative differences between countries in terms of the number of received researchers, which further confirms that researchers' inflows are dependent on factors that predate the MSCA.

The analysis also shows that widening fellows perform well on many scientific measures. There is no gap between MSCA fellows and widening fellows when assessing their research performance and output. The pilot supported the spread of excellence in this regard. The general satisfaction with the Widening Fellowships pilot is high.

Based on the scoring that widening fellows receive in the evaluation and their performance, and the beneficial impact that the pilot has had, there is room for expanding the scope of the pilot without having a detrimental impact on the principle of excellence. Considering that the pilot was designed to fund only 120 fellows, even a slight increase in its budget could have significant tangible impacts.

MSCA has a high positive impact on retaining excellent European talents in the EU, bringing talents back to the EU, and attracting foreign researchers to the EU.

The analysis of the MSCA mobility data reveals that while 74% of all IF fellows of any nationality were already residing in the EU27+UK prior to applying to the MSCA fellowship, 92% of all IF fellows of any nationality ended up being hosted in the EU27+UK by the end of the fellowship. This indicates that the MSCA managed to retain a substantial number of European researchers in Europe, while attracting both European and third-country researchers living abroad.

Another way to examine the MSCA impact on retaining excellent European research talents is to look at the alternative pathways that European MSCA fellows might have potentially pursued, had they not received and accepted their MSCA fellowship offers. In the MSCA fellows' survey, 70% of European (EU27+UK nationals) ITN/IF/COFUND fellows hosted in the EU27+UK confirmed that they had other offers/opportunities available to them at the time of accepting the MSCA fellowship offer. While the majority of those opportunities were available in Europe, 4.7% of them had offers in the US or in other third countries. It is likely that those researchers might have decided to accept the offers by third-country institutions if it was not for the MSCA fellowship. 3.5% of the same survey respondents indicated that the second-best option they would have considered in the case of not being awarded the MSCA fellowship was to apply for other fellowships in third countries.

Furthermore, prior to their MSCA IF fellowships, 8.6% of all EU27+UK nationals were living in third countries, and 4% in associated countries. The MSCA managed to attract back the majority (79%) of those IF fellows to the EU27+UK. Non-widening Member States hosted almost all (95%) of those returnees.

Finally, the available residency data of IF fellows highlight yet another dimension of the MSCA impact on bringing the best European research talents back to Europe. Out of the 628 EU27+UK nationals who were living in associated countries or third countries and ended up being hosted in the EU27+UK, 46% were hosted in their countries of origin. This

again demonstrates how the MSCA programme is seen by many European researchers living in non-EU countries as an instrument to help them return to their countries of origin.

8.2 Recommendations

Recommendation 1: Member States (and especially widening countries) should take the lead in implementing national level reforms that enhance conditions to attract excellent researchers. This should be done by using both national and EU-level initiatives and funding.

As shown in the conclusions above, the most effective way to sustainably attract more MSCA fellows to countries and regions with less advanced R&I systems is to reform these systems in such a way that they become more attractive to mobile researchers. Based on the key factors influencing the choice of the fellowship location by MSCA fellows, future reforms should focus especially on building high-quality research infrastructures (RIs), creating conditions to attract leading scientists, and supporting universities (mainly) and other institutions in developing high quality training programmes (especially for doctoral students). While the quality of training offered and the location of leading scientists may be easier to influence by policy reforms and targeted funding for R&I, one of the important factors for the choice of an MSCA host country and institution – quality and availability of research infrastructures – is clearly a location-based feature, which shows the embedded nature of attractiveness of the leading R&I systems.

Ultimately, the responsibility of building strong R&I systems, as well as educating or attracting a critical mass of excellent researchers, rests with the Member States. Therefore, we recommend that Member States take the lead in reforming their own national and regional R&I systems so that they are more attractive and welcoming for excellent researchers. Based on the results described above, policy reforms with the following objectives should be prioritised:

- Taking steps to ensure that a country or a region hosts a critical mass of excellent researchers, which in turn would attract other researchers. In this context, Member States could, for example, set-up very attractive national-level fellowships for most excellent researchers (national or foreign), by providing these researchers with suitable research infrastructure. Even a small number of top scientists residing in a country can have a very strong pull effect on other scientists, who wish to work with them. Even 10-20 financially and scientifically very attractive national fellowships could make a big difference for smaller widening countries. Indeed, there exists evidence on how a single top scientist becomes the key factor for the whole scientific field of research emerging in a region. This policy direction would also strongly benefit from providing additional funding to the recipients of the MSCA Seal of Excellence.
- Strengthening the quality of national doctoral training programmes. One of the most important policy reform directions in this regard in widening countries would be raising the salaries of researchers and teachers who train doctoral researchers. The major problem in widening countries is that university researchers (and especially teachers) often need to have other jobs in addition to training doctoral students to sustain themselves. Secondly, implementing the first policy direction suggested above (ensuring a critical mass of excellent researchers in a country) would also contribute to strengthening doctoral training, since doctoral students will be able to engage with those excellent researchers. Further policy reforms related to doctoral training could be undertaken in order to move the doctoral training provided in a country even closer to the principles foreseen in the European

Charter for Researchers[125], the Code of Conduct for the Recruitment of Researchers[126], and the Innovative Doctoral Training principles.

- Investing in developing excellent research infrastructures and providing a possibility for national researchers to work in leading RIs based in other countries. This is a policy direction, which may be among the most difficult for widening Member States to implement, since it is extremely costly to build leading RIs. Widening Member States could also further collaborate in order to develop leading networks of RIs, which could be accessed by researchers in different countries (for example, building on the experience of CERIC-ERIC).

Having in mind how important these suggested policy reforms will be for the future of national R&I systems and even economic development of countries, to implement these reforms, widening Member States should invest their own resources from the national budget. In addition, Member States should more actively draw on the European-level tools and funding instruments, e.g., the European Structural and Investment Funds, Recovery and Resilience Facility[127], Horizon Europe Policy Support Facility, and Structural Reforms Support Programme.

Recommendation 2: At the same time, the European Commission should more prominently steer the use of the policy and funding tools at its disposal to support national and regional level reforms of R&I systems, which would contribute to enhancing the quality of the less advanced R&I systems and in particular their capacity to support more balanced flows of researchers (directly related to the MSCA, when possible).

This can be implemented through various tools available at the EU level. For example, the European Commission could steer the Horizon Policy Support Facility to focus on brain circulation-enhancing R&I policy reforms. Also, the Structural Reform Support Programme could be used to provide technical assistance to national and regional governments, as well as higher education institutions and their networks, for example, to attract leading scientists or to develop higher quality training programmes. EU funding for research infrastructures could be directed towards building more of the leading RIs in currently less advanced R&I systems. Successful tools such as the Seal of Excellence or the European Universities Initiative should be continued and reinforced with further funding, if possible, by focusing on good practices identified by this and other relevant studies. As shown by already existing examples, the European Universities Initiative can contribute to shaping MSCA doctoral training programmes, which involve universities from both more and less advanced research systems. Finally, the European Commission could advise the Member States to use the European Structural and Investment Funds more prominently for reforms related to improving conditions for attractive research careers.

Recommendation 3: The European Commission should consider expanding the funding available for the ERA Fellowships, since the Widening Fellowships pilot showed an unambiguous capacity to contribute to more balanced flows of researchers to and from widening countries.

As revealed by the conclusions above, the Widening Fellowships pilot had a strong positive impact on balancing the flows of researchers to and from widening countries, with the most significant impact on widening Member States. The study evidence provides very strong grounds for the recommendation that the funding available for the ERA Fellowships should

[125] *European Charter for Researchers: https://euraxess.ec.europa.eu/jobs/charter/european-charter.*
[126] *The Code of Conduct for Recruitment of Researchers: https://euraxess.ec.europa.eu/jobs/charter/code.*
[127] *A significant number of Member States include reforms and investments targeting training, mobility and career development of researchers in their Recovery and Resilience Plans, some of which target the MSCA Seal of Excellence. Further analysis of the extent to which Member States are planning to use the Recovery and Resilience Facility in support of reforms related to researchers' careers is included in the annexes of this report.*

be increased, so that a higher number of fellows could benefit from them and, as a result, further increase the extent to which widening countries are able to attract excellent researchers.

The evidence shows that annually funding around 50-53 widening fellows in total (i.e., 10-13 more of widening fellows each year in addition to the current annual number of funded widening fellows) would provide a possibility to fully balance the mobility flows to and from the widening Member States. According to our calculations provided in the main text of the report, this would cost the EU budget an additional 1.5-2 million EUR per year (in addition to the annual budget of around EUR 6 million during the Widening Fellowships pilot). This is in line with the 2021 budget for ERA Fellowships under the WIDERA part of Horizon Europe.

However, our analysis also reveals that even much larger additional funding for ERA Fellowships may not achieve the goal to balance the mobility flows to and from widening *associated countries*, since the majority of the additional ERA fellowships are likely to be used by fellows to go to widening Member States.

The study also reveals that the Widening Fellowships have mostly benefitted countries with the strongest R&I systems among widening countries. The scheme would benefit from further differentiating widening countries in terms of the quality of their research systems and allocating a similar number of ERA Fellowships to each of these groups. For example, widening countries could be further classified into "catching-up" and "lagging-behind" widening countries; and both of these groups could be eligible for a similar number of ERA Fellowships (otherwise based on the same rules related to excellence, i.e., only the highest-scoring proposals should be retained for funding). To be more objective and politically acceptable, this classification of widening countries could be based on the widely accepted categorisation of innovators as per the European Innovation Scoreboard. While we are aware that this suggestion did not receive support from Member States during the negotiations for Horizon Europe, we would like to keep this recommendation in the policy discussions (perhaps even to be considered for the next Framework Programme, if not possible to implement under Horizon Europe).

No major flaw of the Widening Fellowships scheme has been observed, except for the fact that Widening Fellowships were seen as less prestigious than MSCA fellowships. In this regard, renaming the Widening Fellowships to the ERA Fellowships should help to some extent. In its communication, the European Commission should also emphasise how excellent the proposals retained for ERA fellowships are, and that the scientific achievements of the ERA fellows are of the same level as those of MSCA fellows, as revealed by this study (further research in this direction would also be valuable).

Recommendation 4: The European Commission should consider implementing a hop-on facility for MSCA Staff Exchanges, allowing organisations from widening countries to join already established successful MSCA SE consortia.

Based on the experience of the Hop-on Facility focused on grants supported under the Pillar 2 of Horizon Europe and under the EIC Pathfinder scheme, we recommend establishing a similar facility or expanding the focus of the current Hop-on Facility to cover the MSCA Staff Exchanges (SE). The Hop-on Facility for MSCA Staff Exchanges could work very similarly as the one already covering the Pillar 2 projects and the EIC Pathfinder. The scheme would allow existing SE consortia to add new partners from widening countries, and to receive additional funding for these partners. The primary beneficiary of this budget increase should be the new partner. As in the existing scheme, only partner organisations from countries not yet represented in the consortium could be introduced. The new organisation would participate as a full member of the consortium and would be able to receive and send researchers for secondments in other participating organisations.

The most important immediate impact of such scheme will be on building networks between organisations in widening and non-widening countries. Building such networks through exchanges of staff would be an especially promising and viable path, since personal ties between researchers resulting from common work prove to be especially solid. Evidence from other studies show that there are many cases where partners in the MSCA Staff Exchanges go on to apply together for MSCA Doctoral Networks. It is expected that establishing the suggested Hop-on Scheme for Staff Exchanges would possibly result in a larger number of organisations from widening countries participating in the consortia establishing Doctoral Networks.

Recommendation 5: The study does not recommend establishing a return grant scheme either under the MSCA or under the WIDERA part of Horizon Europe. Such a scheme may have a harmful effect for widening countries and further reinforce the existing disparities in mobility flows, as it is likely to benefit more fellows from advanced research systems than fellows from widening countries.

At the request of the Council of the European Union, the study analysed the feasibility of establishing "return grants", which could provide financial support to researchers seeking to return to their country of origin. The study started with an assumption that the establishment of a "return grant" scheme may especially support the countries with less advanced R&I systems in bringing back excellent researchers originating from these countries. However, the analysis carried out during the study unambiguously revealed that the MSCA already significantly supports return mobility, and that establishing a return grant scheme may have detrimental effects and contribute to more imbalanced brain circulation. It could lead to a situation where non-widening countries are the main beneficiaries of the scheme, whereas currently the MSCA particularly favours return mobility to widening countries. Therefore, the study does not recommend establishing a return grant scheme under the MSCA.

The study also analysed the possibility to establish a return grant scheme under the WIDERA part of the Horizon Europe programme. Such a scheme would only target postdoctoral fellows going to widening countries and would closely resemble the Widening Fellowships scheme. This scheme may either be aimed at fellows with the nationality of a widening country to which they would like to return; or at fellows with the nationality of any widening country, who are moving either to their own country of origin or another widening country. Such a scheme could be funded under the "Widening Participation and Spreading Excellence" (WIDERA) part of the programme, and not the MSCA budget, in order to respect the principle of excellence embedded in the MSCA.

However, the study found no clear added value of such potential programme compared to the expected impact of an increased budget for ERA Fellowships. Introducing return grants under the WIDERA part of Horizon Europe only for widening countries would likely increase disparities between the more and less advanced widening countries in favour of the former and create unnecessary redundancy with the already existing and successful ERA Fellowships. The analysis of return grant schemes that were repeatedly introduced and systematically discontinued under the previous Framework Programmes further supports this conclusion.

Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries

1 Introduction

This case study aims to identify the conditions that affect mobility flows to widening countries and the steps that have proved effective in bridging the gap in MSCA mobility flows with non-widening countries.

Widening countries are the countries participating in Horizon 2020 that were deemed as requiring special support given their low rate of access to the predecessor programme, i.e. the Seventh Framework Programme 2007-2013 (FP7). Under FP7, these countries were characterised by low levels of EU funding (relative to size), a low number of received grants, and, in particular, a low number of projects coordinated by institutions in those countries. Widening countries under Horizon 2020 include the countries that joined the EU since 2004 (EU13), as well as Portugal and Luxembourg. The eligibility for widening countries actions has also been extended to twelve associated countries to the programme.

Table 17. Non-widening countries, widening countries, and associated countries in Horizon 2020

Country group	Countries
Non-widening EU Member States in Horizon 2020	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Spain, Sweden, United Kingdom
Widening EU Member States in Horizon 2020	Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal (including the Azores and Madeira), Romania, Slovakia and Slovenia; plus the outermost regions: Guadeloupe, French Guiana, Réunion, Martinique, Mayotte and Saint-Martin (France), and the Canary Islands (Spain)
Widening associated countries in Horizon 2020	Albania, Armenia, Bosnia and Herzegovina, Faroe Islands, the Republic of North Macedonia, Georgia, Moldova, Montenegro, Serbia, Tunisia, Ukraine, Turkey
Non-widening associated countries in Horizon 2020	Switzerland, Israel, Iceland, Norway

Source: Net4Mobility (2018), Kalodimou, V. (2021)

This case study addresses the structural factors impacting the attractiveness of widening countries and curbing foreign researchers' inflows. It assesses some of the national and regional-level support initiatives to increase participation in the MSCA and successful initiatives introduced to attract or retain researchers. It also outlines obstacles in less successful widening countries and presents transferable solutions that could be implemented to enhance their attractiveness for researchers under the MSCA.

The study is based on the analysis of the FP7, Horizon 2020 and MSCA evaluations, online materials and academic literature, data on the R&I performance of EU countries, online interviews conducted with National Contact Points and the representatives of EURAXESS and, finally, the analysis of the CORDA data.

2 Research and key issues

2.1 Performance of widening countries in Horizon 2020

First, the analysis shows that the performance of widening countries under the MSCA reflects their overall performance in the Horizon 2020 programme.

Overall, widening countries continue to be less successful than non-widening countries in accessing Horizon 2020 funding. The Interim Horizon 2020 evaluation

carried out in 2017 indicated that between FP7 and Horizon 2020, the 'share of applications' filed by EU-13 countries increased from 9.6% to 10.3%, the 'share of participations' from 7.9% to 8.5% and the 'share of EU contribution' from 4.2% to 4.4%. However, the success rate of EU-13 Member States' applications plummeted from 18% in FP7 to 11% under Horizon 2020.[128] The evaluation concluded that Horizon 2020 had been 'making progress, albeit slowly, in spreading excellence and widening participation'.[129] The 2018 European Commission study on the participation of widening countries in spreading excellence and widening participation under Horizon 2020 reinforces this finding.[130] The study found that although supportive measures were introduced for widening countries, and despite some improvements, disparities in participation persisted under Horizon 2020. Data from the European Commission also show that the net EU contribution per capita in non-widening countries was EUR 147, but only EUR 43 in widening countries.[131,132]

Some widening countries have successfully secured Horizon 2020 funding, whilst others continue to struggle. Data from the European Commission show that the most successful widening countries received more funding per capita than the average for non-widening countries (EUR 147), including Cyprus (EUR 385), Luxembourg (EUR 316), Estonia (EUR 206) and Slovenia (EUR 181). In contrast, the least successful widening countries received much below the average for widening countries (EUR 43), including Romania (EUR 16), Poland (EUR 20) and Bulgaria (EUR 23).

2.2 Performance of widening countries in the MSCA

Looking at the MSCA, widening countries attract far fewer MSCA researchers than non-widening countries, relative to their share of the EU population and their share of researchers in the EU. Since widening countries accounted for 22% of the population of the then 28 Member States under Horizon 2020, they would be expected to attract a similar share of MSCA researchers.[133] Participation was balanced within RISE, where 22% of researchers who undertook a mobility period in an EU Member State did so in one of the widening countries, whilst 78% did so in a non-widening country, hence reflecting the population share of widening countries.[134] In contrast, among the researchers who undertook a mobility period in one of the EU Member States under COFUND, ITN or IF (n=23,478), only 6% (59% males, 41% females) chose a widening country, while the remaining 94% (56% males, 44% females) spent their mobility period in a non-widening country.

Widening countries' low share of MSCA researchers in part reflects broader trends in the EU's researcher population. Although widening countries accounted for 22% of the overall population in EU28, they only accounted for 15% of the total population of researchers in 2019.[135] Moreover, as shown in Section 3.1.2 of the main report, mobile researchers in general are disproportionately attracted to non-widening countries rather than widening countries. This evidence reinforces the need for widening countries not only

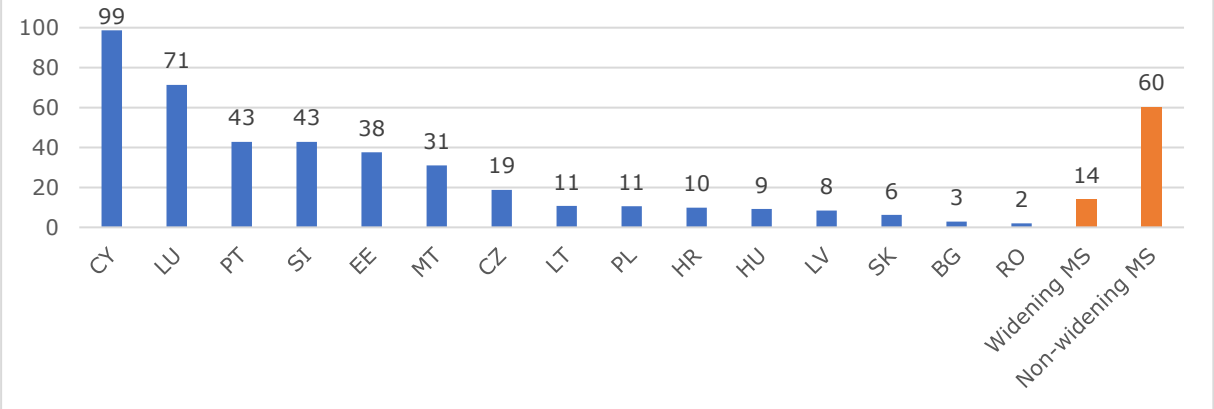
[128] *European Commission (2017). Interim Evaluation of Horizon 2020.*
[129] *European Commission (2018). Commission Staff Working Document, Executive Summary of the interim evaluation of Horizon 2020, p. 3.*
[130] *European Commission (2018). Spreading Excellence and Widening Participation in Horizon 2020 report: Analysis of FP participation patterns and research and innovation performance of eligible countries*
[131] *Net EU contribution is the funding received by project participants after deduction of their linked third parties' funding. Source: Horizon 2020 country profiles. See: https://ec.europa.eu/info/research-and-innovation/statistics/framework-programme-facts-and-figures/horizon-2020-country-profiles_en*
[132] *Population data from Eurostat (2021). Population change - Demographic balance and crude rates at national level. See: https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en*
[133] *Given that the UK participated throughout the seven years of Horizon 2020, it is described here as a Member State. Following the British decision to leave the EU on 31 January 2020, the UK entered a transition period for the rest of 2020.*
[134] *N=18,341, 65% males, 35% females.*
[135] *Eurostat (2021), R&D personnel by sector of performance, professional position and sex (RD_P_PERSOCC)*

to take steps to attract more MSCA fellows but also to strengthen their research and innovation systems in general.

One possible reason for the disparity between widening countries and non-widening countries is that nationals of widening countries (who are more likely to undertake their MSCA mobility in a widening country) are under-represented in the programme. When disaggregated according to researchers' nationality, the data indicate that 18% of IF, ITN and COFUND fellows from widening countries went to a widening country. In comparison, only 4% of IF, ITN and COFUND fellows from non-widening countries went to widening countries.

As with Horizon 2020 overall, some widening countries have been relatively successful in attracting MSCA researchers and in bridging the gap with non-widening countries. The figure below shows the number of participations in COFUND, IF and ITN per one million population in widening countries. It shows that there are also some strong performers among widening Member States such as Cyprus, Luxembourg, Portugal, Slovenia and Estonia.[136] Indeed, the average of hosted MSCA fellows in the best-performing widening Member States is closer to the average of non-widening Member States than to the average of widening Member States. The possible reasons for this difference in performance are explored in Sections 2.3 and 2.4.

Figure 97. Performance of widening Member States in the MSCA (relative to their population)

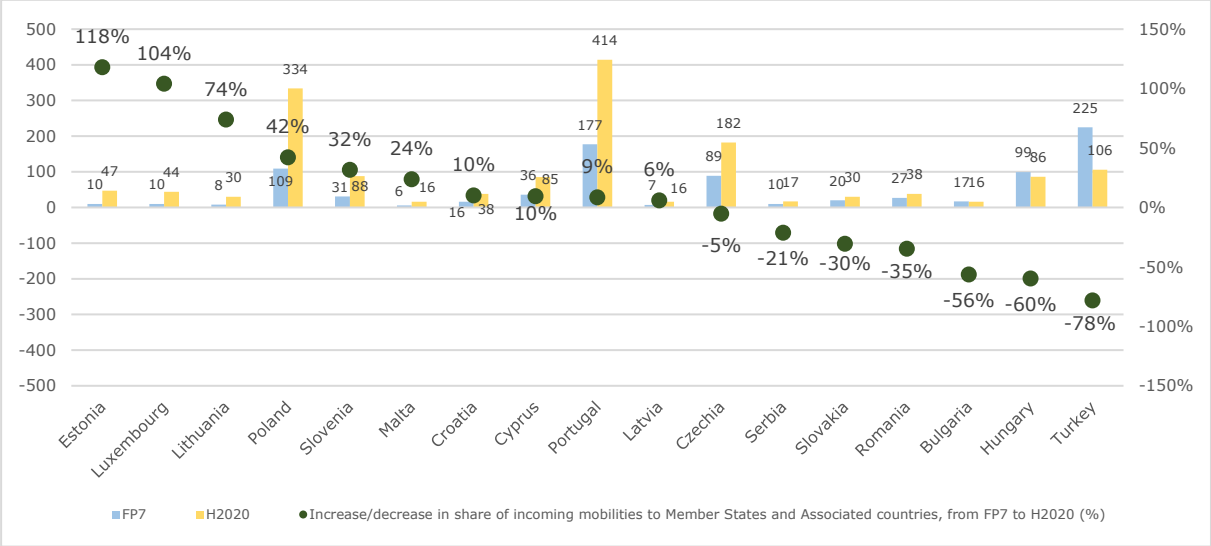


Source: CORDA database; Eurostat.[137]

Some widening countries have strengthened their share of incoming MSCA fellows in Horizon 2020 compared to FP7. The figure below shows the total number of incoming fellows in each country under FP7 and Horizon 2020. It also shows the change in each country's share of all incoming fellows from FP7 to Horizon 2020. Whilst most widening countries received more incoming fellows in Horizon 2020 than in FP7 (as did most non-widening countries), Portugal and Poland experienced particularly high increases. However, there was a significant difference in the changes in each country's share. Estonia, Luxembourg, Lithuania and Poland all experienced increases of more than 40% in their share of all incoming fellows, whilst Romania, Bulgaria, Hungary and Turkey experienced decreases of more than 30%.

[136] *Cyprus and Luxembourg are also strong performers when looking at application success rates. See: Study on mobility flows of researchers in the context of the MSCA. Annex 5. Case study 5: Influence of support to applicants on mobility flows.*
[137] *Eurostat (2022). Population change – Demographic balance and crude rates at national level, online: https://ec.europa.eu/eurostat/databrowser/view/demo_gind/default/table?lang=en, accessed: 10.02.2022.*

Figure 98. Inflows to widening countries under FP7 and H2020 and change in the share of mobilities from FP7 to H2020 (%)



Source: CORDA database.

2.3 Framework conditions impacting mobility

As described above, not all widening countries are equally successful in attracting MSCA researchers. The evidence shows that a number of explanatory factors relate to the framework conditions in the different countries.[138] These factors are outlined below.

First, **the quality of national research and innovation systems explains a substantial part of the disparities in performance between the different widening countries**. As noted in the main report, systemic factors alone account for around 70-90% of the MSCA mobility flows. According to the study, the main factors affecting widening countries' performance are:

- Level of national research investment and research and development (R&D) personnel
- Level of articulation between the Framework Programme (FP) and the national research system
- System learning through experience with FP procedures
- Wage levels
- Access to networks
- Size of projects
- Access to information, communication, training and advice
- Adverse incentives in national R&I systems (e.g. incentives which overvalue the quantity of publications over their quality)
- Level of fragmentation of national R&I systems
- Language barriers, or the lack thereof
- Regulatory and administrative burden and bureaucratic procedures
- Quality of government and public institutions
- The lack or presence of a European patent code and intellectual property-related costs.[139]

[138] *Based on the 2018 European Commission study on the participation of widening countries in Spreading Excellence and Widening Participation, the literature review and evidence from the interview programme.*
[139] *European Commission (2018), op. cit., p. 21-22.*

The 2018 European Commission study on the participation of widening countries emphasised that most of the factors identified seven years earlier as causes of imbalanced participation of different countries in the FPs could still be observed under Horizon 2020.[140] The variables listed above can, to varying extents, influence the countries' success in the MSCA, either by causing outflows (push factors) or as incentives to incoming mobility (pull factors). A certain degree of knowledge of a given research system is also needed for a researcher to assess how the system is performing.[141] Some widening countries are also better connected than others to the most prestigious networks of scientific collaboration:

> *Intra-EU collaboration frequencies in co-publications are highest between the larger and more R&D-intensive countries, while those with smaller R&I domestic ecosystems often collaborate with each other and with at least one of the R&D intensive nations. Germany, the Netherlands and the UK have continued to collaborate with each other, and Belgium and France have also joined this trend in Horizon 2020. Spain and Italy form their own group but are also collaborating more with smaller Member States, such as Cyprus, Romania, Croatia and Greece. While the Nordics and Ireland formed their own group under FP7, in Horizon 2020 they are collaborating more with the Eastern European countries.*[142]

In its 2016 analysis, Bruegel pointed out that between 2006 and 2013, according to the European Innovation Scoreboard's Summary Innovation Index, reducing the divide in innovation capacity between EU Member States had been challenging, with some countries less effective than others in improving their capacities. The data indicated that even Member States that had progressed well in terms of research and innovation (R&I) spending before 2008, had since stopped improving. Southern Member States suffered from low improvement in the area of R&I funding, while Central and Eastern European Member States faced challenges due to the low quality of the local public research systems.[143]

According to the 2021 European Innovation Scoreboard, all the countries below the EU average were Southern, Central and Eastern European countries. Similarly, except for Estonia and Luxembourg, all Horizon 2020 widening countries performed worse than the EU average in 2021. Amongst these, a significant improvement can be observed between 2014 and 2020 in the performance of the following widening countries: Portugal, Estonia, Cyprus and Lithuania. Others, such as Romania, Bulgaria, Slovakia and Hungary (all categorised as emerging innovators), show only weak signs of improvement.[144]

Second, **the level of national expenditure on research and innovation affects the level of participation in EU framework programmes and the ability to attract MSCA researchers.** This also relates to the first point on the quality of national research and innovation systems. According to the European Commission, low levels of R&D investments in some widening countries are an important cause of their low FP participation.[145] Low levels of R&D investment have other effects, too: "low spending combined with fragile and/or nascent R&I systems creates barriers to developing capacity and human resources for R&I" and "[c]ountries with high R&D intensity rates typically have high shares of

[140] *European Commission (2018), op. cit., p. 5.*
[141] *For an assessment of MSCA fellows' knowledge of a given research system, see Section 6.1.1 in the main report.*
[142] *European Commission (2018), op. cit., p. 27.*
[143] *Bruegel, (2016). The European Union's Growing Innovation Divide, online: https://www.bruegel.org/wp-content/uploads/2016/04/pc_2016_08.pdf, accessed: 23.01.2022, p. 6-11.*
[144] *European Commission (2021). European Innovation Scoreboard 2021, Executive Summary, online: https://ec.europa.eu/docsroom/documents/46411,accessed: 24.01.2022.*
[145] *European Commission, (2017). Horizon 2020 Work Programme for Research & Innovation, 2018-2020, Spreading Excellence and Widening Participation, online: https://www.ugent.be/nl/onderzoek/financiering/eu-int/ceeevent/pres-kroll.pdf, accessed: 24.01.2022.*

researchers in total employment and are also innovation leaders".[146] As noted in the main report, there is a strong relationship between gross domestic expenditure on R&D (GERD) and MSCA researchers' inflows. The main report also shows that even when fellows go to a widening country, they still prefer countries with strong research systems.[147]

Third, **it can take time for countries (and the institutions therein) to gain the experience and capacity required to be competitive within the MSCA (and the FPs more generally).** As shown in Figure 98, some of the countries with low levels of incoming MSCA fellows in FP7 then experienced falls in their share of incoming fellows or even in the absolute number of incoming fellows in Horizon 2020. As noted by the 2018 European Commission study on the participation of widening countries, this reflects a "rookie effect", i.e. the time that is needed for new actors to adapt to the FP as well as the culture of competing for FP funding. Indeed, the same study found that it can take two seven-year programming periods for a country to gather sufficient "system learning effects" to be competitive. As a result, the study noted that the "newer Member States such as Bulgaria and Romania, which both joined the EU in 2007, and the most recent Member State Croatia, which joined in 2013 as well as accession countries appear to be still in the beginning of the learning curve".[148] However, once experience is gained and capacity built, it becomes possible to increase participation. For example, as shown in Figure 98, eight of the Member States that joined the EU in 2004 or later all experienced increases in the absolute number of incoming fellows, as well as their share of incoming fellows in Horizon 2020 compared to FP7.

Fourth, **disparities in the quality of researchers' working conditions in different widening countries explain why certain widening countries have been more successful in attracting MSCA researchers**. The main report also supports this conclusion, noting that the quality of the research environment is an important determinant for MSCA mobility decisions.[149] This includes not only research infrastructure but also the working conditions of researchers. For example, a study on foreign academic workers in Polish academia found that the Polish research system suffers from weak organisation, burdening researchers with substantial administrative duties. Similarly, a representative of a Romanian mobility organisation pointed out that researchers hosted in Romania face extensive administrative requirements and the local administration (currently undergoing reforms) uses terminology that differs from the one used at the EU level.

Linked to this, case study 2 also found that the ease or difficulty in securing entry visas, work and residence permits can influence incoming mobility flows.[150] In the Recommendations for MSCA NCPs, excessive bureaucracy was identified as one of the key factors curbing researchers' mobility.[151] This includes difficulties in accessing registered employment and short-term and long-term residence permits; as well as difficulties in gaining recognition of qualifications issued in other countries. These issues are more problematic for third-country nationals. Some countries have taken steps to reduce such obstacles to researchers' mobility, such as Slovenia, which stated a policy commitment to

[146] *Ibid.*
[147] *See Section 6 in the main report.*
[148] *European Commission, Directorate-General for Research and Innovation, Puukka, J. (2018): Spreading excellence and widening participation in Horizon 2020: analysis of FP participation patterns and research and innovation performance of eligible countries.*
[149] *See Section 6 in the main report.*
[150] *Study on mobility flows of researchers in the context of the MSCA. Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows.*
[151] *The following list of barriers to mobility to widening countries under the MSCA is based on: N. Jeney (2018), Deliverable 4.1, Recommendations for the MSCA NCPs, online: https://www.net4mobilityplus.eu/fileadmin/user_upload/N4M_D1.4__Recommendations__for_Widening_countries_NCPs.pdf, accessed: 24.01.2022, p. 33-37.*

eliminate administrative, technical and tax obstacles for international mobility in both directions.[152]

Finally, language barriers are more significant in some widening countries than others. Language barriers can manifest in two ways. First, the internationalisation of R&I systems can be hindered if relatively few researchers in a country are fluent in English and struggle to participate in international networks or access information, communication and training.[153] Second, some countries benefit from English being an official language (e.g. Malta) or a widely used language (e.g. Cyprus). English language proficiency tends to be lower in Central and Eastern European states than in Luxembourg and Portugal, for example, meaning that incoming researchers often face substantial difficulties in communication, especially when it comes to dealing with administrative tasks:

> *[For foreign researchers working in Poland] another obstacle was related to the limited communication skills of office workers employed by Polish higher education institutions, which led to several problems on the administrative level. Administrative staff at Polish universities never had a good reputation to begin with […], but when it comes to contact with foreigners, the difficulties begin to multiply. In Poland, despite the debate on internationalisation of academia […], the ability to communicate in English or other foreign languages is not a common skill, especially among older employees.*[154]

2.4 National and regional level support for MSCA mobilities

Many of the framework conditions described above are broad issues that require contributions from various actors (regional, national and transnational) to be addressed effectively. Below we look at some of the actions that widening countries have taken to address them and support MSCA mobility inflows.

First, **strengthening NCPs' structures, processes, and capacity for programme management and administration can help raise national performance in the MSCA.** Three of the more successful widening countries, namely Cyprus, Estonia and Portugal, have notably strengthened their administrative support and expertise in working with the FPs in recent years. For example, in Portugal, the NCP role has been restructured and decentralised: Pillar I and widening NCPs are now located in the Portuguese national funding agency, while Pillars II and III are assigned to the National Innovation Agency. Such decentralisation contributes to building synergies between relevant national-level and EU-level actions. The aim is to create a situation where securing EU funding leads to securing national-level financing, and vice versa. The local NCPs can provide significant support for MSCA applicants. Malta has also stated a policy commitment to strengthen the capacity of the NCP to support MSCA researchers.[155]

Second, **some widening countries introduced funding opportunities for applicants who were awarded the MSCA Seal of Excellence**. The Seal of Excellence (SoE) concept was introduced in Horizon 2020 as a quality label awarded to applications that are of very high quality, but which did not receive funding due to budget limits within the programme. The award of the SoE aims to help applicants secure alternative sources of funding,

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[152] *Slovenian Strategy for Strengthening the European Research Area 2016–2020*
[153] *European Commission (2017). Horizon 2020 Work Programme for Research & Innovation, 2018-2020, Spreading Excellence and Widening Participation, online: https://ww.ugent.be/nl/onderzoek/financiering/eu-int/ceeevent/pres-kroll.pdf, accessed: 24.01.2022.*
[154] *K, Łuczaj and J. Mucha (2018). Why to Employ Foreign Academics in Poland? Perspective of Heads of University Research Teams, [in:] 'Studia Migracyjne, Przegląd Polonijny', Vol. 3/169, pp. 185-204, online: https://www.ejournals.eu/Studia-Migracyjne/2018/169(3)/art/13107/, DOI: https://doi.org/10.4467/25444972SMPP.18.042.9441, p.198, accessed: 14.02.2022.*
[155] *National European Research Area Roadmap Malta 2016 – 2020*

including from EU Cohesion Policy programmes.[156] The label thus recognises the high quality of the proposal and helps other funding bodies take advantage of the Horizon 2020 proposal evaluation outcomes. Several countries have introduced support programmes that recognise the SoE, including six widening countries (namely Bulgaria, Cyprus, Czechia, Lithuania, Poland and Slovenia).[157]

With most of these schemes having only recently been introduced, comprehensive evidence is not available to determine their effectiveness. The interim evaluation of Horizon 2020 highlighted a lack of comprehensive data on the number of proposals for which the SoE has allowed applicants to secure other sources of funding and questioned the SoE's ability to effectively influence funding decisions.[158] With several schemes now recognising the SoE, it will be important over the next few years to assess the extent to which such schemes enable widening countries to improve their experience and capacity in attracting incoming researchers, which in turn may help raise their levels of participation in the MSCA.

However, some preliminary conclusions can be drawn. Three countries apply a lower than 85% scoring threshold required for the Seal of Excellence (Bulgaria 80%, Czechia 70% and Lithuania 70%). The rationale for a lower threshold is to attract excellent researchers from a wider pool of candidates. Both Czechia and Bulgaria have reported this strategy to be effective. The highest number of fellowships granted to applicants is found in Czechia and Poland. Interviewees also indicated that an additional benefit of the SoE was that funding bodies were able to benefit from the MSCA proposal evaluation procedure.

Third, **some widening countries increased their attractiveness by developing connections between researchers and their international diasporas**. As shown in case study 4, this can be helpful in attracting not only nationals of widening countries (i.e. returning researchers) but also non-nationals (e.g. those working or studying with the diaspora).[159] For example, Portugal maintains strong bonds with organisations formed by the Portuguese diaspora abroad, and Portuguese organisations recruit MSCA participants among them. Return mobility can be strengthened if leaving researchers are given the opportunity to maintain connections to the home country's R&I system. One example of maintaining such a connection is 'the practice of permitting scientists to retain unpaid positions in the home country during their stays abroad' in order to achieve 'an important networking effect in some cases, encouraging [*the researchers*] to maintain live connections with their home country and institution'.[160] Conferences for Romanian researchers living abroad are reported to have helped foster return migration and cooperation on research projects. Czech researchers working in other countries are supported by the 'Czexpats in Science' initiative, which connects them to researchers and research institutions in Czechia, as well as supporting them to return to Czechia to develop their careers.[161]

Fourth, **some widening countries adopted measures to improve the conditions for researchers in general, including through the implementation of the European Charter and Code for Researchers and the HR Excellence in Research Award**

[156] *https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/seal-excellence_en*
[157] *https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/seal-excellence/funding-opportunities-under-msca_en*
[158] *SWD(2017) 220 final, Commission Staff Working Document, In-Depth Interim Evaluation of Horizon 2020.*
[159] *See also: Study on mobility flows of researchers in the context of the MSCA. Annex 4. Case study 4: How to foster the development of ties between researchers and their home country.*
[160] *L. Ackers, et al. (2007), Moving People and Knowledge: Scientific Mobility in an Enlarging European Union, University of Liverpool, online: https://reshare.ukdataservice.ac.uk/851527/4/MOBEX2_Summary_Report_FINAL_20_June_2007.pdf, accessed: 15.02.2022.*
[161] *http://czexpats.org/en/*

(HRS4R). Although not specifically targeted at MSCA researchers, such measures help to improve the overall attractiveness of the research environment. The Charter and Code are a set of principles published by the European Commission in 2005 and designed to set high standards for the recruitment of researchers and for the working conditions of researchers.[162] Institutions that make progress in aligning their human resources policies to the 40 principles of the Charter and Code receive recognition from the European Commission in the form of the "HR Excellence in Research Award" (HRS4R).[163] However, the take-up of these tools varies widely between widening countries, even when the country size is taken into account. For example, 150 institutions in Poland and 73 in Czechia have endorsed the Charter and Code, compared to only 16 in Romania and 14 in Bulgaria. Similarly, 93 institutions in Poland and 51 in Czechia have gained the HRS4R, compared to only 6 in Romania and 4 in Bulgaria.[164]

The high commitment of organisations in Czechia results from a legal requirement on research organisations and relevant public authorities to comply with the Charter and Code and incorporate the HRS4R into their management culture.[165] Compliance with this requirement is supported by EU funding from the European Structural and Investment Funds. Two dedicated calls within the Operational Programme for Research, Development and Education (OP-RDE) allocated EUR 55 million to set up the strategic management of research organisations according to the conditions for obtaining the HR Excellence in Research Award.[166,167] Reflecting this commitment at national level, Czechia was the country with the sixth-highest number of institutions endorsing the Charter and Code (73) and the fourth-highest number of institutions receiving the HRS4R award (51).

Similarly, in Poland, the European Commission reports that national authorities such as the Ministry of Science and Higher Education have taken systematic steps to encourage research and higher education institutions to adopt the Charter and Code.[168] As a result, Poland was the country with the second-highest number of institutions endorsing the Charter and Code (150) and the third-highest number of institutions receiving the HRS4R award (93).

Last, **some widening countries specifically incorporated their efforts to attract MSCA fellows and other incoming researchers into broader national strategies for research and innovation, most notably their national roadmaps within the European Research Area (ERA).** Until its renewal in 2020, the ERA featured a priority explicitly relating to research careers, namely Priority 3, the objective of which was "[a] truly open and excellence-driven ERA in which highly skilled and qualified people can move seamlessly across borders to where their talents can be best employed".[169] Each Member State prepared its own national roadmap for implementing the ERA, which included commitments related to Priority 3. Some national roadmaps included very specific commitments to take steps to enhance participation in the MSCA. For example:

- Cyprus: the roadmap included a commitment to enhance participation in the MSCA, as well as in international networks and partnerships that provide opportunities for training and access to research infrastructures/activities of international scope.

[162] *Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers.*
[163] *https://euraxess.ec.europa.eu/jobs/hrs4r*
[164] *European Commission, Directorate-General for Research and Innovation, K. Vandevelde, C. Biglia, J. Rampton, et al., Taking stock, evaluating the achievements and identifying the way forward for the ERA priority 3 policy measures: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2777/401723*
[165] *Resolution of 16 August 2006 No. 951*
[166] *https://opvvv.msmt.cz/vyzva/vyzva-c-02-16-028-rozvoj-kapacit-pro-vyzkum-a-vyvoj.htm*
[167] *https://opvvv.msmt.cz/vyzva/vyzva-c-02-18-054-rozvoj-kapacit-pro-vyzkum-a-vyvoj-ii.htm*
[168] *European Commission (2019), European Research Area Progress Report 2018 Country Profile: Poland; p4.*
[169] *COM(2000) 6, European Commission Communication "Towards a European Research Area".*

- Czechia: the roadmap stated that public authorities would promote the international mobility of PhD students, post-doctorate students, and researchers, as well as other staff of research organisations. The roadmap also included a specific commitment to introduce a SoE scheme using the European structural and investment funds (ESIF).
- Estonia: the roadmap set out plans for a talent management and migration policy to attract and support incoming researchers, as well as the ESIF-funded "Mobilitas Pluss" programme to support mobility in research.
- Lithuania: the roadmap included a commitment to attract foreign scientists and other researchers to work in Lithuania.
- Malta stated a commitment to setting up an online community for sharing information and experience.

Whilst Portugal's ERA roadmap did not make specific reference to the MSCA, its success in increasing its share of incoming MSCA fellows is partly due to the wider strategic effort to develop its research and innovation performance. The box below provides a summary.

Support for MSCA in the context of a broader strategy for research & innovation
Portuguese MSCA participation success results in part from its long-term research and innovation strategy and an effective change of strategic objectives over the years. Portugal ensured that the local research and innovation (R&I) strategy corresponded well with the changes in the local R&I landscape. While 20 years ago, the focus of the Portuguese policy was on boosting the R&I system through training, it has since shifted to supporting the sustainability of research careers. The legal framework for postdoctoral researchers in Portugal was changed from grant-based to contract-based, positively impacting working conditions. Portuguese long-term efforts helped create a coherent R&I system with synergies between infrastructure, education and career development. The synergies help the R&I system to retain locally trained talents. Portugal also maintains strong links with research institutions located in other Mediterranean countries (see also Section 2.3 for the importance of collaborative networks). The alliances formed by Portuguese universities with their counterparts in Italy and Spain create added value for the local R&I system. Additionally, Portugal is effective in promoting itself as a destination for researchers. Portuguese authorities report that the country "can be relatively easily sold" (i.e. promoted among foreign researchers) because it is seen as a safe, pleasant place where to live, especially for families, including a favourable work-life balance. The Portuguese strategic document guiding the R&D development acknowledges these factors.

3 Conclusions

Whilst disparities in overall performance between widening and non-widening countries still exist, the evidence shows that certain widening countries have successfully bridged the gap. The various difficulties and policy solutions described above suggest that the major challenge faced by less successful widening countries is twofold.

First, widening countries should continue to reform their R&I systems to raise their performance and better integrate into the wider EU research and science system. A range of actions are already set out in the ERA National Action Plans (NAPs). As NAPs are updated, they should account for the need to improve researchers' working and labour market conditions, to better align national R&I systems with policies and processes, and to build the capacity of all types of research institutions to host incoming researchers. From the

MSCA perspective, national-level funding could be used to create synergies with the programme.

To a varying extent, systemic goals have not been entirely achieved in widening countries, which means that they risk failing to meet researchers' expectations regarding the quality of the research environment, career development, remuneration, and access to professional networks.[170] Nevertheless, several successful approaches to improve MSCA participation rates have been implemented in some widening countries and would merit replication in others. Examples include:

- Aligning the research system with EU relevant strategies and introducing corresponding reforms in the legal framework for research funding.
- Strengthening connections with the scientific diaspora and neighbouring countries' research institutions.
- Better utilising the synergies between the MSCA and ESIF.
- Implementing policies ensuring high quality of researchers' employment, loosening of restrictions on work and residence permits, and providing unrestricted access to social benefits for immigrants.
- Strengthening the human resources of the NCPs system and developing support facilities at organisation level.
- Emphasising the development of the R&I system in the political agenda, as well as stressing the significance and benefits of researchers' mobility and higher education internationalisation.

Second, **widening countries could take specific steps to support incoming MSCA researchers, learning from effective approaches already tested by other widening countries**. These can include strengthening the overall national management processes and capacity for programme management and administration within Horizon 2020 (thus to raise performance across the programme, not only in MSCA), using other EU funding to promote conditions supporting MSCA mobility (e.g. ESIF), using tools such as the European Charter and Code to improve conditions for researchers, and strengthening links with researchers from the diaspora. The importance of establishing high-quality programmes for PhD students should be emphasised, as well as the need for those programmes to be better aligned with the policy strategies such as the European Charter and Code and Innovative Doctoral Training principles. The main report for this study also shows that the Widening Fellowships proved highly successful and that their successor, the ERA Fellowships, should be further reinforced with a focus on the less-well performing widening countries.[171]

Given that widening countries continue to struggle to compete with the best-performing Member States in the area of infrastructure and research funding (which might limit capabilities of establishing new research infrastructures, although EU funding could help), stronger incentives to promote mobility towards these countries should be implemented, while those already in place should be further bolstered. The research suggests that a wide range of motivations behind researchers' mobility, other than financial gains or career development, can be identified.[172] Hence, alternative solutions tailored to the specificity of the particular Member States' contexts could be developed and supported either by Member States themselves, or through Horizon Europe (to the extent possible within the parameters of the programme).

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[170] S. H. Baruffaldi and P. Landoni, (2016). Mobility Intentions of Foreign Researchers: The Role of Non-economic Motivations, [in:] 'Industry and Innovation', Vol. 32/1, pp. 87-111, online: http://dx.doi.org/10.1080/13662716.2015.1126502, accessed: 15.02.2022.

[171] See Section 5 in the main report.

[172] See e.g.: Study on mobility flows of researchers in the context of the MSCA. Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows.

Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows

1 Introduction

The aim of this case study is to describe the determinants of researchers' mobility under the Marie Skłodowska-Curie Actions (MSCA). It complements the analysis in Section 6 of the main report (which summarises evidence from CORDA and the surveys of MSCA fellows and host organisations) by providing a deeper level of analysis, offering qualitative insights, and viewing the MSCA in their broader context (i.e. with reference to the research population in general, wider determinants of mobility, and other relevant EU initiatives). The case study draws on academic knowledge on the determinants of mobility of researchers in general and, more specifically, the determinants of researchers' mobility between different countries participating in Horizon 2020 based on data from the MSCA fellows' survey, CORDA as well as interviews with National Contact Points (NCPs) and MSCA fellows.

2 Research and key issues

This analysis identifies two main groups of mobility determinants: those linked to the destination and those related to the individual researcher. As explained below, in some cases there can be an "intersection" between these two, whereby certain types of researchers (for example, at different career stages) can be particularly attracted to certain types of destinations (for example, widening or non-widening countries).

2.1 Mobility determinants linked to the characteristics of the destination

Evidence from different sources suggests that the characteristics of destinations are key determinants of mobility. In some cases, such characteristics can serve as a "pull factor", notably those linked to research excellence. In other cases, the choice of destination can be affected by barriers or disincentives, relating either to entry into a country or the conditions prevailing within a destination.

The first factor driving researchers' mobility is the overall quality of the destination as a place to undertake research. Respondents to the MSCA fellows' survey were asked to state the degree of importance of different factors in their choice of host country and host institution. As shown in the table below, two of the three most important factors relate to the quality of the research environment. The most important factor was "Working with leading scientists", which was important to 94% of respondents (of which 70% to a large extent). The third most important factor was the "Research infrastructure/host institution", which was important to 93% of respondents (of which 57% to a large extent). These survey findings suggest that the MSCA are attracting researchers who are primarily motivated by research excellence rather than other factors, such as lifestyle.

Table 18. Factors influencing the choice of host country and institution: all MSCA researchers

Factor	To a large extent	To some extent	Not at all
Factors related to research excellence			
Working with leading scientists	70%	24%	7%
Research infrastructure in the host country / institution	57%	32%	10%
Factors related to working conditions and career development opportunities			

Factor	To a large extent	To some extent	Not at all
Quality of training offered	66%	27%	7%
Good career opportunities	38%	37%	25%
Level of remuneration	35%	45%	20%
Factors related to overall attractiveness of the destination			
Favourable social and cultural conditions in the host country	38%	43%	19%
Public infrastructure in the host country	27%	47%	25%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

On this point, it is worth noting some differences in the responses offered by MSCA fellows hosted in widening countries compared to those hosted in non-widening countries. The two tables below suggest two main points. First, the most important factors for researchers hosted in widening countries are identical to those hosted in non-widening countries (i.e. "Working with leading scientists", "Quality of training offered", "Research infrastructure in the host country/institution"). Second, researchers hosted in widening countries report placing less importance on these three factors.[173]

Bringing these two points together, it can be concluded that researchers hosted in widening countries largely have the same priorities as those hosted in other countries. However, in general, widening countries are considered to be less attractive destinations. The lower attractiveness of some widening countries as research destinations has been documented in previous research. For example, Poland's Ministry of Education and Science has highlighted insufficient access to academic literature, which is usually too expensive to be purchased by an individual researcher and often inaccessible through the official channels offered by universities, which suffer from underfunding and poor-quality of governance.[174]

Table 19. Factors influencing the choice of destination: MSCA fellows hosted in widening countries

Factor	To a large extent	To some extent	Not at all
Factors related to research excellence			
Working with leading scientists	56%	30%	14%
Research infrastructure in the host country / host institution	36%	41%	23%
Factors related to working conditions and career development opportunities			
Quality of training offered	59%	29%	12%
Level of remuneration	31%	44%	25%
Good career opportunities	18%	37%	46%
Factors related to overall attractiveness of the destination			
Favourable social and cultural conditions in the host country	32%	44%	24%
Public infrastructure in the host country	15%	42%	43%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

[173] *Equivalent data for Horizon 2020 associated countries are not included due to the smaller number of survey respondents and the diversity of host countries and institutions, i.e. Iceland and Norway have much stronger research infrastructure than other countries.*

[174] *Ministerstwo Edukcaji i Nauki (2010). Nauka w Polsce. Prof. Rachoń apeluje o powszechny dostęp do literatury naukowej.*

Table 20. Factors influencing the choice of destination: MSCA fellows hosted in non-widening countries

Factor	To a large extent	To some extent	Not at all
Factors related to research excellence			
Working with leading scientists	70%	23%	6%
Research infrastructure in the host country / host institution	58%	33%	10%
Factors related to working conditions and career development opportunities			
Quality of training offered	66%	27%	6%
Level of remuneration	35%	45%	20%
Good career opportunities	35%	37%	24%
Factors related to overall attractiveness of the destination			
Favourable social and cultural conditions in the host country	39%	43%	19%
Public infrastructure in the host country	27%	48%	24%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

These findings highlight the importance of the wider effort to improve the overall quality of research environments across the EU, if there are to be more balanced flows of researchers.[175] To that end, EU support through initiatives such as the Horizon Policy Support Facility and the Technical Support Instrument remains important to strengthen the research and innovation capacity of Member States.[176]

A second factor driving mobility relates to the attractiveness of working conditions and career development opportunities for researchers. A previous study for the European Commission highlighted the need to improve the employability of researchers and help them prepare not only for careers in academia but also careers in other sectors, since many will eventually leave academia. The same study found that many researchers suffer from precarious employment conditions and low and insecure income.[177] EU policy recognises the need to address such challenges by encouraging institutions to comply with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers and to seek the HR Excellence in Research Award (HRS4R).

Reflecting these needs, evidence shows that training, career development and remuneration are significant drivers of mobility and destination choice. As shown by Table 18 above, the second most important factor influencing the choice of destination was "Quality of training offered", which was important to 93% of respondents (of which 66% to a large extent). "Good career opportunities" and "Level of remuneration" were also important drivers, although to a lesser extent. One interviewee, a Spanish researcher who moved back to Spain from Canada with an MSCA fellowship, stressed the importance of generous remuneration for a person moving abroad:

> *Mainly I was looking for an option to come back to Europe, whatever country actually. I wasn't specifically looking to come back to Spain but this was the option. I think also it is a very good scheme money-wise, which is also something to take into account. Especially if you are moving to different places you don't know - this is important.*

[175] *See also: Study on mobility flows of researchers in the context of the MSCA. Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries.*
[176] *https://ec.europa.eu/research-and-innovation/en/statistics/policy-support-facility; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:0409:FIN*
[177] *CSES (2021) Taking stock, evaluating the achievements and identifying the way forward for the ERA Priority 3 policy measures. Final Report, p.54-55.*

It is again worth noting differences in the responses offered by MSCA fellows hosted in widening countries, compared to those hosted in non-widening countries. Table 19 and

Table 20 show that researchers place less importance on training and career development in widening countries than in non-widening countries. However, the level of remuneration is almost as important for researchers going to widening countries compared to those going to non-widening countries. These findings are confirmed by the Romanian NCP, who stressed that researchers expect:

> *to be able to see a perspective within the organisation that employs [them]. And perspective means that you would get a good salary, you get a good perspective for your work and you have a good infrastructure that you would be able to use in order to attain your objectives.*

Encouragingly, evidence suggests that MSCA fellows' ambition to receive high-quality training and career development opportunities is very often satisfied. Evidence from the interim evaluation shows that more than three quarters of fellows are satisfied or very satisfied with the training and professional development opportunities they received during their MSCA fellowship. The training received effectively equips fellows with skills specific to the research profession and transferable skills. Similarly, around 60% of MSCA fellows reported that it would have taken them more time to attain their subsequent career stage without the MSCA fellowship, and 12% believed they would not have attained the subsequent career stage at all without it.[178] On this point, it is worth noting that a majority of the top beneficiaries of MSCA Individual Fellowships (53%) are also recipients of the HRS4R Award, which suggests that this EU policy instrument is helping to make MSCA host institutions more attractive to incoming researchers.[179]

A third factor driving the mobility of MSCA fellows relates to the ease or difficulty in securing entry visas, work and residence permits. This is a challenge faced by all individuals wishing to work, study or live in another country. A study by Czaika and de Haas on the impact of visa policies on mobility flows (of the population in general, not only for researchers) identified that visa restrictions reduce inbound mobility by 27% and outbound mobility by 17%.[180] Such barriers were reduced for researchers in the EU through the Third Country Researchers Directive (2005),[181] which introduced the "scientific visa" and its update in 2016 to include students.[182] Nonetheless, researchers still require advice and support relating to entry conditions and visas. Indeed, the most requested service on EURAXESS in 2019 was entry conditions and visas, representing over 30% of all requests, whilst services related to work permits accounted for another 9%.[183] As one respondent to the MSCA fellows survey noted: "As a non-European student, we might benefit from an office/advisor that helps us with visa processing, in cases such as traveling for conferences". Another reported considerable delays in receiving an invitation letter from the host organisation, which was necessary to obtain a visa.[184]

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[178] *European Commission (2017). FP7 ex post and H2020 interim evaluation of Marie Skłodowska-Curie actions*
[179] *CSES (2021) Taking stock, evaluating the achievements and identifying the way forward for the ERA Priority 3 policy measures. Final Report, p.54-55.*
[180] *Czaika, M., de Haas, H. (2014). The Effect of Visa Policies on International Migration Dynamics. 'University of Oxford, International Migration Institute Working Papers, Paper 89, DEMIG project paper 18'.*
[181] *European Council (2005) Procedure for admitting third-country nationals for the purposes of scientific research, European Council Directive 2005/71/EC (OJ L 289, 3.11.2005).*
[182] *European Council (2016), Conditions of entry and residence of third-country nationals for the purposes of research, studies, training, voluntary service, pupil exchange schemes or educational projects and au pairing, European Parliament and Council Directive EC 2016/801 (OJ L132/21 11.05.2016).*
[183] *CSES (2021) Taking stock, evaluating the achievements and identifying the way forward for the ERA Priority 3 policy measures. Final Report, p.54-55.*
[184] *Source: MSCA Follow-up Survey – two years after the end of the fellowship*

MSCA fellows benefit from the fact that in some countries, the MSCA National Contact Points (NCPs) also serve as the Bridgehead Organisation (BHO) that coordinates all EURAXESS services in a country. This enables alignment between EURAXESS services and mobility opportunities available under the MSCA. For example, research institutions interested in supporting researchers' applications to the MSCA Individual Fellowships calls are very often hosted on EURAXESS. As a result, researchers seeking hosting opportunities will be made aware of EURAXESS services and vice versa.

MSCA inflows are also influenced by the ease or difficulty in accessing social protection and health insurance. Evidence from the academic literature on mobility suggests that the modern, transnational model of mobility leads to individuals developing their own strategies to access social protection, for instance by capitalising on connections to formal and informal systems of more than one country.[185] However, where restrictions are imposed, this can serve as a disincentive to mobility. For example, since September 2020, Czechia denies access to the public health service for the children of employed non-nationals, unless the parent possesses a permanent residence permit.[186] These challenges can equally affect researchers, including those undertaking MSCA mobility periods. Reflecting this, 11% of requests on EURAXESS in 2019 related to health insurance, whilst another 1% related to unemployment support.[187] Support offered to researchers might consist of advice in career development in a foreign country, pensions, taxation system, residence permits, networking with local researchers or applying for EU or local research funding.[188]

The overall attractiveness of a destination is also a determinant of mobility, although it is less significant than factors related to research excellence. As shown in Table 1, favourable social and cultural conditions in the host country were reported as important by 81% of MSCA fellows (including 38% to a large extent), making it more influential than career opportunities or the level of remuneration. Public infrastructure in the host country was also mentioned by a majority of MSCA fellows, although it was the least important of all factors mentioned.

The determinants of mobility are broadly similar for MSCA fellows compared with researchers in general. Respondents to the MORE4 survey of researchers who had obtained their PhD in a country other than the one where they obtained their previous degree (i.e. the degree that gave them access to the PhD) were asked to list the factors that were important to their decision. Evidence from the survey suggests that, after the availability of a PhD position and funding, the most important determinants of mobility are related to research excellence. Again, the opportunity to work with leading scientists as well as quality of research facilities and equipment are particularly important. As with MSCA fellows, the quality of training is particularly important for researchers in general. Remuneration and cultural conditions in the destination country are important but not as important as training, career progression or factors related to research excellence.

Table 21. Factors influencing the choice of host country and institution: all researchers

Which of the following factors were important in your decision to obtain your PhD in another country?	Share of researchers (%)
Factors related to research funding	
Availability of a suitable PhD position	82 %

[185] *Faist, T., Bilecen, B., Barglowski, K., Sienkiewicz, J.J (2014). Transnational Social Protection: Migrants' Strategies and Patterns of Inequalities [in:] 'Population, Space and Place', Vol. 21/3, pp. 193-202.*
[186] *European Commission, European Website on Integration (2020). Czech Republic: New initiative demands access to public health insurance for the children of employed migrants (Unofficial translation).*
[187] *CSES (2021) Taking stock, evaluating the achievements and identifying the way forward for the ERA Priority 3 policy measures. Final Report, p.54-55.*
[188] *European Commission, EURAXESS (2022). EURAXESS, Information and Assistance.*

Which of the following factors were important in your decision to obtain your PhD in another country?	Share of researchers (%)
Availability of research funding	80 %
Factors related to research excellence	
Working with leading scientists	76 %
International networking	76 %
Access to research facilities and equipment	74 %
Research autonomy	67 %
Factors related to working conditions and career development opportunities	
Quality of training and education	76 %
Career progression	70 %
Remuneration (salary, other financial incentives, etc.)	64 %
Social security and other benefits	56 %
Balance between teaching and research time	51 %
Job security	49 %
Pension plan	43 %
Factors related to overall attractiveness of the destination	
Culture and/or language	59 %
Personal/family reasons	46 %

Source: MORE4 survey, n=322.

2.2 Mobility determinants linked to the characteristics of the individual researcher

A range of personal characteristics influence both the decision to be mobile and the choice of destination. In some cases, particular types of individuals face barriers to mobility. The barriers can be related to, for example, gender or family situation. In other cases, the evidence suggests that different personal characteristics (e.g. career stage) drive mobility in different ways.

The MSCA demonstrate success in removing barriers to the mobility of female researchers. As noted by the interim evaluation of MSCA under Horizon 2020, the share of female fellows within MSCA rose from 37% in the Seventh Framework Programme (FP7) to 40% under Horizon 2020. Moreover, this is considerably higher than the average percentage of female researchers in EU28, which increased only slightly from 33.4% in 2015 to 33.8% in 2018.[189] This increase reflects the steps taken to facilitate female participation. Gender balance is ensured in selection panels and training is provided on implicit gender biases in the evaluation and selection process. In addition, the MSCA include the gender dimension as a key award criterion in the evaluation process. Female participation is also encouraged through the provision of equal pay for all fellows, as well as work-life balance provisions, such as family allowances, maternity and parental leave and part-time work for family and personal reasons.

Overall, female researchers account for 44% of participants in ITN, IF and COFUND and for 38% in RISE.[190] The interim evaluation of MSCA under Horizon 2020 found that female researchers accounted for 40% of participants across all MSCA.[191] Comparisons with MORE4 data reveal that while the mobility participation of female early-stage researchers (ESRs) is similar both in the MSCA and among the other internationally mobile researchers (45% in the MSCA and 46% based on MORE4 data), the MSCA support the mobility of female experienced researchers (ERs) to a larger extent than is evident in general mobility patterns (42% in the MSCA and 37% based on MORE4 data).[192] Research shows that

[189] *European Commission, Directorate-General for Research and Innovation, She figures 2021: gender in research and innovation: statistics and indicators, Publications Office, 2021.*
[190] *CORDA database, n=31,862.*
[191] *European Commission (2017). FP7 ex post and H2020 interim evaluation of Marie Skłodowska-Curie actions*
[192] *CORDA database, n=31,862; MORE4 survey, n=2,388.*

international mobility of female researchers tends to decrease by age, but the MSCA clearly promote the mobility of female ERs.[193]

Gender has some influence on the destination of researchers within the MSCA. Within the largest two categories of host organisation, namely "Higher or secondary education establishments" (70% of participants) and "Research organisations" (21% of participants), the share of female researchers is in line with the share across ITN, IF and COFUND actions. Women are most under-represented in "Private for-profit entities" where they represented only 42% of participants.[194] Women are over-represented within "Other" types of organisations. The most gender-balanced category of host institutions are "Public bodies" where 52% of the fellows were female.[195] However, these two latter categories serve as hosts for only around 1% of all MSCA fellows. At the same time, it should be noted that female representation by sector is higher amongst MSCA fellows compared to researchers in general. Female researchers represent only 42.3% of all researchers within the higher education sector (compared to 44% in MSCA), 43.9% in the government sector (compared to 52% in MSCA) and 20.9% in the business enterprise sector (compared to 42% in MSCA).[196]

Table 22. Gender balance by type of host institution (IF, ITN, COFUND)

Type of host institution	Female	Male
All	44%	56%
Higher or secondary education establishments	44%	56%
Research organisations	44%	56%
Private for-profit entities	42%	58%
Public bodies	52%	48%
Other	64%	36%

Source: CORDA database.

Gender does not seem to have an influence on whether researchers are hosted in widening countries, non-widening countries or third countries. The analysis of the CORDA data for IF, ITN and COFUND indicates that the host countries' distribution in both gender groups is almost identical, with 86% of males and 87% of females hosted in non-widening countries, 6% of males and 5% of females in widening countries, and 8% of both males and females hosted in third countries.[197] This suggests that the gender barriers to participation are no greater in widening countries compared to other countries.

The relative influence of some mobility determinants depends on the career stage of the researcher. Whilst research excellence is the key driver for researchers at all career stages, remuneration and personal development (training and career opportunities) are more important for early-stage researchers (ESRs) than for experienced researchers (ERs). ESRs also consider how the MSCA mobility will contribute to their career development and level of income to a larger extent than ERs. In contrast, the "research quality" of the destination (leading scientists, research infrastructure) is more important for ERs than for ESRs.

These findings suggest that ERs, being more established in their careers (and having a certain level of income), are mostly motivated by research excellence. For example, as one

[193] *Ackers, L. (2004). Managing relationships in peripatetic careers: Scientific mobility in the European Union. Women's Studies International Forum 27(3):189–201.*
[194] *Excluding higher or secondary education establishments.*
[195] *Excluding research organisations and higher or secondary education establishments.*
[196] *European Commission, Directorate-General for Research and Innovation, She figures 2021: gender in research and innovation: statistics and indicators, Publications Office, 2021.*
[197] *CORDA database, the data on fellows for whom the host country has not been reported were filtered out.*

ER stated: "For me, as a full professor, the MSCA fellowship was more about exploring new directions in research than having a direct impact on my professional career".[198]

This reflects a broader mobility trend identified in the literature. Cai and Hall's study on Western researchers employed in China identified differences in motivations for the mobility according to the researchers' career stage. Compared to ERs, ESRs were more likely to mention the financial attractiveness of a job offer and the possibility of a future promotion as important motivations for accepting a position in China. ERs were more likely to mention "contribution", "promotion of the university" and "sharing of experiences" as important determinants.[199] This finding is also consistent with the literature on mobility in general. For example, de Haas et al. found that relative deprivation within a sending country is a bigger driver of international mobility than income differences between countries.[200] Again, this reinforces the finding that ESRs, who may be in lower-paid and more insecure research positions, see the MSCA as a good way to boost their immediate and long-term income.

An example of an early-stage researcher motivated by research excellence is a Polish researcher who used his MSCA grant to reintegrate into the Polish academic system. He stressed that the opportunity to work with a renowned scientist determined his choice of host institution:

> *The main factor was that the group leader to whom I applied is a well-known scientist. She's a great scientist so I thought - if you wanted to do this kind of fellowship you have to go to the best scientists so that's why… Also the institute is really well known, it has the highest category for science in Poland.*

Table 23. Factors influencing the choice of destination: early-stage researchers

Factor	To a large extent	To some extent	Not at all
Working with leading scientists	65%	26%	8%
Quality of training offered	70%	25%	5%
Research infrastructure in the host country / host institution	51%	35%	13%
Favourable social and cultural conditions in the host country	38%	42%	20%
Good career opportunities	40%	35%	25%
Level of remuneration	44%	43%	13%
Public infrastructure in the host country	29%	47%	25%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

Table 24. Factors influencing the choice of destination: experienced researchers

Factor	To a large extent	To some extent	Not at all
Working with leading scientists	75%	20%	4%
Quality of training offered	61%	30%	9%
Research infrastructure in the host country / host institution	65%	29%	6%
Favourable social and cultural conditions in the host country	38%	43%	18%
Good career opportunities	35%	39%	25%
Level of remuneration	23%	47%	31%
Public infrastructure in the host country	25%	48%	26%

[198] *MSCA Follow-up Survey – two years after the end of the fellowship.*
[199] *Cai, L., Hall, Ch. (2016). Motivations, Expectations, and Experiences of Expatriate Academic Staff on an International Branch Campus in China [in:] 'Journal of Studies in International Education', Vol. 20/3, pp. 207-222, p. 213.*
[200] *De Haas, H., et al. (2019) International migration: Trends, Determinants, and Policy Effects [in:] 'Population and Development Review', Vol. 45/4, pp. 885-922.*

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

The relative influence of mobility determinants also depends on the destination of researchers, as well as their career stage. As shown in the two tables below, the three most important factors influencing ERs' choice of destination are the same for those hosted in widening countries and those hosted in non-widening countries. However, for ERs hosted in non-widening countries, "Good career opportunities" are much more important than for those in widening countries.

For ESRs, it is notable that whilst all factors are less important in widening countries than in non-widening countries, the level of remuneration remains nearly as important. This reinforces the point that ESRs prioritise how an MSCA mobility period will enable them to earn income and undertake excellent research, regardless of their destination. Indeed, it could be suggested that ESRs would be more willing to accept a lower quality research environment (in a widening country) if it means that they can earn a certain level of income. This is true especially if the research job they are leaving is low-paid and temporary.

Table 25. Factors influencing the choice of destination: ERs and ESRs hosted in widening countries

Factor	ERs in widening EU Member States			ESRs in widening EU Member States		
	To a large extent	To some extent	Not at all	To a large extent	To some extent	Not at all
Working with leading scientists	61%	28%	11%	53%	31%	15%
Quality of training offered	53%	33%	14%	63%	26%	11%
Research infrastructure in the host country / host institution	47%	39%	13%	31%	41%	28%
Favourable social and cultural conditions in the host country	38%	43%	18%	29%	44%	27%
Good career opportunities	14%	45%	40%	19%	32%	49%
Level of remuneration	13%	45%	41%	40%	43%	17%
Public infrastructure in the host country	16%	47%	36%	15%	39%	46%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

Table 26. Factors influencing choice of destination: ERs and ESRs hosted in non-widening countries

Factor	ERs in non-widening EU Member States			ESRs in non-widening EU Member States		
	To a large extent	To some extent	Not at all	To a large extent	To some extent	Not at all
Working with leading scientists	77%	20%	4%	66%	26%	8%
Quality of training offered	61%	30%	8%	70%	25%	5%
Research infrastructure in the host country / host institution	64%	29%	6%	53%	35%	12%
Favourable social and cultural conditions in the host country	39%	43%	18%	39%	42%	19%
Good career opportunities	36%	40%	24%	42%	35%	23%
Level of remuneration	22%	47%	31%	45%	43%	12%
Public infrastructure in the host country	24%	49%	26%	30%	48%	23%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

The relative influence of some mobility determinants depends on the nationality of the researcher. The tables below show the factors influencing the destinations of researchers from widening and non-widening countries. Again, the three most important factors are generally related to research excellence ("Working with leading scientists", "Research infrastructure in the host country/host institution", as well as "Quality of training offered").

It is notable that ERs from widening countries are more motivated by remuneration than ERs from non-widening countries. This suggests that they see the MSCA as offering not only the opportunity to undertake excellent research, but also to increase their income compared to what they earn at their home institution. In contrast, the MSCA offer perhaps less potential for ERs from non-widening countries to increase their income, since their existing research position might already be reasonably remunerated.

Unlike ERs, all ESRs seem equally motivated by remuneration, regardless of their nationality. Amongst ESR nationals of widening countries, 89% reported the level of remuneration to be an important factor (of which 48% to a large extent), as did 87% of ESR nationals of non-widening countries (of which 48% to a large extent). Again, this suggests that an important driver for ESRs is to leave a research position that is low-paid and insecure for a position that is more attractive financially, regardless of where that position is.

Table 27. Factors influencing the choice of host country and institution: nationals of widening countries

Factor	ERs, widening countries nationals			ESRs, widening countries nationals		
	To a large extent	To some extent	Not at all	To a large extent	To some extent	Not at all
Working with leading scientists	74%	21%	5%	66%	28%	6%
Quality of training offered	62%	30%	8%	73%	24%	4%
Research infrastructure in the host country / host institution	58%	34%	8%	52%	34%	14%
Favourable social and cultural conditions in the host country	36%	44%	20%	38%	43%	19%
Good career opportunities	33%	39%	28%	42%	33%	25%
Level of remuneration	28%	50%	22%	48%	41%	11%
Public infrastructure in the host country	26%	45%	29%	23%	49%	28%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

Table 28. Factors influencing the choice of host country and institution: nationals of non-widening countries

Factor	ERs, non-widening countries nationals			ESRs, non-widening countries nationals		
	To a large extent	To some extent	Not at all	To a large extent	To some extent	Not at all
Working with leading scientists	75%	21%	4%	59%	30%	11%
Quality of training offered	58%	32%	9%	67%	26%	7%

Factor	ERs, non-widening countries nationals			ESRs, non-widening countries nationals		
	To a large extent	To some extent	Not at all	To a large extent	To some extent	Not at all
Research infrastructure in the host country / host institution	64%	29%	7%	44%	38%	17%
Favourable social and cultural conditions in the host country	39%	43%	18%	40%	41%	19%
Good career opportunities	35%	39%	26%	33%	37%	30%
Level of remuneration	20%	46%	34%	48%	39%	13%
Public infrastructure in the host country	21%	51%	29%	23%	48%	30%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=4,539.

The personal and family situation of the researcher also influences their choice of mobility destination. A previous European Commission study recognised the difficulties which researchers face, particularly female researchers, in reconciling work and family life; and highlighted the need for measures aimed at preventing research career breaks. The study also highlighted the importance of employers supporting flexible working arrangements, family friendly benefits, part-time working, teleworking and other similar strategies.[201] Such arrangements are encouraged by the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, with the aim of ensuring successful research performance.

In response to these challenges, the MSCA include measures to support researchers with family responsibilities, such as parental leave with the possibility to extend the fellowship, part-time working as a response to changing family circumstances, family allowance, as well as support in career restart after a career break.[202] Previous studies identified insufficient family allowance as the main source of dissatisfaction when it comes to the level of renumeration, but this has been addressed in the new MSCA unit costs in Horizon Europe.[203] These measures provided more favourable conditions for researchers with families to be mobile. Data show that 12% of female fellows and 15% of male fellows hosted in the EU under ITN, IF, and COFUND actions reported having a family.[204]

Despite the contribution of the MSCA to help fellows with families to be mobile, having a family can still play a role in mobility decisions and the choice of host country. A female participant in COFUND stated:

> *"[W]hilst moving to another country has been largely a positive experience, the requirement to do so can be prohibitive to those with family commitments and/or who are planning to start a family (especially women). The one year given by the COFUND fellowships is also an issue for women in their thirties not yet in a permanent academic position. Two or three years would be a much more positive experience and the additional job security it would provide would help to remedy the issue of women who wish to start a family leaving academia. A one year COFUND fellowship, in my personal experience, though professionally useful has been personally difficult to navigate."*

[201] *European Commission (2016) Research Careers in Europe, Study Final Report, p. 130.*
[202] *European Commission (2019) Driving Innovation, Supporting Researchers' Mobility and Cultivating Excellence in Doctoral and Postdoctoral Training: Facts & Figures.*
[203] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Pupinis, M., Brožaitis, H., Navikas, V. et al. (2020). Review of Marie Skłodowska-Curie actions unit costs in preparation for Horizon Europe: final report, Publications Office.*
[204] *CORDA database. Data on fellows for whom the information whether they reported having a family is missing have been filtered out.*

The importance of the family situation as a mobility determinant was further highlighted by a Finnish interviewee, who undertook a mobility period in Estonia:

> *[H]aving a family I had given up the idea that I could go abroad in the coming years, because it's just so difficult. We were in 2016 in the United States but it would have been difficult to something like that again. Estonia was close enough that I could make this work also regarding our family's situation.*

There is also ad hoc evidence that some destinations are considered safer than others for LGBT fellows. For example, a Spanish researcher expressed concerns about moving to Central and Eastern Europe due to a perceived threat to the rights of LGBT persons living there:

> *"I'm LGBT so I wouldn't be happy to go to Poland these days for instance. I have a lot of collaborators from Eastern European countries and we are very respectful to others, so I never have any problem, but to live in one of these countries for a couple of years or even thinking of moving there. I would think twice because even though the EU has some LGBT equality and rights, and so on, and there are a lot of there's a lot of effort from the European Union on these kinds of things, I know that I can be prosecuted in other countries."*

There is some evidence that an existing connection to the host country can be a determinant of mobility, albeit less important than research excellence or working conditions. MSCA fellows are more likely to choose a particular destination if they have a personal or professional connection to it. This is not unique to the MSCA, but common to mobile researchers in general. For example, a Joint Research Centre (JRC) study emphasises that "the presence of an international network of relatives and friends is decisive in fostering the intentions to move to another country".[205] This conclusion was echoed in a study by Esipova et al. According to the study, being part of a transnational social network that connects, for example, family members living in different countries increases the likelihood that individuals will migrate, regardless of the development level of their country of residence.[206] Foreign researchers benefit from strong connections with both their host countries and the sending countries. It is known that the scientific diaspora nurtures the development of research and innovation in the sending country and facilitates its networking with foreign research communities, as researchers residing abroad act as "nodes" in the global academic social network.

3 Conclusions

The evidence presented in this case study highlights several conclusions and lessons learned.

First, the most important determinant of mobility within the MSCA is the opportunity to undertake excellent research. This is consistently highlighted as the most important factor mentioned by researchers regardless of their career stage, nationality or destination. In particular, the opportunity to work with leading scientists and to have access to high-quality research infrastructure is a key driver of mobility. In this sense, the MSCA are achieving their central objective. However, this creates a tendency for researchers to be particularly attracted to those countries with the strongest research and innovation systems (as shown in Section 6.3 of the main report), thus potentially leading to further imbalances in mobility flows. To that end, it remains crucial to raise the quality of the research environment and infrastructure in widening countries and others defined as

[205] *Migali, S. and Scipioni, M. (2018). A global analysis of intentions to migrate. European Commission.*
[206] *Esipova, N., Ray, J., Srinivasan, R. (2011). The World's Potential Migrants: Who They Are, Where They Want to Go, and Why It Matters, White Paper, p. 17.*

emerging or moderate innovators in the European Innovation Scoreboard, including through actions set out in National Action Plans under the European Research Area.

Second, the working conditions in which researchers operate in any destination are another key determinant of mobility. While research excellence is the main driver, MSCA fellows also emphasise working conditions, career development opportunities, and the level of remuneration as criteria for their mobility. These factors are particularly important for ESRs who, being less established in their careers and likely seeking to move to a more secure and higher paid research positions, see the MSCA as an effective way to develop their careers and increase their income. Some ESRs may also compromise over the quality of the research environment if a research position offers better remuneration and career development prospects than the one they are leaving. In this context, efforts to improve participation in the MSCA cannot be seen in isolation from the wider efforts to improve working conditions and career development opportunities for researchers, including through adherence to the European Charter and Code for Researchers and participation in the HRS4R process.

Third, the overall attractiveness of destinations is not without influence on mobility. This manifests itself in different ways. Difficulties with obtaining entry visas, work and residence permits and accessing social insurance and healthcare constitute barriers to mobility, as evidenced by the high number of EURAXESS requests related to these issues.[207] Given that MSCA fellows are typically amongst the highest calibre of researchers, many will enjoy a degree of choice over the destination. Providing that research excellence is assured, they will then tend to choose destinations with favourable social and cultural conditions (including for minorities such as LGBT) as well as good public infrastructure. They may also consider connections with their country of origin, for example, through the scientific diaspora. In this context, the proposed evolution of EURAXESS into the ERA Talent Platform, offering a wider range of information, services and networking for mobile researchers, can only be of benefit to MSCA fellows.

Fourth, whilst there remain some barriers, the MSCA have been successful in promoting the mobility of female researchers. Indeed, the evidence suggests that the gender balance amongst MSCA fellows under Horizon 2020 is better than it was during the previous FP7 programme and also better than the gender balance amongst researchers in general. However, further research is needed to identify the reasons for continuing imbalances in participation between females and males. For example, it is not known whether the gender imbalance in researchers hosted in higher or secondary education establishments and research organisations (together representing 91% of hosted positions) is caused by factors within those types of hosts, or whether barriers that are inherent to the MSCA merely manifest themselves within such organisations.

Last, a number of personal factors serve as determinants of mobility, although in different ways. ERs are mostly motivated by research excellence, whilst ESRs are motivated both by research excellence and career development and remuneration. However, these trends play out slightly differently depending on nationality and destination. ERs with nationalities of widening countries see more opportunities to increase their level of remuneration through the MSCA than ERs with nationalities of non-widening countries (who will more often be moving between countries with comparable levels of pay). Similarly, for ERs hosted in non-widening countries, "Good career opportunities" are much more important than for those in widening countries. Taken together, these points suggest that in destinations where salary levels or career development opportunities are seen as limited,

[207] For further details on how EURAXESS can contribute to removing barriers, see: Study on mobility flows of researchers in the context of the MSCA. Annex 3. Case study 3: Career paths of researchers who spend their mobility period in business.

attracting MSCA fellows will be challenging. To that end, efforts to promote the return mobility of researchers such as offering attractive working conditions, enhanced salaries and employment guarantees can be beneficial.

Annex 3. Case study 3: Career paths of researchers who spend their mobility period in business

1 Introduction

The aim of this case study is to examine the subsequent career paths of MSCA fellows who spend their mobility period in an enterprise. It restates the rationale for mobility periods in business in terms of providing career opportunities for researchers and preparing them to address societal challenges. It then offers an analysis of the patterns of mobility periods in enterprises, the immediate destinations of fellows hosted in enterprises and their career situation two years after completing their fellowship. Having established the career paths of MSCA fellows hosted in enterprises, the case study then explores the key factors that determine those career paths. By looking at the subsequent career paths, the case study thus complements Section 3.2 of the main report, which describes trends, strengths and weaknesses in intersectoral mobility in the MSCA. The findings are based on the analysis of CORDA data, the results of the MSCA fellows' surveys, as well as interviews of stakeholders and fellows.

2 Research and key issues

2.1 The rationale for mobility periods in business

The objective of the MSCA is not only to provide excellent and innovative research training, but also attractive career and knowledge-exchange opportunities for researchers and prepare them to tackle current and future societal challenges.[208] Whilst this can be done through placements in academia, mobility periods in enterprises can make their own unique contribution to this objective.

First, mobility periods in enterprises can help prepare researchers to address societal challenges. As noted in a recent European Commission study, research careers increasingly need to be interoperable between academia and non-academia, as many of the current and future challenges faced by society require solutions that draw on and combine knowledge from academic disciplines with expertise from non-academic sectors.[209] Researchers thus need to engage with and work within these sectors to address such challenges. To do this, researchers will need to develop a mix of specialist and transversal competencies, which typically requires a degree of intersectoral and interdisciplinary mobility.

Second, mobility periods in enterprises can help researchers' career development. The same study goes on to note that many researchers cannot pursue a career in academia due to a mismatch between the number of postdoctoral researchers and the availability of senior academic positions: researchers need to have the skills and employability to enter other sectors. Linked to this, short-term funding for research positions at R1 (First Stage Researcher), R2 (Recognised Researcher) and R3 (Established Researcher) levels, in general, requires researchers to change roles within academia or integrate into other sectors; sectors such as manufacturing very often offer more permanent positions for researchers than academia does.[210]

[208] *Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006 Text with EEA relevance*
[209] *European Commission (2021), Taking stock, evaluating the achievements and identifying the way forward for the ERA priority 3 policy measures.*
[210] *For definitions of researcher levels, see: https://euraxess.ec.europa.eu/europe/career-development/training-researchers/research-profiles-descriptors*

2.2 Patterns of mobility periods in business

The data on participation in the MSCA offer some insights into the scale and nature of mobility periods in business, as well as the profile of MSCA fellows.

Only a small minority of MSCA mobility periods are hosted in businesses. The interim evaluation of Horizon 2020 identified a significant increase in business participation in Horizon 2020 compared to FP7. This was helped, in part, by a European Commission communication campaign addressed at businesses.[211] However, as shown in the main report (Section 3.2.1), only 8.7% of MSCA fellows were hosted in private for-profit entities in the IF, ITN and COFUND actions under Horizon 2020. The proportion was significantly higher in RISE (24.2%), as parts of this action have intersectoral mobility as their main requirement.

A previous study for the European Commission suggested that one barrier to intersectoral mobility is the lack of information amongst businesses regarding certain aspects of the MSCA. Businesses are unfamiliar with the possibility to participate in the MSCA as partner organisations and often unaware of changes in programme design (especially from one framework programme to the next).[212] The study also pointed to the lack of a mechanism for informing newly established companies about the benefits of the MSCA, as well as a lack of awareness about EURAXESS services. Perhaps reflecting this, one MSCA National Contact Point (NCP) perceived that companies interested in participating in MSCA collaborations either had staff members with experience in conducting research, or were start-ups created in academic establishments.

MSCA fellows hosted in the private sector tend to be more experienced compared to the MSCA average. This is especially true for COFUND where 75% of fellows hosted in the industry were experienced researchers (the overall percentage of experienced researchers in COFUND was 59%). However, there were only 18 fellows going to private for-profit entities under the COFUND action in total. Therefore, the figures are only indicative.

Female representation in business in the MSCA is significantly higher than the level of female representation in the business sector in general. The table below shows that female representation in enterprises was 42% across the MSCA. Remarkably, this is much higher than the level of female representation in the business enterprise sector in general, which was only 21.2% in EU28 countries in 2018.[213] This reflects the successful steps taken under the MSCA to facilitate female participation, such as gender balance in selection panels, as well as the provision of equal pay for all fellows, family allowances, maternity and parental leave, and part-time work for family and personal reasons.[214]

The table also shows that female participation in business is slightly lower than female participation in other types of host institutions. However, with the exception of COFUND, these differences are marginal. As noted above, the number of COFUND fellows hosted in private for-profit entities was low (18 in total). Therefore, the gender balance shares for COFUND fellows going to private for-profit entities are only indicative.

[211] *European Commission (2017), FP7 ex post and H2020 interim evaluation of Marie Skłodowska-Curie actions.*
[212] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020): final report, Publications Office, 2017, https://data.europa.eu/doi/10.2766/46752.*
[213] *European Commission, Directorate-General for Research and Innovation (2021), She figures 2021: gender in research and innovation: statistics and indicators.*
[214] *For details on measures to support balanced participation in the MSCA, see: Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows.*

Table 29. Gender balance of MSCA fellows by type of host institution

Action	Private for-profit entities (Female – Male)	All other types (Female – Male)
IF	44% - 56%	45% - 55%
ITN	42% - 58%	44% - 56%
COFUND	33% - 67%	43% - 57%
ALL MSCA	42% - 58%	43% - 57%

Source: CORDA database.

Information Science and Engineering fellows account for the majority of fellows hosted in business. 36% of all fellows hosted in business were in Information Science and Engineering (reflecting the fact that the scientific panel is the most popular as measured in absolute numbers of fellows). 22% of fellows in Information Science and Engineering had a private for-profit entity as their main host institution. Fellows from Social Sciences and Humanities and Mathematics were the least likely to be hosted in business.

Table 30. MSCA fellows hosted in businesses by scientific panel[215]

Scientific panel	Share of fellows (%) hosted in business out of all fellows by scientific panel	Share of fellows (%) by scientific panel out of all fellows hosted in business
ENG	22%	36%
CHE	18%	13%
LIF	17%	24%
ENV	16%	13%
ECO	11%	2%
PHY	8%	5%
SOC	6%	6%
MAT	5%	1%

Source: CORDA database.

The share of MSCA fellows hosted in enterprises is broadly similar between non-widening countries, widening countries and associated countries. Of all the fellows hosted in non-widening countries, 9% were in enterprises, compared with 8% in widening countries and 7% in associated countries. However, there is considerable variation within each group of countries: the share within non-widening countries varied from 4% in the UK to 15% in Sweden and in widening countries from 0% in Malta and 2% in Poland to 23% in Hungary.

2.3 Immediate destinations post-MSCA

The results of the survey at the end of the fellowship offer some insights into the immediate career steps that MSCA fellows take following a period of mobility in an enterprise.

The majority of MSCA fellows hosted in business enter a research job upon completion of their mobility period. Of the fellows hosted in enterprises, 56% entered a research job, which was slightly more than for fellows hosted in other types of organisations (51%). Very few fellows entered non-research jobs, regardless of whether their mobility period was in a large enterprise (4%), SME (5%) or other type of organisation (4%). Male fellows hosted in enterprises were slightly more likely to enter employment (62%) than were female fellows (58%).[216]

MSCA fellows hosted in private enterprises are slightly more likely than other MSCA fellows to enter employment within three months of completing their

[215] *The scientific panels are: MAT (Mathematics), ECO (Economic Sciences), PHY (Physics), SOC (Social Sciences and Humanities), ENG (Information Science and Engineering), LIF (Life Sciences), CHE (Chemistry) and ENV (Environmental and Geosciences).*

[216] *The figures include fellows who did not find employment immediately: e.g. 56% of fellows hosted in enterprises entered a research job, 4% a non-research job, 19% continued in education and/or training and 15% were unemployed. 6% responded "Other".*

mobility period. As shown in the table below, 60-61% of those who spent their mobility period in an enterprise had entered employment within three months of completing their mobility period, whereas only 55% of those in all other types of host institutions had done so. Conversely, those in institutions other than enterprises were more likely to continue in education and training than those in enterprises. There was little difference in the share of fellows (by type of host institution) who became unemployed.

Table 31. Post-fellowship employment status of MSCA fellows by type of host institution

Host	Employment	Education / training	Unemployed	Other (e.g. maternity leave)
Large enterprise	60%	19%	15%	6%
SME	61%	12%	15%	12%
Other	55%	22%	14%	9%
TOTAL	55%	21%	14%	9%

Source: End of fellowship survey.

The majority of MSCA fellows who enter employment are taken on by an organisation involved in the project. This was the case for 66% of those whose mobility period was in a large enterprise and 59% in an SME. Compared to fellows hosted in other types of organisations, they are more likely both to be employed and, if employed, to be employed by an organisation within the project. Perhaps reflecting this, 69% of those who were employed had remained in the same country in which they had undertaken their mobility period.

Table 32. Employment of MSCA fellows by organisations involved in projects

Host	Employer involved in project	Employer not involved in project	Not employed
Large enterprise	40%	20%	40%
SME	36%	25%	39%
Other	27%	28%	45%
TOTAL	28%	27%	45%

Source: End of fellowship survey.

Table 33. Employment of MSCA fellows by organisations involved in projects

Host	Employer involved in project	Employer not involved in project
Large enterprise	66%	33%
SME	59%	41%
Other	49%	50%
TOTAL	50%	49%

Source: End of fellowship survey.

Reflecting the above findings, **the majority of MSCA fellows hosted by enterprises go on to pursue a career in an enterprise of similar size.** In particular, those hosted in large enterprises are especially likely to continue within a large enterprise (75%). As shown in the table below, those hosted in SMEs are slightly more likely to enter academia (25%) than those hosted in large enterprises (20%). MSCA fellows hosted in enterprises are much less likely than those hosted in other types of organisations to enter employment in academia. Like fellows in general, those hosted in enterprises tend not to enter employment in the private non-profit or public/government sectors. This tendency to remain within enterprises is supported by evidence from the survey of MSCA host organisations: only two out of the nineteen businesses responding to the survey reported that their MSCA fellows switched sectors after their fellowship.[217]

[217] *Survey of MSCA organisations (2022).*

Table 34. Immediate destination of employed MSCA fellows by type of employer

Host type	Type of employer						
	Large enterprise	SME	Private non-profit	Academia	Public/ government	Other	Not known
Large enterprise	75%	2%	0%	20%	2%	2%	0%
SME	8%	61%	2%	25%	2%	2%	0%
Other	8%	4%	2%	79%	2%	3%	1%
TOTAL	11%	7%	2%	73%	2%	3%	1%

Source: End of fellowship survey.

The majority of MSCA fellows hosted by enterprises (52%) choose to remain in their host country. This decision is driven in part by the possibility to remain with the host organisation (22% of all fellows). However, the majority of those staying in the host country were not planning to stay with the host organisation or were undecided. This suggests that MSCA fellowships in businesses can be a driver of relocations to host countries, even where the host organisation does not take on the fellow. Moreover, MSCA fellowships in businesses can be a driver of relocation in general, with only 13% of fellows planning to return to their countries of origin. At the same time, a significant number of MSCA fellows wished to remain mobile, with 35% wanting to relocate to another country within or outside Europe. This is reinforced by evidence from the survey of MSCA host organisations; of the 19 businesses responding, a significant number (6) reported that their MSCA fellows planned to relocate to another country after their fellowship.[218]

Table 35. Relocation decision of MSCA fellows hosted in enterprises

Relocation decision after a fellowship in an enterprise	Share of fellows (%)
Stay in the host country	52%
Move back to my country of origin	13%
Relocate to another country in Europe	30%
Relocate to a third country outside Europe	5%
TOTAL	100%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=186.

Table 36. Relocation decision of MSCA fellows hosted in enterprises

Do you plan on staying in your MSCA host organisation? (NB: fellowship in enterprises)	Share of fellows (%)
In host country AND in host organisation	22%
In host country NOT in host organisation	4%
In host country BUT do not know where	26%
Not staying in host country	48%
TOTAL	100%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=186.

2.4 Subsequent career paths post-MSCA mobility

The results of the follow-up survey two years after the end of the MSCA fellowship offer additional insights into subsequent career paths of fellows following a period of mobility in a business.

The majority of MSCA fellows hosted in businesses move onto careers in research and innovation. As shown in the table below, 91% of those employed after two years

[218] *Ibid.*

report that their current work is related to research and innovation. This is very similar to the percentage of those whose mobility period had been in another sector and suggests that mobility periods in business are just as beneficial as mobility periods in other sectors for developing research talent.

Table 37. MSCA fellows employed in research and innovation roles after two years

Current employment or self-employment is related to research and innovation	MSCA period hosted in an enterprise (n=473)	MSCA period hosted in other sectors (n=463)
Yes	91%	89%
No	9%	11%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

After two years, there is little difference in the employment status of MSCA fellows hosted in businesses compared to those hosted in other sectors. As shown in the table, the majority of all fellows are employed or self-employed after two years, with most of the rest in education or training.

Table 38. Sector of MSCA fellows employed after two years

Employment status after two years	MSCA period hosted in an enterprise (n=605)	MSCA period hosted in other sectors (n=612)
Employed	79%	77%
Self-employed	2%	2%
Education/training	16%	16%
Unemployed	2%	4%
Inactive	1%	1%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

Of those who are employed after two years, the majority of MSCA fellows hosted in businesses have (re)entered academia. As shown by the table below, more than two-thirds of fellows hosted in business, if employed, were employed in academia. This shows a considerable shift between three months after the end of the mobility period (when those hosted in businesses were most likely to be employed in businesses; see Table 34 above) and two years after the end of the mobility period (when employment is more likely to be in academia).

This shift is perhaps surprising, given the overall shortage of academic positions in relation to the number of doctorates awarded each year, and the consequent move of doctoral researchers to other sectors. The reasons for this shift cannot be deduced from the data alone; however, the interviews suggest two possible explanations. First, the high competition for MSCA fellowships means that MSCA fellows are of the highest calibre. Many of those who wish to return to academia can often do so. Second, MSCA fellows (who have significant international mobility experience, see e.g. Section 6.1.1 in the main report) are likely to be more willing than less mobile researchers to move again to take up a new academic position.[219]

However, MSCA fellows hosted in businesses are less likely to (re)enter academia than those hosted in other sectors. As shown in the table below, 84% of MSCA fellows hosted in other sectors, if employed, were employed in academia after two years, compared to only 68% of those hosted in enterprises. In the future, it might be useful to further explore whether MSCA fellows hosted in business are inspired by their mobility

[219] *Researchers who have been mobile internationally are more likely to be mobile again in the future. See e.g.: Weert, E. (2013). Support for Continued Data Collection and Analysis Concerning Mobility Patterns and Career Paths of Researchers. DG RTD, Brussels.*

period to choose to pursue a career outside academia, or whether they wish to return to academia but face barriers doing so, for example, if potential academic employers do not sufficiently value their intersectoral mobility period.

Table 39. Sector of MSCA fellows employed after two years

Employer after two years	MSCA period hosted in an enterprise (n=461)	MSCA period hosted in other sectors (n=455)
Academia	68%	84%
Enterprise or other private for profit	19%	7%
Public administration/government	6%	2%
NGO/private non-profit	4%	2%
International organisation	1%	3%
Other	1%	2%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

MSCA fellows hosted in businesses enjoy slightly more employment security compared to those hosted in other sectors. As shown in Table 37, they are slightly more likely to be employed and slightly less likely to be unemployed, compared to MSCA fellows hosted in other sectors. Moreover, as shown in the table below, those who are in employment are slightly more likely to either have permanent contracts or contracts of at least three years' duration. This suggests that mobility periods in business are equally, if not more, beneficial to research careers development.

Table 40. Duration of employment contracts for those employed after two years

Duration of current employment contract	MSCA period hosted in an enterprise (n=464)	MSCA period hosted in other sectors (n=464)
Permanent/indefinite	58%	53%
>3 years	12%	11%
1-3 years	18%	23%
<1 year	13%	13%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

MSCA fellows hosted in businesses enjoy comparable levels of professional satisfaction compared to those hosted in other sectors. As shown in the table below, 93% of fellows hosted in businesses were satisfied or very satisfied with their professional situation after two years, compared to 90% of those hosted in other sectors. Taken together with the earlier findings, this rules out the possibility that those hosted in businesses are forced to take employment that does not match their aspirations.

Table 41. MSCA fellows employed in research and innovation roles after two years

Satisfaction with current professional situation	MSCA period hosted in an enterprise (n=464)	MSCA period hosted in other sectors (n=464)
Very satisfied	35%	39%
Satisfied	58%	51%
Dissatisfied	5%	8%
Very dissatisfied	2%	2%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

MSCA fellows hosted in enterprises are more likely than other MSCA fellows to start their own business. As shown in the table below, more than one quarter of MSCA fellows hosted in enterprises had either started a new business (8%) within two years or intended to do so (18%). In contrast, only 17% of other MSCA fellows had started a new

business or intended to do so. Amongst the respondents to the follow-up survey who had started a business, 67% had been hosted in an enterprise. However, further research would be needed to determine whether more entrepreneurial-minded fellows choose to be hosted in an enterprise or whether those hosted in enterprises become more entrepreneurial.

Table 42. MSCA fellows starting a business after two years

Have you started a business since your MSCA fellowship?	MSCA period hosted in an enterprise (n=529)	MSCA period hosted in other sectors (n=552)
Yes, related to my MSCA research project	2%	1%
Yes, but not related to my MSCA research	6%	3%
Not yet but I intend to	18%	13%
No	74%	83%

Source: MSCA Follow-up Questionnaire – two years after the end of the fellowship

2.5 Determinants of career paths

Having established the career paths of MSCA fellows hosted in enterprises, below we explore the key factors that determine those career paths. Evidence from previous research suggests three main positive influences on the career development for MSCA fellows who are hosted in businesses. These factors tend to steer fellows towards continuing their career in an enterprise, often at the host organisation. At the same time, the possibility to pursue a researcher career in business is dependent on an enterprise perceiving sufficient commercial benefit. It may also be the case that some fellows pursue a career in business out of necessity rather than choice, because of the difficulty in securing a suitable position in academia. Despite the fact that previous findings indicate that more than two-thirds of fellows hosted in business were employed in academia two years after the end of the fellowship, this possibility is also explored below.

First, MSCA fellows hosted in businesses gain considerable skills, which are of benefit to their employer. The benefits for MSCA fellows in general (not only those hosted in businesses) are well-documented. The FP7 ex-post and H2020 interim evaluation found that MSCA's training and professional development dimension is strong and that most fellows were very satisfied with the training and professional development opportunities they received.[220] The same evaluation also found that many go on to collaborate effectively between academia and business. For example, the evaluation found that ITN fellows' share of academic-corporate cross-sector publications (4.3%) is significantly higher than the world average (2.6%).

A previous study for the European Commission found that MSCA fellows hosted in businesses acquired new knowledge and developed industry-relevant professional and research skills. The acquisition of transferable skills is particularly relevant. Moreover, the impact on skills was greater than for researchers not exposed to a business environment.[221]

Second, host businesses are stimulated to offer better support to researchers in their career development. Amongst the business beneficiaries that responded to a survey within the same study[222]:

- 69% improved the career development offered to researchers;

[220] *European Commission (2017), FP7 ex post and H2020 interim evaluation of Marie Skłodowska-Curie actions.*
[221] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020): final report, Publications Office, 2017, https://data.europa.eu/doi/10.2766/121877.*
[222] *Ibid.*

- 74% improved the quality of training for researchers;
- 66% improved career advice for researchers;
- 60% adopted more open, transparent and merit-based procedures for recruitment,
- 48% adopted procedures and practices recommended in the European Charter for Researchers and Code of Conduct for Researchers.

At the same time, when MSCA fellows do not feel well supported or fully integrated into the host, the same aspects can serve as a disincentive to enter employment with the same enterprise following the period of mobility. For example, one MSCA fellow reported that he was benefiting from being able to use the equipment of the host enterprise but did not feel integrated into the host company, as he was the only person involved in the research project. Although other company staff were supportive at a personal level, they were not particularly interested or involved in the research. As a result, the fellow did not intend to seek a permanent position with the enterprise after the completion of his mobility period.

Third, host businesses are able to expand the number and quality of research positions available, which the MSCA fellows then fill. Evidence from the same study[223] shows that 47% of business beneficiaries reported creating at least one full-time equivalent new post as a result of the project, whilst around 14% created two more posts. On average, SMEs created 0.94 new jobs, whilst large enterprises created 0.48 jobs. Of the new jobs created by businesses, 77% were in SMEs. The earlier finding that a large percentage of fellows remain with the host institution suggests that businesses will very often create an entirely new post to retain the MSCA fellow because of the business benefits that they gain. For example, one interviewee reported that the host business (specialising in image analysis and data science) had taken him on at the end of the fellowship and that he was now supporting a new MSCA fellow who had recently started a mobility period. Moreover, the survey of MSCA host organisations found that when it comes to the obstacles to retaining MSCA fellows, only six out of nineteen businesses reported a lack of employment opportunities within the company as a barrier. None reported a lack of planning or support by the company as an obstacle.[224]

As highlighted by the study[225], business benefits include an improvement in global reputation, further internationalisation and international networking opportunities for the organisation, the acquisition of new contacts, and strengthened collaborations with other businesses. Moreover, many beneficiary businesses report that taking part in the MSCA helps them to establish new research infrastructures. A key enabling factor here is the opportunity for the beneficiary company to shape the professional profile of research fellows according to the company's interests and needs. As a result, the study found that the recruitment rates of fellows by their host companies was 30-75% in some ITN projects and up to 100% in some Industry–Academia Partnerships and Pathways (IAPP) projects under FP7.

At the same time**, the extent to which MSCA fellows can follow career paths within businesses depends on the extent to which they can generate commercial benefits for their employers**. For example, one fellow highlighted the ease of transitioning from a PhD contract to an employment contract with the same company. In this case, the company retained the fellow to continue working on a new open software product developed during the MSCA mobility period that offered commercial benefits to the business. Similarly, another fellow hosted in a laser manufacturer (a spin-off from a

[223] *European Commission, Directorate-General for Education, Youth, Sport and Culture, Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020): final report, Publications Office, 2017, https://data.europa.eu/doi/10.2766/121877.*
[224] *Survey of MSCA organisations (2022).*
[225] *Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (2017).*

university research centre) reported that the company's decision to offer him a job beyond the period of MSCA depended on his potential to generate commercial benefits through new product development and intellectual property.

The key factor in the above examples was the extent to which businesses saw themselves as being dependent on academic expertise to make technological breakthroughs with a potential for commercial exploitation. It is also essential that enterprises see MSCA fellows as contributing to the business rather than merely using company facilities. One potential limiting factor relates to ownership and the protection of intellectual property. One fellow reported that companies need reassurance that their intellectual property will not be at risk by hosting an MSCA fellow who may return to academia. There is a need for more clarity on who will have ownership of any intellectual property developed during the mobility period.

The contribution of fellows to the commercial success of an enterprise that employs them after the completion of their MSCA mobility period can be strengthened by networking with other researchers. Such networking has been explicitly promoted by the Marie Curie Alumni Association (MCAA) through its "Bridging Science and Business" working group (BSB WG).[226] While the BSB WG is open to all MSCA alumni, it is particularly relevant to fellows hosted in businesses. Amongst other things, the BSB WG aims to create a community for entrepreneurs as a platform to help MCAA members start their own businesses. The BSB WG arranges conferences bringing together research and business and provides training opportunities for MCAA members. Other activities include webinars on different topics with speakers from both the MCAA and beyond, as well as the organisation of sessions during MCAA General Assembly meetings.

MSCA fellows may also pursue careers in business because of the difficulties in securing a position in academia after their period of mobility. As noted earlier, many researchers cannot pursue a career in academia due to a mismatch between the supply of postdoctoral researchers and the availability of senior academic positions. This affects researchers in general but can particularly affect MSCA fellows hosted in an enterprise if their experience is not recognised when applying for an academic post. In some cases, the criteria for recruiting researchers into academic positions and evaluating their careers can indeed overlook experience gained in other sectors. For example, a survey carried out by the European Universities Association found that the main criteria for researcher assessment in over 75% of respondent universities were research publications and securing external research funding.[227] Moreover, as one stakeholder interviewed for this study mentioned, there is also a risk that academic employers focus on hiring younger researchers with fewer years of postdoctoral experience and who are still eligible to apply for European Research Council (ERC) Starting Grants.[228] Again, in this context, the MSCA fellow who has been hosted in a business may be overlooked when academic posts are being filled.

2.6 EU tools supporting research careers in business

A number of EU policy tools play an important role in supporting the career development of researchers in business. Although aimed at researchers in general, they are of relevance to the career development of MSCA fellows hosted in businesses.

2.6.1 EURAXESS

The EURAXESS Services network of over 630 centres provides free personalised assistance to researchers, with a special focus on international mobility and career development.

[226] *https://www.mariecuriealumni.eu/groups/bridging-science-and-business*
[227] *EUA (2019), Research Assessment in the Transition to Open Science.*
[228] *https://erc.europa.eu/funding/starting-grants*

Researchers can access a broad range of practical information for internationally mobile researchers and their families. In addition to the EURAXESS Services network, there are complementary national web portals with country-specific information for researchers (currently 42 national portals), as well as a central EU portal.[229] The EU portal offers a database of jobs, funding and hosting opportunities as well as a range of online tools for researchers and employers. Researchers can access a wide range of services, including information on entry conditions and visas, health insurance, work permits, taxation, salaries, research funding, job opportunities, departure, family-related issues, recognition of diplomas, pensions, IPR, and unemployment benefits. Although data do not exist on the extent to which MSCA fellows make use of EURAXESS, the network is promoted extensively through EU programmes, and MSCA hosts and fellows are often registered as users.

A recent study highlighted how EURAXESS helps prepare academic researchers for mobility periods in business, and helps researchers develop their careers after such a mobility period. For instance, EU funding via the TOP IV project supported the EURAXESS network in acquiring the relevant know-how and tools for developing new services with a view to improving synergies between academia and industry. More specifically, this work package developed an "academia-industry mentoring toolkit", training EURAXESS members to be able to offer mentoring programmes for other researchers interested in moving to positions in industry. In addition, a manual on scientific entrepreneurship was also developed, outlining definitions of the main technical terms, as well as relevant information on accelerators, incubators, investment funds, and other entrepreneurship opportunities.[230]

The European Commission stated its intention for EURAXESS to evolve into a more comprehensive ERA Talent Platform, which will go beyond the mere provision of information and support to mobile researchers, towards becoming a hub for talent development and career evaluation services for researchers.

2.6.2 European Charter for Researchers and Code of Conduct for Researchers

The Charter and Code are a set of principles published by the European Commission in 2005 and designed to set high standards for the recruitment and working conditions of researchers.[231] They describe roles and responsibilities for researchers, the institutions employing or hosting them, and the organisations funding them. Adherence to the Charter and Code is supported by the Human Resources Strategy for Researchers (HRS4R). Institutions that make progress in aligning their human resources policies to the 40 principles of the Charter and Code through a customised action plan/human resources strategy receive recognition from the European Commission in the form of the "HR Excellence in Research Award".[232]

A recent study found that a majority of the top beneficiaries of IF and ITN are also recipients of the HR Excellence in Research Award. However, the study also found that relatively few non-academic employers have endorsed the Charter and Code or engaged with the HRS4R (particularly, few industrial employers). This suggests a lack of relevance and that the Charter and Code and HRS4R tend to primarily address challenges in the academic sector.[233]

[229] *https://euraxess.ec.europa.eu*
[230] *European Commission, Directorate-General for Research and Innovation, Vandevelde, K., Biglia, C., Rampton, J., et al., Taking stock, evaluating the achievements and identifying the way forward for the ERA priority 3 policy measures: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2777/401723.*
[231] *Commission Recommendation of 11 March 2005 on the European Charter for Researchers and on a Code of Conduct for the Recruitment of Researchers.*
[232] *https://euraxess.ec.europa.eu/jobs/hrs4r*
[233] *European Commission, Directorate-General for Research and Innovation, Vandevelde, K., Biglia, C., Rampton, J., et al., Taking stock, evaluating the achievements and identifying the way forward for the ERA priority 3 policy measures: final report, Publications Office, 2021, https://data.europa.eu/doi/10.2777/401723.*

The Charter and Code and HRS4R facilitate the (re)entry of researchers who spend their mobility period in business into academia by helping to raise HR practices in the academic sector. However, these EU policy tools are less useful to developing career paths in other sectors. For that reason, the same study highlighted the need for EU policy tools to address two recruitment challenges facing the non-academic sectors, namely that 1) researchers in academia are too often insufficiently prepared for employment in other sectors, and 2) the career paths from academia to other sectors (and back into academia) are insufficiently developed.[234]

3 Conclusions

The analysis presented above leads to the following conclusions.

First, there is a potential to further increase the participation of businesses in the MSCA, which, although increasing with each framework programme, is still below what it could be. Given the benefits that mobility periods in business offer in terms of career development for researchers, there would be merit in finding ways to shape mobility periods more closely to the needs of businesses and promote them more effectively to companies.

Second, the MSCA offer long term benefits by facilitating the permanent recruitment of fellows into the businesses that have hosted them or into other companies. Key enabling factors here are the skills gained by the fellow during the mobility period and the career development support that companies are stimulated to offer to researchers. Crucially, the mobility period very often allows the company to expand its research operations or gain commercial benefits, for instance through the researchers' contribution to product development or to intellectual property.

Third, mobility periods in enterprises stimulate and enable many MSCA fellows to take up employment in another country. The survey data show that slightly more than half of fellows hosted in enterprises (52%) choose to remain in the host country. For some (26%), this decision is driven by the offer of a job with the host institution or another employer. However, another 30% of MSCA fellows hosted in enterprises state the intention to remain in the host country even before securing a job offer.

Fourth, the long-term career prospects of MSCA fellows hosted in business are comparable to those hosted in other sectors. The survey data show that those hosted in business are as likely to be employed after two years, to have a contract of at least three years' duration, to be working in research and innovation and to have a reasonable level of professional satisfaction. This finding supports the argument that mobility periods in business are an effective preparation for a research career – provided that researchers are open to pursuing that career outside of academia, if necessary (although many can still do so within academia).

Fifth, the MSCA could be further fine-tuned to ensure that mobility periods more explicitly serve as a stepping stone from academia to permanent positions in businesses. In the context of a shortage of academic posts relative to the supply of doctoral researchers, a mobility period in business gives companies the incentives to host a fellow, which can then turn into a permanent post if companies perceive a potential commercial benefit. This may mean revising the communication targeted at potential participating businesses in order to emphasise the additional value MSCA fellows can provide to a business. For example, their

[234] *For further analysis on the Charter and Code, see: Study on mobility flows of researchers in the context of the MSCA. Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries & Annex 2. Case study 2: Importance of mobility determinants for individual MSCA fellows.*

research might lead to the development of an improved product, and ultimately generate commercial revenue. Equally, research-intensive SMEs could be more explicitly targeted as potential hosts. Mobility funding might also include microgrants that could fund courses to help fellows steer their career development or career changes.

Last, additional EU tools support the career development of MSCA fellows, notably EURAXESS and (perhaps more indirectly) the Charter and Code and HRS4R. The evolution of EURAXESS into a talent platform that offers a wider range of career development tools in particular is expected to be of benefit to them. In addition, other EU policy tools might be developed to help them prepare for employment in the non-academic sector, as well as develop better career paths between academia and other sectors.

Annex 4. Case study 4: How to foster the development of ties between researchers and their home country

1 Introduction

The aim of this case study is to explore how best to foster the development of ties between researchers and their home country while undertaking a mobility period supported by the MSCA.

Developing such ties is greatly beneficial for the fellows, their host institutions and home countries alike. For researchers, this can lead to better career prospects, including returning to their home country upon completion of their MSCA mobility period or at a later stage. As shown in Section 7 of the main report, 41% of fellows who were not hosted in their country of citizenship returned to their home country within two years of the end of their fellowship. This is supported by the academic research which suggests that both scientific productivity in the host country and the probability of returning to their home country are higher for researchers that maintain home linkages.[235] Maintaining ties with people and institutions in home countries also contributes to an easier reintegration upon return, as returning researchers benefit from stronger personal networks and are better positioned to readjust to the local work culture.

For host institutions, benefits include stronger international connections and a greater potential for future transnational collaboration. For home countries, developing and maintaining ties with the scientific diaspora abroad may help to attract high calibre researchers. As highlighted by the Slovenian Presidency of the Council of the EU, opportunities for researchers to return and reintegrate are key to reducing brain drain and to developing a more balanced European Research Area (ERA) overall.[236] Even where return mobility does not happen, strong ties between researchers and their home country strengthen Europe's research and innovation systems by contributing to the circulation of knowledge and expertise. Again, this is supported by the academic research which shows that the presence of home linkages directly benefits both countries, in addition to the indirect benefit of expanding scientific networks.[237]

This case study first analyses the factors that influence the development of such ties, including secondments. It then reviews instruments to strengthen them at institutional and national level. Finally, it provides conclusions about how to foster the development of such ties.

The case study draws on application data provided by the European Commission, data from surveys of MSCA fellows and participating organisations, interviews of National Contact Points (NCPs), host organisations and fellows, as well as existing policies and strategies of relevant national bodies.

[235] *Baruffaldi, S., and Landoni, P., (2012), Return mobility and scientific productivity of researchers working abroad: The role of home country linkages, Research Policy, Volume 41, Issue 9, 2012, Pages 1655-1665, ISSN 0048-7333, https://doi.org/10.1016/j.respol.2012.04.005.*

[236] *Slovenian Presidency. (2021). An effective European Research Area. Council of the EU. [online] Available at: https://slovenian-presidency.consilium.europa.eu/en/programme/key-topics/an-effective-european-research-area*

[237] *Baruffaldi and Landoni (2012).*

2 Factors influencing ties with home countries

2.1 Characteristics of fellows

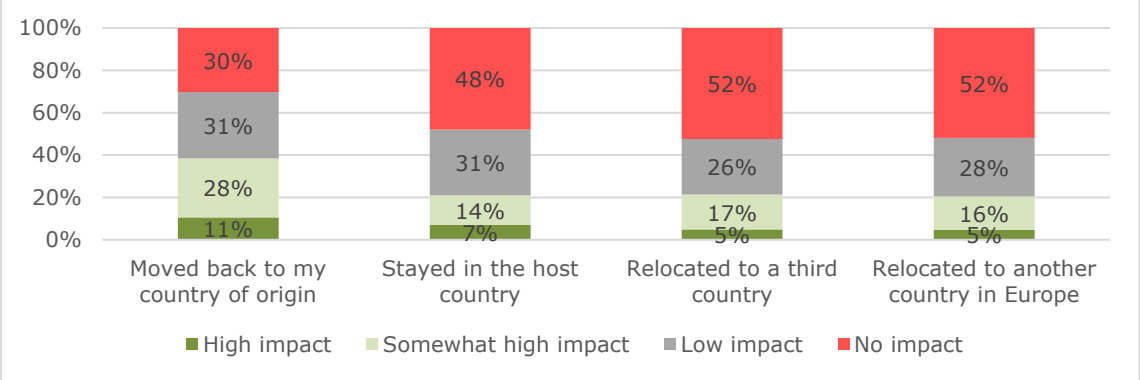
The survey of MSCA fellows provides evidence of the extent to which fellowships foster collaboration between fellows and their home countries. 25.7% of fellows who were not hosted in their country of origin reported that the fellowship had a high or somewhat high impact on increasing their collaboration with their home country.

The extent to which ties between researchers and their home countries are fostered by their participation in the MSCA depends in part on the career stage of the researcher. Experienced researchers (ERs) were more likely to say that the fellowship had an impact on collaboration with their country of origin (33.4%) compared to early-stage researchers (ESRs, 21%). This may stem from the fact that ERs are more likely than ESRs to return to their countries of origin after the end of their fellowship.[238] Therefore, they may also seek to maintain closer ties with their home countries in order to increase the job opportunities available to them there.

The figures below show the share of non-returning fellows (i.e. those undertaking their MSCA mobility in a country other than their country of origin) based on whether they have either moved or plan to move after the end of their fellowship. The data are disaggregated based on the extent to which the fellowship increased collaboration with their respective home countries.

Fellows returning or planning to return to their country of origin were more likely to report that the MSCA had a positive impact on increasing collaboration with their home countries than other fellows. Of those returning to their country of origin, 39% reported a high or somewhat high impact, compared to only 21% of those staying in the host country, 22% of those relocating to a third country and 21% of those relocating to another European country. However, the data available do not allow to establish a causality in one sense or another, for instance since fellows who are planning to move back to their country of origin are also more likely to maintain closer ties with their home countries. However, at the very least, **the MSCA enable and contribute to increasing collaboration with the fellows' home countries, thereby also increasing the likelihood of return after the end of the fellowship**.

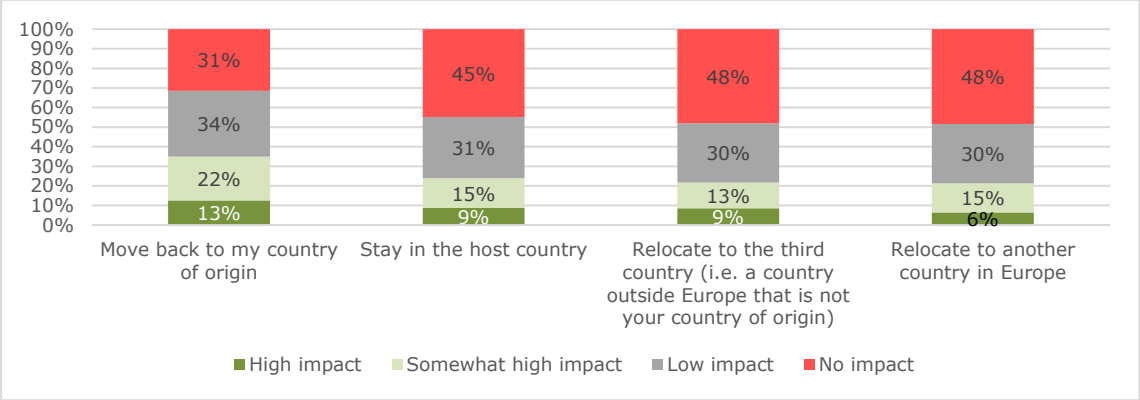
Figure 99. Mobility destination of fellows after the end of their fellowship and impact of the fellowship on increasing collaboration with their home countries (non-returning fellows)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022) (n=1,641).

[238] *See Section 7.1 in the main report.*

Figure 100. Planned mobility destination of fellows after the end of their fellowship and impact of the fellowship on increasing collaboration with their home countries (non-returning fellows)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022) (n=2,101).

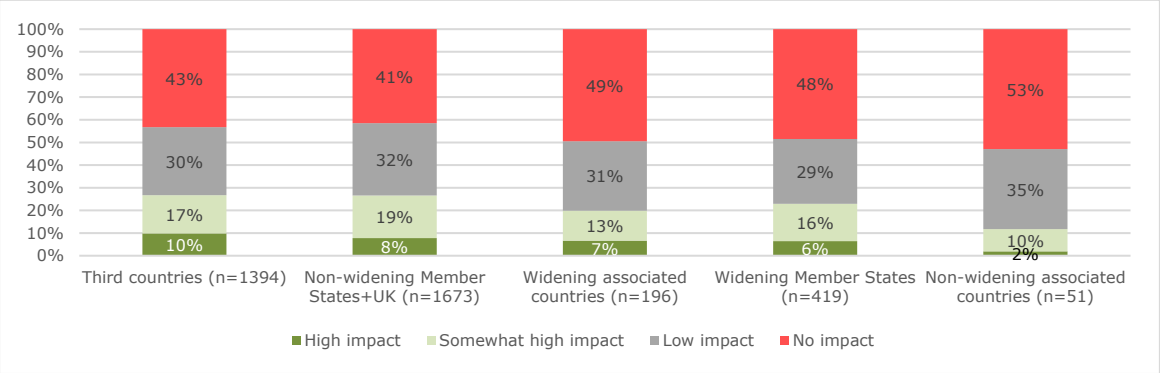
As shown in Figure 101, **fellows from non-widening Member States and third countries (27%) were more likely than those from widening Member States (22%) to report that the fellowship had a high or somewhat high impact on collaboration with their home countries**. This indicates that nationality may impact an individual fellow's willingness to foster collaborative links with their country of origin.

Similar conclusions can be drawn from the fellows' subsequent career paths. Of those employed within three months after the fellowship, 24% of fellows from third countries found employment in third countries (whereas only 4-5% of fellows from Member States and associated countries were employed in third countries). 87% of fellows from non-widening Member States found employment in non-widening Member States. In contrast, 28% of fellows from widening Member States found employment in a widening Member State, whereas 59% of them found employment in a non-widening Member State.[239]

Although we cannot establish causality from the data, this suggests that **nationals from non-widening countries and third countries are more likely to pursue employment in their home countries of origin, and therefore to maintain ties with those countries**. Fellows from widening countries are less likely to pursue a career in their home countries, which may explain why they consider that the fellowship increased their collaboration with their home countries to a lesser extent, as they were not necessarily looking for it to do so. This suggests that countries should ensure that there are enough attractive research positions available to fellows once they complete their MSCA fellowship. This is in line with the findings of the main report, which suggest that system-level determinants alone explain around 70-90% of MSCA mobility flows.[240] In order to increase the willingness of fellows to collaborate with their home countries, countries need to ensure that there are factors in place encouraging researchers to do so.[241] As shown in Section 3.2, some countries are taking steps to do this.

[239] *Evaluation questionnaire for MSCA fellows at the end of the fellowship (n=6,692).*
[240] *See Section 6.4 in the main report.*
[241] *See Section 6 in the main report and Annex 2 for further analysis of the factors contributing to mobility decisions. See Section 7 in the main report for further analysis of the different barriers to reintegration.*

Figure 101. "What kind of impact has the fellowship had on your career and skills (increased my collaboration with my home country)?" Breakdown by country of origin

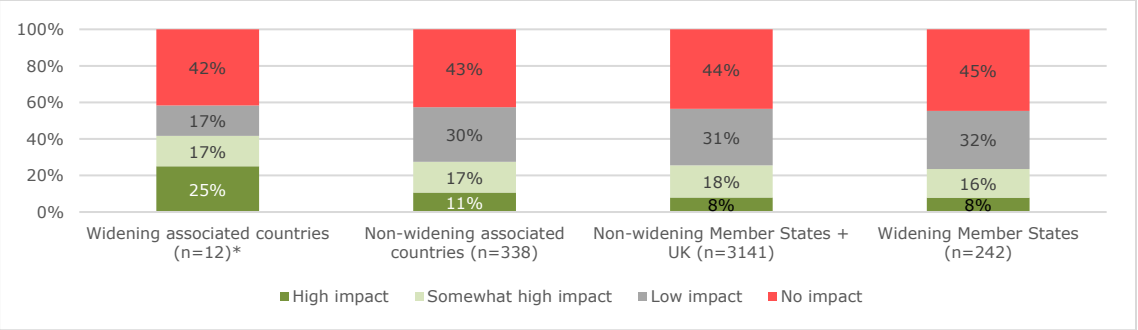


Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

2.2 Choice of host country

The choice of host country has a limited impact on the fellows' collaboration with their home countries during their mobility period. As shown in the figure below, the share of fellows reporting a high or somewhat high impact on increasing collaboration with home countries was slightly higher in non-widening countries than in widening Member States (results for widening associated countries are based on a small sample size and therefore not accounted for in this context). However, the differences are only marginal, which suggests that other factors are more influential, such as the career stage of the researcher or the nationality of the researcher (as described above).

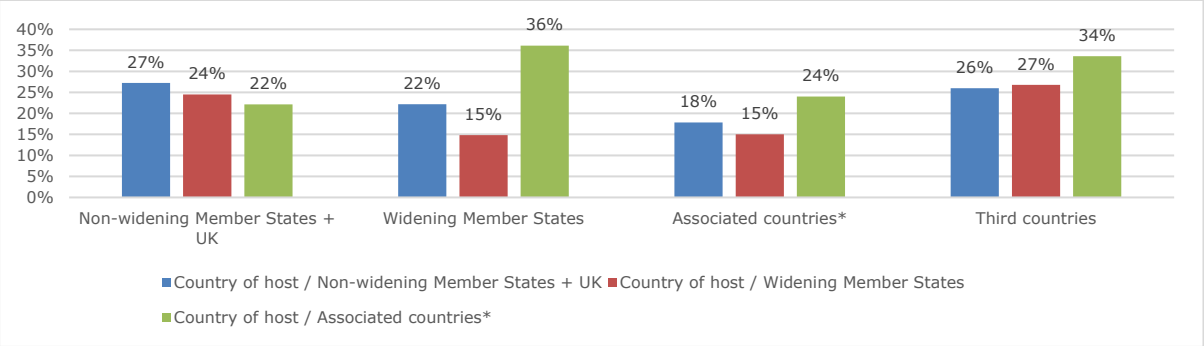
Figure 102. What kind of impact has the fellowship had on your career and skills (increased my collaboration with my home country)?" Breakdown by country of host institution



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022).

The figure below shows the country of origin and host country destination of fellows who reported that their fellowship had a high or somewhat high impact on collaboration with their home countries. Again, when nationality is accounted for, differences in collaborations become clearer.

Figure 103. What kind of impact has the fellowship had on your career and skills (Increased my collaboration with my home country)?" Breakdown by country of origin and destination of those answering high or somewhat high impact



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022) (n=3,141). *Associated countries are shown together due to small sample size.

2.3 Additional determinants

The table below highlights the influence of different factors on the collaboration with the fellows' home countries. Non-returning researchers were categorised based on their answers to the question "Which of the following factors positively influenced your MSCA mobility experience?". This categorisation is provided for all non-returning researchers, as well as for non-returning researchers hosted both in widening and non-widening Member States. The table shows the share of fellows who considered a factor to be positive and who stated that the fellowship had a high or somewhat high impact on increasing collaboration with their home country.

The table shows, for example, that 38.5% of fellows who considered support from National Contact Points (NCPs) to have influenced their mobility positively also reported that their fellowship had a high or somewhat high impact on increasing collaboration with their home country (a positive difference of 13 percentage points compared to all non-returning fellows).

Across almost all categories, fellows hosted in widening Member States were more likely to report that the fellowship had a high or somewhat high impact on increasing their collaboration with their home countries than fellows hosted in non-widening Member States and the United Kingdom.

Table 43. "What kind of impact has the fellowship had on your career and skills (Increased my collaboration with my home country)?" Share of non-returning researchers answering high or somewhat high impact based on host country and factors considered positively influencing mobility period

Factors contributing positively to the MSCA fellowship	All non-returning researchers (%)	Non-returning researchers hosted in non-widening Member States+UK (%)	Non-returning researchers hosted in widening Members States (%)
Support from national contact points	38.5%	36.2%	51.2%
Organisational strategies for involving mobile researchers	36.4%	35.4%	44.9%
Easy to understand and informative information on MSCA	36.0%	35.3%	39.2%
Help with integration into the local environment and culture	33.1%	32.4%	31.0%
Supportive alumni network	32.4%	31.0%	37.9%
Help with integration into the work environment	31.1%	30.1%	36.2%

Knowledgeable staff with experience on international projects	30.4%	30.1%	30.7%
Administrative support at host institution	29.0%	28.7%	30.7%
Concrete support for conducting research	28.5%	28.2%	32.2%
Support from colleagues and supervisors	27.3%	27.0%	25.3%
International networking opportunities	27.1%	26.8%	25.0%

Source: survey of MSCA fellows (ITN, IF, COFUND) (2022) (n=3,742).

There are limitations to the extent to which we can draw conclusions from the data above. Due to data limitations, we cannot, for example, determine the exact nature of organisational strategies or if these organisational strategies[242] were employed in the host institution or in an institution in the fellow's country of origin. However, some conclusions can be drawn when the data are contrasted with evidence from interviews and academic literature.

The table above suggests that **the main factors strengthening ties between fellows and their home countries are supportive networks** (e.g. support from NCPs or alumni networks) **and access to information** (e.g. support from NCPs or easy to understand information on the MSCA). Networks are relevant for providing access to information.[243] As discussed in Section 3.2 below, the importance of networks is consistent with previous research, which indicates that researchers most commonly maintain contact with their home countries via formal and informal networks. Several Member States have taken steps to support such networks of researchers amongst their diaspora communities.

If the importance of NCPs, who often act as information providers[244], and easy to understand and informative information on MSCA are accounted for together, they seem to indicate that access to information, in general, is an important aspect contributing to maintaining links. Interviewed fellows expressed the need to be informed about opportunities and prospects, including in their home countries. This encompasses information on career and collaboration opportunities, the level of remuneration and research infrastructure. Fellows who consider easy to understand and informative information on the MSCA to be a positive factor may also be fellows who seek to be well-informed in general about different opportunities and practices.

The second set of **factors supporting ties between fellows and their home countries relates to the involvement of researchers.** These include organisational strategies, help with integration into the local and work environment.[245] Successful integration may mean that fellows have more time and resources to pursue collaborations with their home country. Removing barriers and ensuring that fellows feel at home may lead to fellows being able to pursue their own interests, including collaborations with their home country, to a larger extent than would be possible otherwise.

However, academic research also suggests that involving researchers can increase their personal and professional commitments in the host country, therefore decreasing the likelihood of returning to their home country.[246] On the other hand, Andújar et al. found that integrative practices, which contribute to creating stronger personal and professional commitments in the host country, may not always lead to situations where collaboration with home countries would decrease. In fact, they note that "far from implying a loss of

[242] *Organisational strategies are discussed in-depth in Section 3.1, which presents measures at an institutional level.*
[243] *The importance of networks and access to information for maintaining ties is also supported by academic research. See e.g.: Fontes, M. (2007). Scientific mobility policies. How Portuguese scientists envisage the return home. Science and Public Policy, 34(4); Andújar, I. et al. (2015). International stays abroad, collaborations and the return of Spanish researchers. Science, Technology & Society, 20(3).*
[244] *Net4Mobility+ (2018). Recommendations for Widening Countries' MSCA NCPs.*
[245] *See Section 3.1 for further analysis.*
[246] *Casey, T., Mahroum, S., Ducatel, K., & Barré, R. (2001). The mobility of academic researchers: Academic careers and recruitment in ICT and biotechnology. Report EUR 19905 EN, JCR/IPTS-ESTO. See also: Baruffaldi and Landoni (2012).*

contact with the home country, this appears to be positive for the establishment of collaborations between home and host countries. It could also be indicative of a 'brokering' role for mobile researchers between their mentoring (home) and independent (host) research networks".[247]

The problem of what kind of involvement and level of involvement at the host institution contributes to fostering ties with home countries seems to be confirmed by the findings above. Some of the factors that are less likely to be associated with a high impact on collaboration with their home countries include those related to research at the host institution (administrative support at the host institution, concrete support for conducting research, support from colleagues and supervisors), which can contribute to increased involvement of fellows at the host institution. More research is required to conclusively be able to address which factors contributing to the involvement of researchers lead to fostering stronger ties with a fellow's home country.

Factors related to international aspects (knowledgeable staff with experience on international projects, international networking opportunities) are less likely to be associated with a high impact on collaboration with the fellows' home countries. Although we cannot establish causality based on the data available, these results suggest that when a host organisation has a strong international dimension, fellows do not feel that they need to seek collaboration opportunities with their home countries as much as they would otherwise.

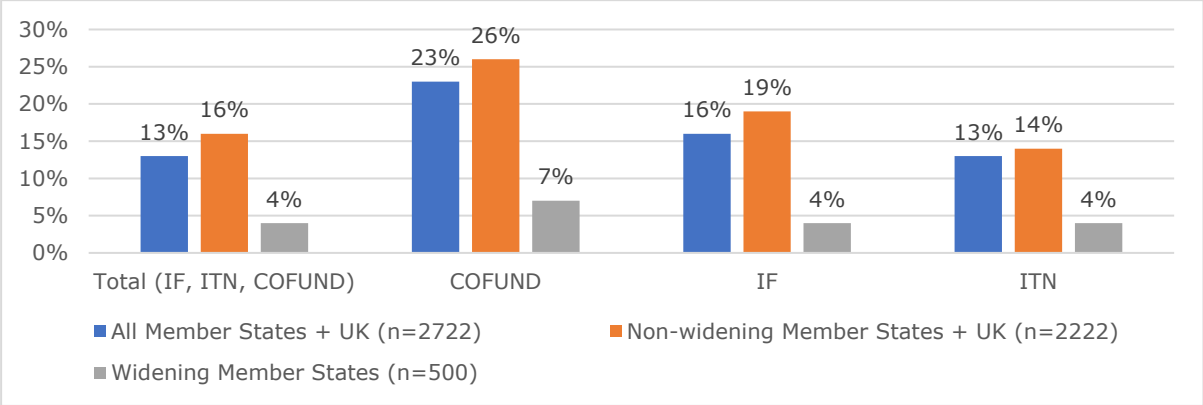
2.4 Secondments to home countries during the mobility period

Under COFUND, IF and ITN, fellows can undertake a secondment at the premises of a different beneficiary, partner organisation or other entity. The premises of the institution hosting the secondment must be independent from the main host institution and the secondment must involve physical mobility of the fellow. During their secondment, fellows receive supervision and training at the premises of the secondment host.

Evidence from the survey of fellows shows that 13% of secondments involved fellows returning to their country of citizenship (of those who were non-returning fellows). Secondments to home countries were most common in COFUND and least common in ITN. Across all three actions, researchers with the citizenship of a non-widening country were more likely to undertake a secondment to their home country (16%) than researchers with the citizenship of a widening country (4%). Again, while it is not possible to infer causality from the data, this suggests that citizens of non-widening Member States are more motivated and/or have more opportunities to maintain ties with their home countries during their mobility periods. This may be because non-widening countries offer a more attractive research environment for secondments and better prospects for future career development than widening countries.

[247] *Andújar, I. et al. (2015). International stays abroad, collaborations and the return of Spanish researchers. Science, Technology & Society, 20(3).*

Figure 104. Secondments undertaken to home countries as a percentage of all secondments (out of non-returning fellows who are nationals of Member States)



Source: Evaluation questionnaire for MSCA fellows at the end of the fellowship.

Looking at non-returning researchers' career paths after the end of the fellowship, 48% of fellows who undertook a secondment in their country of origin and found employment within three months after the end of the fellowship were employed in their country of origin. Out of those employed in their country of origin, 46% were employed in one of the institutions involved in the research project.[248]

When compared with the same sample (i.e. non-returning researchers who undertook a secondment), only 21% of fellows who conducted a secondment in another country than their country of origin and were employed within three months after the end of the fellowship were employed in their country of origin. Out of those employed in their country of origin, 10% were employed in one of the institutions involved in the research project. Similarly, when compared with non-returning researchers who did not undertake secondments, 22% of those employed within three months found employment in their country of origin.

While we cannot establish causality, the data indicate that **secondments can be an effective tool in fostering the development of ties between researchers and their home country and lowering barriers to future employment in the home country**. This was also noted in interviews, during which some interviewees suggested that it could be made clearer that researcher can carry out their secondment in their home country.

3 Measures to strengthen ties with home countries

Evidence gathered for this case study suggests that measures can be taken at both institutional and national level to strengthen ties between researchers and their home countries.

3.1 At institutional level

To determine whether institutions can have an impact on supporting the development of such ties, we cross-referenced the fellows' survey responses with information about the organisations' strategies to promote international mobility or their success in promoting return mobility (e.g. reintegrating returning researchers). This is based on the assumption that organisations with coordinated action plans to attract mobile researchers are better positioned to maintain ties with researchers who are based abroad. We also assume that organisations that are very effective in promoting return mobility and in reintegrating returning researchers will maintain better ties with researchers.

As shown in the first figure below, **no clear pattern emerges between the support provided by organisations and the share of non-returning researchers who stated**

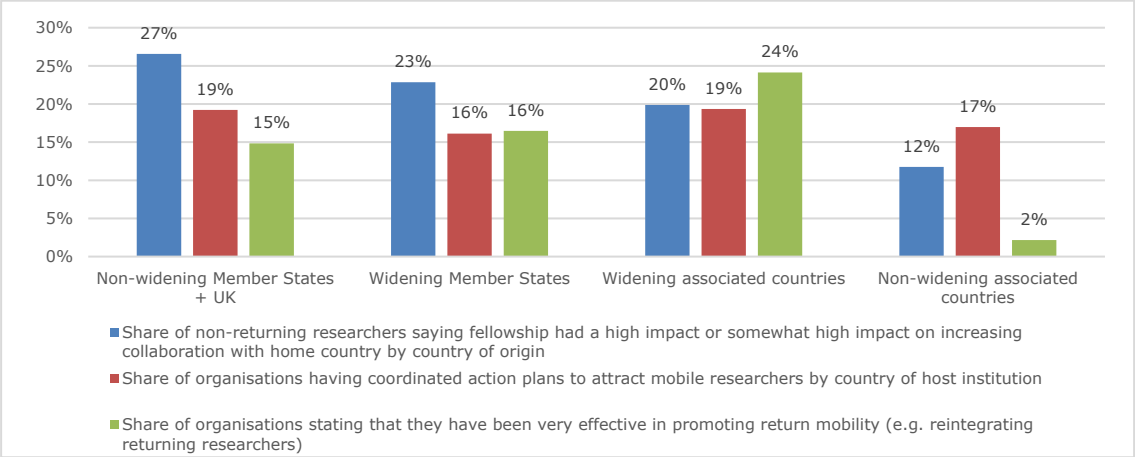
[248] *Shares based on data from: Evaluation questionnaire for MSCA fellows at the end of the fellowship (n=6,692).*

there was an increased collaboration with their home country. This is even more evident when we further match non-returning researchers (based on the country of origin) and host institutions (based on the country of the host institution) together at country-level, as shown in the second figure below.

This indicates that **there are no clear, systemic benefits derived from the strategies that organisations employ to either attract mobile researchers or in their capacity to promote return mobility, at least in terms of maintaining ties with MSCA fellows**. Although the data are limited, the analysis conducted indicates that the individual characteristics of a researcher and their personal networks are much more influential for the development of ties between researchers abroad and their home country and/or institutions in their home country.

However, as Sections 6.2 and 7.4 in the main report show, only 19.5% of host institutions surveyed indicated that they had in place a coordinated action plan to attract mobile researchers. Of those institutions in widening Member States that had coordinated action plans, only 31% reported that they targeted returning researchers. Of those institutions in non-widening Member States that had coordinated action plans, 35% indicated they targeted returning researchers.[249] Therefore, the lack of correlation may be more related to the fact that **plans to attract international and returning researchers are implemented only to a small extent, and institutions could increase their efforts in this area.** Interviewees also noted that there is a lack of institutional support for reintegration.

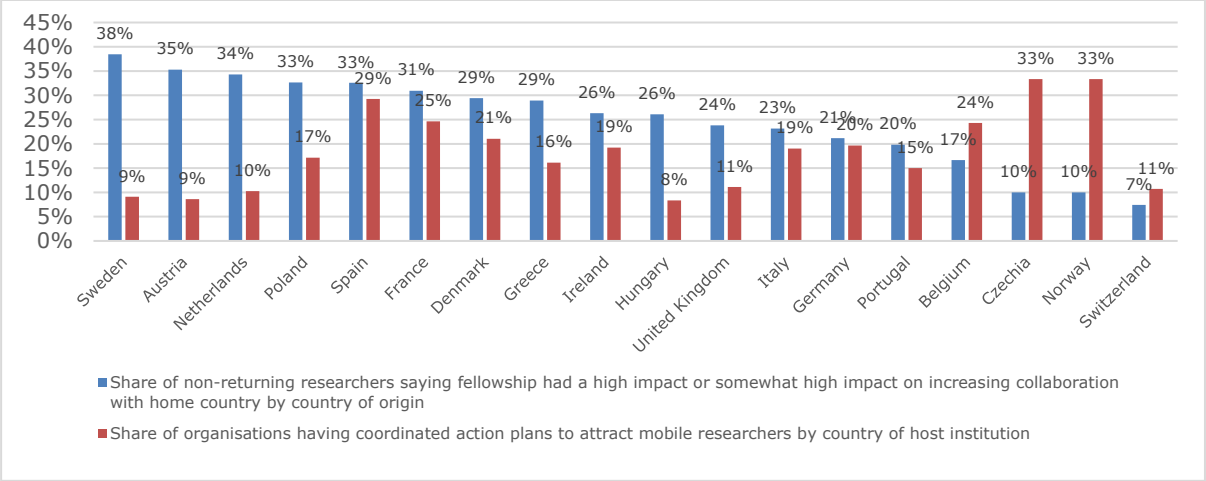
Figure 105. Share of non-returning researchers with increasing collaboration with home countries and share of organisations with coordinated mobility action plans and stating that they are very effective in promoting return mobility (breakdown by country groups)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=3,742; survey of MSCA organisations (2022), n=1,644.

[249] *Survey of MSCA organisations (2022).*

Figure 106. Share of non-returning researchers with increasing collaboration with home countries and organisations with coordinated action plans to attract mobile researchers (country-level breakdown)



Source: survey of MSCA fellows (ITN, IF, COFUND) (2022), n=3,742; survey of MSCA organisations (2022), n=1,644. Countries with n<10 are excluded.

From the perspective of return mobility and reintegration, organisational strategies can relate to awareness-raising campaigns, which can include providing information on career prospects at the university or other benefits that a researcher could be interested in, such as work-life balance, level of remuneration or the possibility of establishing one's own research group.[250] However, as indicated above, not many institutions have coordinated action plans to attract mobile researchers, and even fewer target returning researchers. As one NCP stated:

> *There should be, for example, an HR department or office trained for this purpose, so if there is a researcher who wants to reintegrate, who would like to come back and be integrated, they should have at least a kind of welcome package. […] [Institutions] should have a specific policy or strategy how to attract those who left the country and want to come back. They should also keep some statistics what, for example, their former students are doing, if they work in research abroad, and they should try to stay in contact with these people, because otherwise they will lose excellent or talented manpower.*

Ideally, as noted in other interviews, institutions should have plans for reintegration in place already when a researcher leaves the country, reflecting the comment above about understanding what former students are doing and maintaining communication with them. Understanding the subsequent paths of researchers would allow institutions to ask alumni established abroad to be part of evaluation or advisory committees, or to invite them to specific events. It could also contribute to the co-supervision of graduate students and research collaborations, which increase the likelihood of returning and reintegration.[251] As noted in interviews, advertising opportunities to form research collaborations is important for maintaining ties with the home country. Often the challenge relates to finding the right person to contact when one seeks to establish research collaborations. Having a department or an office that could help in finding relevant collaborators could contribute to stronger research networks with the fellows' home countries.

[250] *Andújar, I. et al. (2015). International stays abroad, collaborations and the return of Spanish researchers. Science, Technology & Society, 20(3). For the importance of advertising the country as an attractive destination, see also: Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries.*

[251] *See e.g.: Fontes, M. (2007). Scientific mobility policies. How Portuguese scientists envisage the return home. Science and Public Policy, 34(4); Andújar, I. et al. (2015). International stays abroad, collaborations and the return of Spanish researchers. Science, Technology & Society, 20(3).*

Interviewees also noted that western European universities are typically more active in helping the social integration of returnees and building a career plan for their spouses. Widening countries tend to be less active in this regard. This can be considered a similar service to the "welcome package" mentioned above.

One way institutions can strengthen ties between researchers and their home countries is through **transnational cooperation in the context of the European Universities Initiative (EUI)**. The initiative supports transnational alliances of universities that share a long-term strategy and offer student-centred curricula jointly delivered across inter-university campuses. Links between the EUI and the MSCA have been specifically encouraged, for example, in terms of doctoral and postdoctoral programmes, including joint programmes under MSCA Doctoral Networks and COFUND, as well as collaborative projects under MSCA Staff Exchanges.[252] Reflecting this, 9% of the host organisations responding to the survey reported that they were participating in the EUI.[253]

To date, at least three alliances supported by the EUI are implementing MSCA mobility periods through COFUND:

- Una Europa is an alliance of nine universities supported by the EUI. The alliance is implementing UNA4CAREER with support from the MSCA, which will enable 40 researchers to undertake mobility periods.[254]
- EUTOPIA is an alliance of six universities. The alliance is implementing a "Science and Innovation Fellowship", which will allow 76 post-doctoral researchers to work in five interdisciplinary research areas. The project will link researchers to the universities within the alliance as well as companies, local authorities and NGOs. By establishing a transnational community of researchers, it will also strengthen the links between the fellows and their home countries.[255]
- CIVIS is an alliance of ten universities which are collaborating around current challenges such as digital transformation and climate change. The alliance will enable 32 researchers to undertake international, interdisciplinary and intersectoral research. These MSCA mobility periods will include secondments to different CIVIS partners.[256]

There is no guarantee that the MSCA fellows selected by an alliance will come from one of the countries represented in the alliance. However, the survey evidence suggests that slightly more than half (50.7%) of MSCA hosts organisations that also participate in the EUI tend to recruit MSCA fellows from organisations with which there is existing cooperation (29.5%), prospective co-operation (4.1%) or both (17.1%). Since organisations participating in the EUI account for 9.1% of MSCA hosts (according to the survey), this means that up to 4.6% of all MSCA hosts tend to accept MSCA fellows from their partners within an EUI alliance.[257] This suggests that the EUI offers considerable potential to maintain and strengthen ties between MSCA fellows and their home countries.

[252] *See https://marie-sklodowska-curie-actions.ec.europa.eu/news/msca-presidency-conference-synergies-with-european-universities-and-supervision*
[253] *Survey of MSCA organisations (2022), n=1,644.*
[254] *https://www.una4career.eu/*
[255] *https://cordis.europa.eu/project/id/945380*
[256] *https://www.univ-amu.fr/en/public/actualites/new-success-european-university-civis*
[257] *The survey did not ask respondents to specify whether the existing or prospective cooperation was related to alliances supported by the EUI or not. The figure of 4.6% of MSCA hosts potentially accepting fellows from their EUI partners must therefore be seen as a maximum. The actual figure will be lower in so far as organisations involved in EUI accept MSCA fellows from other organisations with which they cooperate.*

3.2 At national level

The strengthening of ties with the scientific diaspora is seen by many Member States as an important part of their broader strategies to attract incoming researchers, support research careers and strengthen their research and innovation systems. Such measures usually encompass researchers in general rather than only MSCA fellows. **National measures to strengthen such ties are, therefore, very often included in broader strategies for research and innovation**, such as the national roadmaps for the European Research Area (ERA). Bulgaria provides one such example.

Bulgaria's national strategy
Bulgaria's national strategy for the development of scientific research includes a pillar dedicated to human resources. Under this pillar, specific measures include a fellowship programme to encourage the return of Bulgarian researchers working abroad (as well as incoming researchers of other nationalities) and support for collaboration between Bulgarian researchers working abroad and research organisations in Bulgaria. The strategy is supported by the Horizon 2020 Policy Support Facility.[258]

Several Member States also support **networks of researchers amongst their diaspora communities**. The rationale for such support is underpinned by evidence from a previous study that involved a survey of doctoral candidates in twelve EU Member States.[259] The study found that, aside from informal networks with friends, acquaintances and colleagues, researchers most often maintained ties with their home countries through official dispersed networks bringing together researchers of the same nationality working abroad. Where they existed, linkage mechanisms (visits, training, joint projects, fundraising) were also beneficial. Ties were least often maintained through scientific journals and business relationships. Portugal and Greece offer examples of national support for networks of researchers amongst their diaspora communities.[260]

Global Portuguese Scientists platform
Portugal has established a diaspora network in the form of the Global Portuguese Scientists platform (GPS).[261] The primary aim is to establish links between Portuguese researchers working abroad. With a similar layout to a social networking platform like Facebook, the GPS platform allows users to join communities and groups and to create professional researcher profiles. The main users are PhD researchers and PhD students, and the most common discipline is Natural Sciences. The average mobility patterns among its users are two stays abroad with a duration of approximately 35 months per stay. While the demographic information is useful for research, the GPS platform also serves as an "intense environment of collaboration, but at the same time, a powerful tool for mobility studies and science policy-making."[262] Such a tool enables researchers abroad to share their experiences with each other and to keep up to date about developments in their scientific field around the world.

[258] *National strategy for the development of scientific research in the Republic of Bulgaria 2017-2030*
[259] *Ates, G. et al. (2009). Eurodoc Survey I: The First Eurodoc Survey on Doctoral Candidates in Twelve European Countries: Descriptive Report. Eurodoc. Brussels, Belgium. Available at: http://eurodoc.net/sites/default/files/attachments/2017/144/eurodocsurveyireport2011.pdf*
[260] *Additionally, Portugal is effective in promoting itself as a destination for researchers. See: Study on mobility flows of researchers in the context of the MSCA. Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries.*
[261] *https://gps.pt/*
[262] *Marques, J. L. et al. (2020). Global Portuguese Scientists (GPS): an academic social network to assess mobility in science. In: The EWG-DSS 2020 International Conference on Decision Support System Technology. [online] Zaragoza. Available at: https://www.researchgate.net/publication/348135457_Global_Portuguese_Scientists_GPS_an_academic_social_network_to_assess_mobility_in_science*

Foundation for Science and Technology, Portugal

In Portugal, the Foundation for Science and Technology (a governmental agency) has a strong connection with associations of Portuguese students and researchers in different countries. These associations organise events and activities that enable Portuguese students and researchers to connect with each other and maintain ties to their home country. Each year, the Foundation allocates a modest fund to these associations based on a proposed programme of activities. It also sponsors events and helps organise meetings between the different national associations.

One association is the "Portuguese Association of Researchers and Students in the UK" (PARSUK), which is an independent not-for-profit organisation created in 2008. Registration is free and more than 400 members have joined. PARSUK offers professional development such as a mentorship programme and information about research jobs. PARSUK also organises "LUSO", an annual meeting of Portuguese students and researchers in the UK which takes place in June each year.

PARSUK, along with other national associations for the Benelux, France, the Nordic countries, Germany, and the USA, has since 2012 organised the Annual Forum of Portuguese Graduates Abroad ("Fórum de Graduados Portugueses no Estrangeiro" or GraPE). The 2021 event featured speeches from the Portuguese Minister of Foreign Affairs, the Minister of Science, Technology and Higher Education, the Vice President of the Foundation for Science and Technology and the Calouste Gulbenkian Foundation.

BrainReGain and Knowledge Bridges (Greece)

Greece has introduced initiatives in recent years to address the negative consequences of the considerable out-migration of researchers (as well as other professionals and highly-qualified people) since the 2008 financial crisis.

BrainReGain is a non-profit association that seeks to strengthen communication channels between Greek researchers and other professionals abroad and the Greek business community; as well as to create favourable conditions for the return of Greek researchers. BrainReGain is supported by the non-profit Hellenic Roots Association. Services offered by BrainReGain include support for return mobility of researchers in the form of an online portal providing information and support, including a mentoring scheme and a database of jobs.[263]

Knowledge Bridges aims to build and strengthen networks of Greek researchers living in other countries.[264] In 2019, Knowledge Bridges provided grants to networks of Greek researchers including at least 15 members residing in at least two countries (one of which must be Greece). Knowledge Bridges is an initiative of the General Secretariat for Strategic and Private Investment (GSSPI), Ministry of Economy and Development and is implemented by the National Documentation Centre (EKT).

4 Conclusions

The evidence presented in this case study leads to a number of conclusions on how best to foster the development of ties between researchers and their home countries.

First, the fellows' individual characteristics and the strength of their personal networks are significant factors for the development of ties with their home country. There are also differences in the extent to which fellows report that their mobility period helped increase

[263] *https://brainregain.gr*
[264] *https://www.knowledgebridges.gr/*

collaboration with their home countries. Although it is difficult to demonstrate causality, experienced researchers and nationals from non-widening and third countries place more emphasis than other fellows on maintaining ties with their home countries. Conversely, the choice of host country has a limited impact on fellows' collaboration with their home countries during their mobility period.

Second, certain aspects of a mobility period can help to strengthen ties with home countries. These are supportive networks (support from NCPs or alumni networks) and the involvement of researchers (organisational strategies, information on MSCA, help with integration into the local and work environment). Conversely, when an organisation offers strong support for conducting research at the host institution for fellows and has a strong international dimension, fellows do not feel that they need to seek out opportunities for collaboration with their home countries as much as they would otherwise.

Third, secondments offer opportunities for researchers to return temporarily to their home country. Fellows from non-widening countries take advantage of this opportunity much more often than fellows from widening countries. This may be because non-widening countries are perceived as more attractive and more likely to offer better prospects in terms of future career development. Secondments in a fellow's home country also correlate with a higher likelihood that the fellow becomes employed in their country of origin after the fellowship.

Fourth, some measures to foster the development of ties between fellows and their home countries appear successful. Where alliances of universities supported by the European Universities Initiative also implement MSCA projects, a more structured international collaboration ensues, which may include collaboration between the researchers and their home country. Some countries have introduced measures to strengthen the networks of researchers amongst their diaspora communities or to attract such researchers back home. Such measures are very often part of broader national strategies to support researcher careers and to create an attractive research environment and would merit being replicated in countries that seek to attract back their scientific diasporas and increase their overall attractiveness for excellent researchers.

Annex 5. Case study 5: Influence of support to applicants on mobility flows

1 Introduction

One of the determinants of mobility flows within the MSCA will be the quantity and quality of applications submitted by researchers in different countries; countries that feature a high volume of applications and a high success rate will account for more researchers participating in the MSCA than other countries. This becomes significant as applicants' country of origin is one determinant (amongst others) of their destination country (as shown in Section 3.1.2 of the main report). One possible reason for differences between countries in terms of the volume of applications submitted and success rates is the extent and quality of support offered to applicants.

This case study therefore aims to explore the drivers of successful applications to the MSCA, the different types of support available to applicants and the impact of such support. It starts by reviewing the volume of applications and the success rates of the then 28 EU Member States in order to highlight those countries that generate a high number of high-quality applications.[265] It then considers the extent to which applicants make use of different types of support and to which they find it helpful. Finally, it reviews different types of support in terms of the services offered, the means of delivery and their availability across the EU.

Support for applicants is one of many factors influencing each country's volume of applications and success rate. For that reason, this case study does not attempt to prove that particular levels or forms of support are key to the success of any particular country. Nonetheless, by highlighting successful countries and exploring the different forms of support, some lessons can be learned about the most useful forms of support, where support to applicants may be sub-optimal or uneven, and how it can be improved. The case study thus complements the analysis in Section 6 of the report, which considered the individual, organisational and system-level determinants of mobility flows. It also complements case study 1 on the determinants of the participation of widening countries and case study 2 on the individual determinants of researchers' mobility.

The case study draws on application data provided by the European Commission, data from surveys of MSCA fellows and participating organisations, interviews of NCPs, host organisations and fellows, previous research as well as online sources.

[265] *The UK ceased to be an EU Member State on 1 February 2020 on the basis of the Withdrawal Agreement that foresaw that UK-based legal entities would continue to be fully eligible to participate in and receive funding from Horizon 2020 as if the UK were a Member State until the closure of the programme. For the purpose of this case study, the UK is therefore treated as a Member State rather than a third country.*

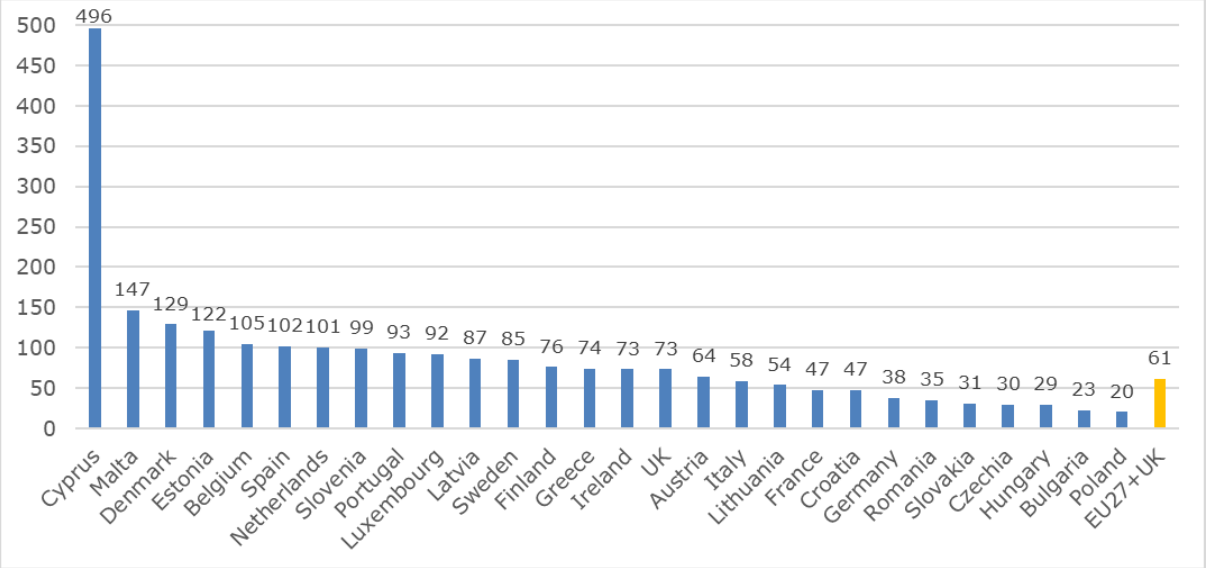
2 Research findings

2.1 Applications to the MSCA

Before considering the effectiveness of support to applicants, it is helpful to start by identifying those countries that generate a high volume of applications and have high success rates. This subsection considers data on MSCA applications under Horizon 2020 (2014-2020).

The figure below shows the number of MSCA applications submitted from each country in relation to the size of its researcher population. Smaller countries appear to generate more applications than larger ones once the size of their research workforce is taken into account. However, there are significant differences between countries of similar size. For example, Estonia generates many more applications than Lithuania, Greece generates many more than Czechia, and Ireland and Slovenia generate many more than Slovakia. This suggests that other factors are important, which may include the level and quality of support to applicants.

Figure 107. Volume of MSCA applications (2014-2020) relative to the size of research workforce (per 1,000 researchers)



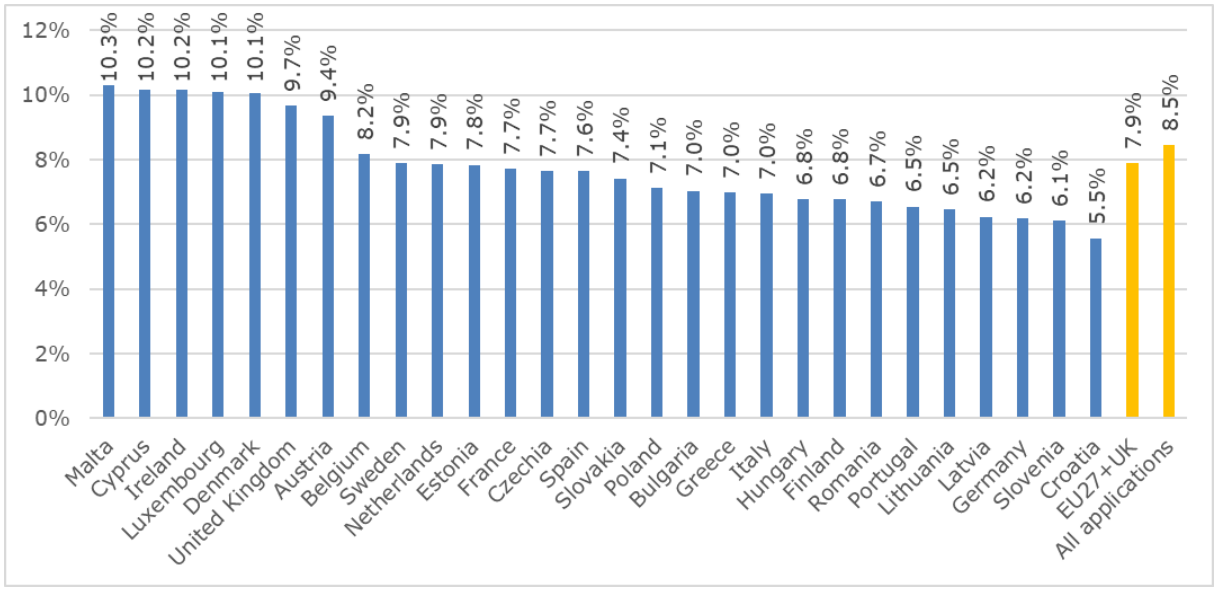
Source: European Commission,[266] Eurostat.[267]

The figure below shows the application success rate of each Member State. Success rates vary from 5.5% in Croatia to 10.3% in Malta (as a benchmark, across the MSCA, 7.9% of applications from EU27+UK were successful under Horizon 2020). There is no correlation between success rates and the size of the overall population (r=-0.11) or between success rates and the size of the researcher population (r=-0.08). However, the three smallest Member States (Cyprus, Luxembourg, Malta) have three of the four highest success rates. Moreover, those three countries are the only non-widening countries with success rates above the average for EU27+UK.

[266] *European Commission (2021), H2020 Proposals summary. See: https://webgate.ec.europa.eu/dashboard/sense/app/e02e4fad-3333-421f-a12a-874ac2d9f0db/sheet/941d3afe-da24-4c2e-99eb-b7fcbd8529ee/state/analysis*

[267] *Eurostat (2022), R&D personnel by sector of performance, professional position and sex[rd_p_persocc]*

Figure 108. MSCA application success rate by Member State (2014-2020)



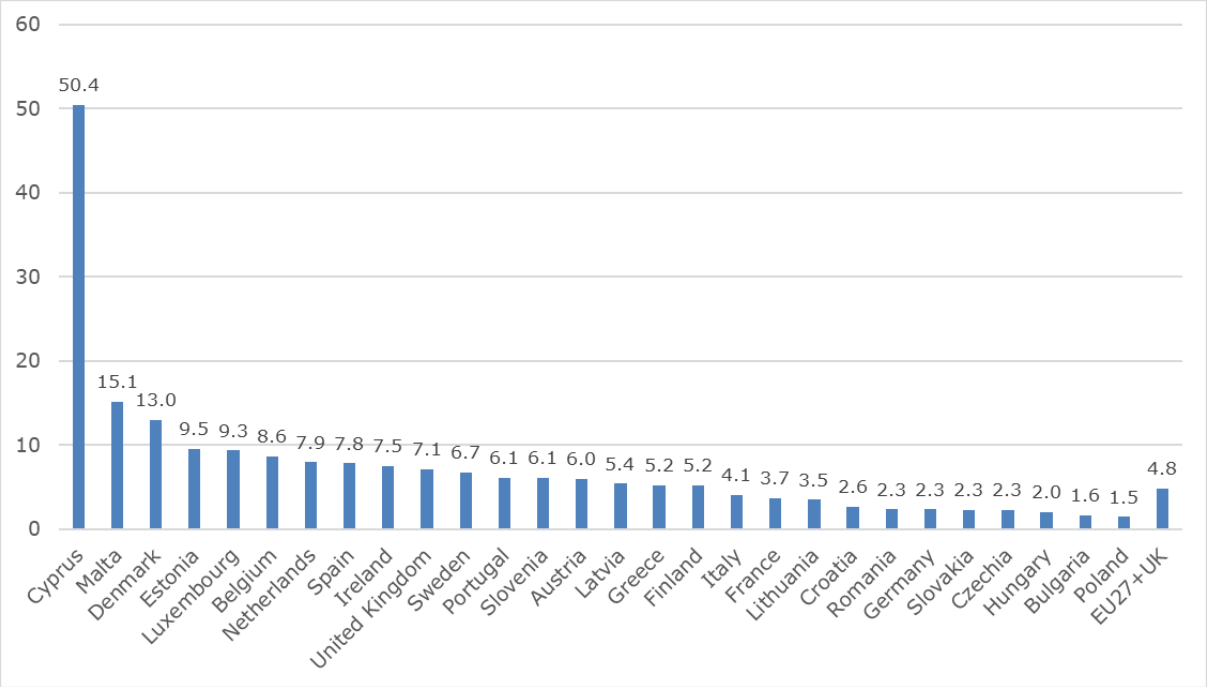
Source: European Commission.[268]

The analysis of data from the two figures above identifies only a weak correlation between the number of applications (relative to the size of the research workforce) and the success rate (i.e r=0.48). This suggests that there is no inherent trade-off between the quantity and quality of applications submitted by country; given the right conditions (e.g. quality of research environment) and support to applicants, it should be possible for any country to submit more and better applications.

Finally, the figure below shows the number of retained applications in each Member State relative to the size of the research population. The figure shows that Cyprus, Malta, Estonia and Luxembourg are the most successful countries. Again, smaller countries tend to be more successful than larger ones. However, there are exceptions: Hungary and Ireland have similar numbers of researchers, but Ireland is much more successful in its MSCA applications.

[268] *European Commission (2021), H2020 Proposals summary. See: https://webgate.ec.europa.eu/dashboard/sense/app/e02e4fad-3333-421f-a12a-874ac2d9f0db/sheet/941d3afe-da24-4c2e-99eb-b7fcbd8529ee/state/analysis*

Figure 109. Retained MSCA applications per 1,000 researchers (2014-2020)



Source: European Commission,[269] Eurostat.[270]

2.2 Availability and usefulness of support for applicants

2.2.1 Overview

The survey of MSCA fellows asked them whether they had made use of different types of support and how helpful they found the support provided. A summary of the responses is provided in the figure below.

First, **support was most commonly received from the host organisation. 90% of fellows received such support, with 79% finding it very or rather helpful**.

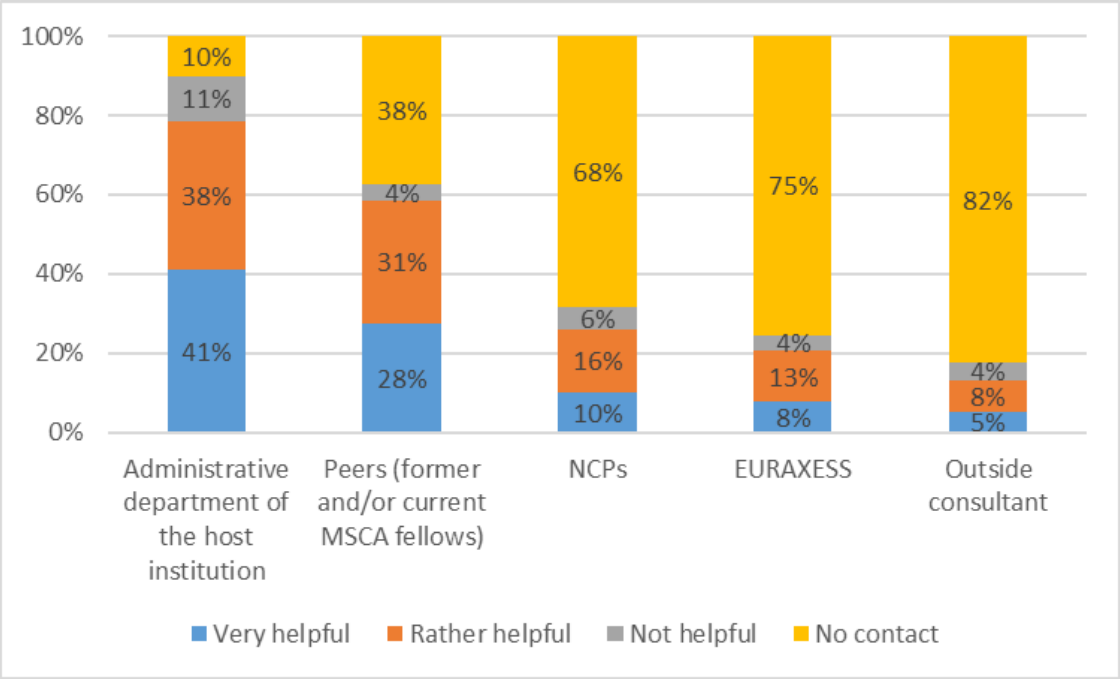
The second most commonly received form of support was from current or former MSCA fellows; 73% of fellows were supported by their peers. However, only 42% found it very or rather helpful, whilst 31% (i.e. more than four out of ten who received such support) did not find it helpful at all.[271]

Support from NCPs and EURAXESS was received by fewer than one in three applicants, reflecting either limited and uneven provision of such support, or a lack of awareness amongst applicants regarding the availability of such support. As discussed in Section 2.2.4 below, whilst training and assistance on proposal writing is considered a basic service to be provided by all NCPs, some NCPs report difficulties in providing such support to a significant degree. Outside consultants were the least commonly used form of support, being used by only 17% of applicants, no doubt reflecting

[269] *European Commission (2021), H2020 Proposals summary. See: https://webgate.ec.europa.eu/dashboard/sense/app/e02e4fad-3333-421f-a12a-874ac2d9f0db/sheet/941d3afe-da24-4c2e-99eb-b7fcbd8529ee/state/analysis*
[270] *Eurostat (2022), R&D personnel by sector of performance, professional position and sex[rd_p_persocc]*
[271] *I.e. 31% of 79% = 42%*

the costs associated with it. More than three-quarters of fellows who made use of support from NCPs, EURAXESS and outside consultants found such support very helpful or helpful.

Figure 110. Helpfulness of support sources during the application process and mobility phase



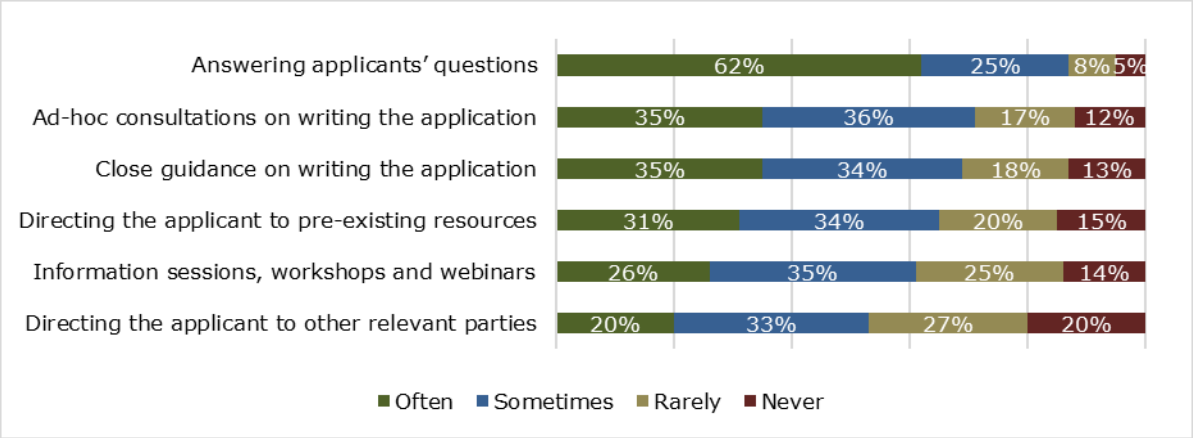
Source: Survey of MSCA fellows (ITN, IF, COFUND) (2022); n = 4,284.

2.2.2 Support from host organisations

Host organisations are an obvious source of support for applicants, given their interest in a successful application. In many cases, hosts also have considerable experience and expertise from previous successful applications. Support from host organisations includes informal support, such as answering questions or signposting the applicant to other sources of information or support, as well as more formal support such as providing guidance or holding information sessions and workshops. This varies from institution to institution, depending on their willingness and capacity to provide such support.

The survey of host organisations indicates that host organisations provide a range of support to applicants during the application process, as shown in the figure below. Answering applicants' questions is by far the most common form of support offered by MSCA host organisations to applicants. However, supporting the proposal writing process itself does not seem to be given the same level of attention. Moreover, directing applicants to other relevant parties is the least commonly offered support provided by MSCA host organisations.

Figure 111. How often does your organisation or department support the MSCA applicants in the following ways during the application process?



Source: MSCA organisations' survey (2022) (n=1,110).

It might be expected that the percentages of host organisations offering each type of support would be higher, given their expertise and their interest in a successful application. This suggests a possible need both to encourage more hosts to offer support and to provide them with further guidance on possible approaches.

The provision of support was relatively similar between non-widening and widening Member States. When looking at organisations providing support at least sometimes, the major differences are in providing close guidance on drafting the application (72% for non-widening and 66% for widening Member States) and in directing the applicant to pre-existing resources (69% for non-widening and 61% for widening Member States). However, these differences are relatively insignificant.

In analysing if the support provided to MSCA applicants impacts success rates, we can note that only information sessions, workshops and seminars (support often provided) show a moderate effect on success rates (r=0.55). The effect is stronger for widening Member States (r=0.63) than for non-widening Member States (r=0.55).[272] No other clear patterns emerge from analysing organisational or departmental support against success rates.[273] This analysis indicates that information sessions, workshops and seminars are the factors contributing the most to successful proposals overall, and the effect is more pronounced in widening Member States.

Examples of good practice approaches in providing support to MSCA applicants are offered by the University of Padua and Sapienza University, as shown below.

University of Padua (Italy)
One best practice example of support provided by a host organisation to MSCA applicants is offered by the International Research Office of the University of Padua. Support is offered through an event entitled the "Marie Skłodowska-Curie Actions, Master your

[272] *European Commission; MSCA organisations' survey (2022) (n=1,644). Country were excluded from the analysis if the number of organisations was inferior to 5 (these include Estonia, Lithuania, Bulgaria, Slovakia, Latvia and Malta).*

[273] *The factors analysed include: answering applicants' questions, directing the applicant to pre-existing resources, close guidance on writing the application, ad-hoc consultations on writing the application and directing the applicant to other relevant parties.*

Research and Training Needs programme", also known as the MSCA MaRaThoN. Four editions of the programme have been implemented, with a fifth planned for May 2022.

The MSCA MaRaThoN is addressed to candidates who wish to apply for MSCA Individual/Postdoctoral Fellowships calls indicating the University of Padua as their host organisation. The event features opportunities for applicants to meet experts and MSCA evaluators, receive advice on drafting project proposals, familiarise themselves with the campus, and meet potential supervisors at the university.[274]

Sapienza University (Italy)

Sapienza University of Rome offers a 3-day in-depth 'Grant Writing Lab', free-of-charge for MSCA applicants. The Lab explores each step in the application process and how best to write an application. The target audience is researchers looking to undertake a fellowship in Italy and Italian researchers looking to go to other countries. Sessions are provided in both English and Italian. In particular, the Labs aims to provide insights into the most common mistakes to avoid and the best ways to ensure added value. In advance of the Lab, potential applicants are invited to attend a short online workshop to learn about more the Lab and the services offered to applicants by the university.[275]

2.2.3 Support from peers

As noted above, the second most commonly received form of support was from current or former MSCA fellows, which was received by 73% of fellows, although only 42% found it helpful or very helpful.

Support from peers (including former or current MSCA fellows) may be sought through personal contacts and informal networks. A considerable wealth of support is available online, albeit mostly in passive forms, such as videos, blogs, or interviews. Much of this support is provided independently by MSCA fellows on platforms, such as YouTube, WordPress blog-spaces, and Twitter. Some fellows may use their MSCA experience to further their online presence as an academic and public/social media figure, which is increasingly seen as important for academics.[276] An example of peer support provided online to MSCA applicants is offered below.

Peer support (Tomislav Stojanov)

One MSCA fellow, Tomislav Stojanov, has posted video tutorials offering support to MSCA applicants on his personal YouTube channel.

The first tutorial ("#1 MSCA Postdoctoral Fellowship Tips & Tricks") focuses on how to find a promising host institution, supervisor, and research topic. This 30-minute tutorial is the longer version of a presentation on 22 April 2021 at the Horizon Europe Info Day - Marie Skłodowska-Curie Action Postdoctoral Fellowships, which was organised by the Agency for Mobility and EU Programmes of the Ministry of Science and Education of the Republic of Croatia. In the 12 months since first being posted, the tutorial attracted 1,284 views.[277]

[274] *https://www.unipd.it/en/msca-marathon22*
[275] *https://euraxess.ec.europa.eu/worldwide/india/grant-writing-lab-msca-postdoctoral-fellowship-sapienza-university-rome*
[276] *Mark. "An Introduction to Social Media for Academics." Mark Carrigan (blog), October 25, 2018. https://markcarrigan.net/2018/10/25/an-introduction-to-socia-media-for-academics*
[277] *https://www.youtube.com/watch?v=NcDPoeSi7o0*

The second tutorial ("#2 MSCA Postdoctoral Fellowship Impact part") relates to the impact and dissemination aspects of the fellowship, rather than the application process. This 20-minute tutorial was based on a presentation made on 21 July 2021 at the My Marie Curie Postdoc Experience virtual event organised jointly by the Agency for Mobility and EU programmes of the Ministry of Science and Education of the Republic of Croatia and the Marie Curie Alumni Association Croatian Chapter. In the ten months since first being posted, the tutorial attracted 419 views.[278]

Alternatively, applicants may connect with peers through formal networks, such as the Marie Curie Alumni Association (MCAA) and its 33 geographic chapters covering various national and regional networks.[279] However, the MCAA specifies that it does not provide any form of advice or assistance to candidates for MSCA funding[280] and the majority of resources on the website and the majority of events are targeted at alumni rather than applicants. Nonetheless, among the central aims and objectives of the alumni networks are efforts to: "initiate activities, events, seminars, webinars that add value to the Alumni network and prospective Marie Curie applicants."[281] In line with this, the MCAA provides general information about the MSCA and organises ad hoc webinars, which will be of use to potential applicants. For example, in February 2022, the MCAA held a webinar "Introduction to Marie Skłodowska-Curie Actions (MSCA) under Horizon Europe".[282] The event was open to any potential applicant but had a particular focus on the Middle East, with members of the Middle East Chapter sharing their experiences.

Given that 31% of successful applicants reported that they did not find the support of current or previous MSCA fellows to be helpful, there may be a need to stimulate new forms of support. For example, funding to encourage and support the MCAA (or other alumni networks) in linking applicants to fellows in the same field or to offer more introductory webinars, similar to the Middle East event described above.

2.2.4 National Contact Points

National Contact Points (NCPs) are the main structure providing guidance, practical information and assistance on all aspects of participation in Horizon Europe. NCPs work alongside their respective national research councils (and, in many cases, are funded by them) and university associations to promote the value and attraction of applying for a MSCA fellowship in their country.[283] Training and assistance in proposal writing are considered as basic services to be provided by all NCPs.[284] For example, the NCP in France organised a webinar in June 2021 for applicants planning to submit an application to a French host institution.[285]

Since NCPs are national structures, the type and level of services offered differ from country to country. Some NCPs reported being short-staffed or under-resourced, and that their structure only allows them to dedicate a small share of their time to the

[278] *https://www.youtube.com/watch?v=LwNGN6DCwMI*
[279] *For an analysis of the contribution of MCAA to maintaining intersectoral networks, see: Study on mobility flows of researchers in the context of the MSCA. Annex 3. Case study 3: Career paths of researchers who spend their mobility period in business.*
[280] *https://www.mariecuriealumni.eu/help*
[281] *"About Us | Marie Curie Alumni Association." <https://www.mariecuriealumni.eu/>*
[282] *https://www.mariecuriealumni.eu/mcaa-events/introduction-marie-sklodowska-curie-actions-msca-under-horizon-europe*
[283] *MarieCurieActionsIre - YouTube*
[284] *https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/ncp*
[285] *https://euraxess.ec.europa.eu/worldwide/asean/france-msca-online-seminar-how-write-successful-msc-postdoctoral-fellowship*

MSCA.[286] Supporting this, NCPs interviewed for this study mentioned that the time devoted to the MSCA is quite modest and not consistent with the amount of work or expected deliverables in MSCA applicant support. Moreover, there is also the risk that applicants may view the NCP as a "substitute" for the role that host organisations should play in supporting applicants.

Although Germany has an application success rate (6.2%) below the average for EU27+UK (7.9%), it accounts for nearly as many submitted applications in absolute terms as the country with the highest absolute number of submitted applications in absolute terms (Italy) and for nearly as many retained applications as the country with the highest number of retained applications in absolute terms (the UK). This may reflect the particular NCP structure in Germany, which consists of 126 NCPs of which six are specifically dedicated to the MSCA. Within the broad scope of German NCPs, overseen by the German Ministry of Research and Education, available resources for applicants include:

- information on MSCA funding opportunities and calls for proposals;
- advice on how to apply for funding from the MSCA and on contract preparation, project implementation and reporting;
- proofreading of project proposals, providing suggestions for improvement (usually until two weeks before the call deadline);
- holding information events;
- further information, analyses and statistics;
- monthly newsletter with topical information on the MSCA.[287]

In contrast, although the UK accounts for more eligible and more retained applications than Germany and has a higher success rate (9.7%), it has a less extensive NCP structure than Germany or France (with 64 NCPs). The UK has 26 NCPs, which are predominantly working within the UK Research and Innovation (UKRI), the national funding agency investing in science and research in the UK. Of these 26 NCPs covering various research and administration areas relating to Horizon 2020/Horizon Europe and research funding, only one NCP is dedicated to the MSCA. The UKRI and UK Horizon 2020 websites advise applicants to make contact with the relevant NCP for MSCA in order to discuss their application further.

As shown in Figure 107 and Figure 109 above, Cyprus has the highest number of submitted and retained applications relative to the size of its researcher population. This may reflect the support measures provided by the NCP, which include information days, proposal writing workshops and pre-proposal feedback service. The latter is especially useful for applicants to identify gaps in their proposals and how they can be improved. The NCP runs a mailing list and sends information on MSCA news and updates to universities. Individual applicants can also contact the NCP office directly. The University of Cyprus hosts the most MSCA fellows in Cyprus and organises information days on funding opportunities and research and proposal writing workshops for students.

Luxembourg has the highest success rate, as well as a relatively high number of submitted and retained applications relative to the size of its researcher population. Support provided via the main website is relatively modest, with no guidance or advice other than to ensure adherence to the 'general eligibility criteria'.[288] However, there is subsequent engagement by national government ministries and research bodies in providing events and resources.

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[286] *Net4Mobility+ (2018). Recommendations for Widening Countries' MSCA NCPs. Available at: https://www.net4mobilityplus.eu/fileadmin/user_upload/N4M_D1.4__Recommendations__for_Widening_countries_NCPs.pdf. For recommendations for NCPs, see also: Study on mobility flows of researchers in the context of the MSCA. Annex 1. Case study 1: Bridging the gap in mobility flows towards and from widening countries.*
[287] *https://www.nks-msc.de/en/Our-Services-2245.html*
[288] *https://www.luxinnovation.lu/msca-application-2022/*

For example, Luxembourg launched a national call for expressions of interest from private companies to increase visibility and interest in MSCA opportunities. NCPs then derived a list of keywords from the specific needs and interests of companies, which were used to target and approach potential researchers. These researchers were then matched with companies that expressed interest in hosting a post-doctoral fellow. These examples demonstrate how closer contact and more tailored approaches to contacting researchers, encouraging them to apply for MSCAs based on their needs and those of willing host organisations, can increase interest in the MSCA programme and increase researchers' inflows to that country.

One way by which NCP support for applicants has been fostered is the Net4Mobility project (which operated from 2015-2018)[289] and its successor the Net4Mobility+ project (which operated from 2018-2021), both of which received funding from Horizon 2020.[290] The projects facilitated transnational co-operation between NCPs as a way of raising the general standard of applications and better inform research and innovation stakeholders about MSCA funding opportunities. The activities included training sessions for NCPs, twinning visits and best practice meetings between NCPs, and a communication platform for the exchange and transfer of knowledge. Benefits include creating opportunities for NCP networking, providing high-quality training materials and providing the NCP network with a one-stop-shop service through the Enterprise Europe Network (EEN) for SMEs, matching a potential applicant to the most appropriate enterprise for cooperation. The project has also provided an unofficial guide for applicants in the form of a "Survivor's Guide to the MSCA-IF". The successor to these projects, MSCA-NET, started operating in March 2022, ensuring the continuity of the network.[291] This new project is co-ordinated by the NCP for Switzerland (operated by Euresearch), together with partners in 25 EU Member States and several countries associated with Horizon Europe. In addition, four MSCA NCPs from third countries, notably from Latin American countries, participate in the project actively.

2.2.5 Networks of universities and other host organisations

In order to provide both better general and more localised support to applicants, some countries have established a second-level NCP network or other similar support structures located within higher education institutions. This includes Finland, Latvia and Sweden, as described below.

Sweden
While each university has its own grant office or research support service that directly works with MSCA fellows, Swedish universities maintain a strong collaboration network amongst themselves. NCPs are the initial point of contact but quickly direct researchers to the university contact points. Because there is such a strong network, researchers communicate directly with universities. If universities cannot address the researcher's queries, they contact the NCP. In Sweden, hosting massive information sessions with prospective fellows was not as constructive as individual consultations. The Swedish NCP acknowledged that all situations are highly individual, and that a general answer or explanation might not fully address an applicant's question. To resolve this, Sweden uses its university network, providing local-level support to applicants, while stressing the university's autonomy. Each university has its own recruitment, communication and support strategy for prospective fellows. Meanwhile, members of the NCP office can participate in the universities' events and have worked to set up strategic meetings with the universities' top management.

[289] *https://cordis.europa.eu/project/id/640603*
[290] *https://euraxess.ec.europa.eu/worldwide/north-america/net4mobility-project-comes-end*
[291] *www.msca-net.eu.*

2.2.6 EURAXESS

The EURAXESS Services network of over 630 centres provides free personalised assistance to researchers, with a special focus on international mobility and career development. Amongst its services, EURAXESS hosts a database of current funding opportunities related to incoming and outgoing mobility and travel grants, which some potential host organisations use to reach potential MSCA fellows. Some EURAXESS Local Contact Points (LCPs), which are typically located in universities (research office or human resources department), also provide more hands-on support to MSCA applicants, although they are not required to do so. In many cases, such as in Germany, the NCPs for EURAXESS and the MSCA are provided by the same organisation and often are the same staff members.

EURAXESS creates video and published content, which is often tailored to different national contexts.[292] As a consequence, the specific output and frequency are not entirely uniform, although a rich diversity of content is available via the EURAXESS portal. For example, across ASEAN, AU&NZ, India, Japan and South America, output online is fairly regular, particularly as application deadlines come onto the horizon, with uploads of video conferences and discussions on average each month.[293] This includes a proposal writing webinar organised by EURAXESS ASEAN, Japan and Korea in August 2021. EURAXESS ASEAN also held a series of workshops for MSCA applicants as part of the European Research Day 2016.[294]

2.2.7 Outside consultants

Some MSCA applicants hire consultants to provide support with their applications. As shown above, only 17% of fellows reported having used this type of support. However, more than three-quarters of these (i.e. 13% of all fellows) reported it being very or rather helpful. This suggests that such support could be considered a useful complement to support offered by hosts, peers, NCPs and EURAXESS.

In some cases, consultants actively market their services to potential MSCA applicants on a paying basis. For example, a certain consultancy company claims to offer expertise in EU research funding and consultation, provide a breakdown of the assessment criterion and offer prospective applicants to use their 'No/Go' screening process to assess whether to submit an application. The company similarly offers pre-award and post-award services to applicants, including standard and 'deep dive' reviews of application work delivery plans and post-project plans for dissemination and communication of research.

In other cases, consultancies and independent online sites offer general information relating to MSCA applications, although these tend to be brief overviews with URL links to relevant websites and documents. For example, sites like 'DiscoverPhDs' offer free-to-access advice on general processes and first steps, its primary income stream being the advertisement of PhD posts paid for by universities.[295]

2.2.8 National public or sectoral bodies

In some countries, national public or sectoral bodies (other than those responsible for MSCA NCPs or EURAXESS) support applicants in order to boost participation and promote national policy priorities supporting researcher careers. Given the support available from MSCA NCPs or EURAXESS, the support provided by other bodies tends to be ad hoc rather than consistently provided in all countries. For example, Romania has taken steps to

[292] *EURAXESS ASEAN. Practical Pointers for Developing Your MSCA Postdoctoral Fellowship Proposal, 2021. https://www.youtube.com/watch?v=KOh-NOZV_HU.*
[293] *EURAXESS Australia & New Zealand. Webinar: Marie Sklodowska-Curie Actions Postdoctoral Fellowships 2021: Application Advice, 2021. https://www.youtube.com/watch?v=tjM0xkuUgxY.*
[294] *For example, see: https://euraxess.ec.europa.eu/worldwide/asean/european-research-day-2016-effective-proposal-preparation-marie-sk%C5%82odowska-2*
[295] *"How To Get A Marie Curie Fellowship – A Complete Guide | DiscoverPhDs," May 21, 2020. https://www.discoverphds.com/advice/funding/marie-curie-fellowship.*

increase its success rates in applications for Horizon Europe through the provision of support for applicants, as explained below.

Romania

Although Romania submitted more applications relative to the size of its researcher population than the EU27+UK average, the small size of the researcher population meant that it submitted relatively few applications compared to its overall population size. Moreover, Romania's MSCA application success rate (6.2%) was below the average for the EU27+UK (7.9%). For this reason, Romania is taking steps to promote participation with funding from the EU's Recovery and Resilience Facility.

The Recovery and Resilience Facility aims to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.[296] Member States set out in their Recovery and Resilience Plan the reforms and investments that they aim to implement by 2026 with support from the Facility. Romania's plan will be supported by EUR 14.9bn loan financing from the EU.

Romania's Recovery and Resilience Plan aims to increase the success rate of applications under Horizon Europe, including the MSCA, by providing support to applicants. In particular, Investment 6 within Component 9 ("Business Support, Research, Development and Innovation") will finance 500 vouchers for researchers whose Horizon Europe application has passed the eligibility phase. The vouchers will finance support in writing the project proposal, staff exchanges to organisations with experience in writing successful applications to Horizon 2020 and participation in brokerage events.[297]

However, there are examples in third countries that do not feature NCPs, such as IndiaBioscience.

IndiaBioscience

IndiaBioscience is a government-funded body within the campus of the National Centre for Biological Sciences, Bangalore, that promotes networking of life science professionals across India and abroad, the development of science careers and the exchange of scientific expertise in India.

Amongst its services, IndiaBioscience provides advice to potential MSCA applicants via its website in the form of podcasts, links to calls, and practical tips suggested by MSCA fellows. IndiaBioscience also operates a database of mentors and contact persons that can support applicants to various international funding opportunities, including the MSCA.[298]

[296] *https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en*
[297] *COM(2021) 608 final, ANNEX to the Proposal for a Council Implementing Decision on the approval of the assessment of the recovery and resilience plan for Romania {SWD(2021) 276 final.*
[298] *https://indiabioscience.org/columns/funding/10-pointers-for-the-msca-application*

3 Conclusions

The evidence presented in this case study suggests a number of conclusions.

First, **the level and quality of support currently available to applicants appear sufficient to enable the submission of a high volume of applications of the required quality**. Out of nearly a quarter of a million MSCA applications submitted under Horizon 2020 (2014-2020), nearly two-thirds (66%) were of sufficient quality, but only 8.5% were retained for funding (and only 7.9% from the EU27+UK). In a context of such high overall demand in excess of the funds available, it could be argued that there is no urgent need to increase support to applicants – unless, of course, additional funds were to be made available.

Second, **there is evidence of good practice in providing support to applicants, which may explain some of the differences in the volume or success rates of applications from different countries**. This includes support from NCPs, EURAXESS centres or other national bodies. At the same time, there is insufficient evidence to conclusively attribute any level of success in MSCA applications to the level and quality of support provided to applicants in any particular country; other factors remain important, not least the size of the researcher population. Moreover, where host institutions provide effective support, this naturally benefit incoming researchers from other countries.

Third, **applicants already make use of a range of supporting measures, with host organisations and peers being the most commonly used sources of support.** However, some NCPs and EURAXESS centres go beyond their mandatory services to support applicants. This varies from country to country, in line with national priorities and available resources. Peer support is perhaps under-developed and might merit more structured support at EU and national levels. Outside consultants are used successfully by a minority of applicants, although the cost of such support is likely to deter many, if not most applicants, in the absence of specific funding.

Fourth, **there is a potential to increase the support available to applicants, perhaps by "levelling up provision", so that countries with relatively low volumes of submitted and accepted applications can perform better within the MSCA.** Improvements in support will probably need to be driven by the relevant national stakeholders (e.g. NCPs, EURAXESS) and financed by relevant funds. In some cases, NCPs or EURAXESS centres might directly provide improved support. In other cases, national stakeholders might assist and encourage host organisations to offer more consistent, high-quality support to applicants by highlighting good practice examples. To this end, there are examples of national bodies using EU funds to improve support to applicants, such as the Recovery and Resilience Facility, or hiring consultants.

Annex 6. Methodology

This study required a triangulation of quantitative and qualitative data collected from multiple sources. The qualitative data include information collected from already existing studies and scientific papers, as well as interviews conducted by the study team. The qualitative data include administrative Horizon 2020 data, end of the fellowship and follow-up surveys, the MORE4 survey as well as surveys that were run specifically for this study.

In the sub-sections below, we provide detailed information on the surveys run by the study team, the methodology used to exploit the MORE4 survey data, as well as information about the interview programme.

1 Survey data collection

In order to fill the information gaps not covered by the empirical and administrative data and desk research, the study team conducted a survey of all organisations and individual researchers participating in the MSCA.

The data collected cover the implementation period of Horizon 2020 and include geographical and intersectoral aspects of MSCA researchers' mobility, the types of organisations involved, as well as a breakdown of researchers' profiles (e.g. by host country, career stage, area of research, etc.).

The response rate for researchers was 17% and 6% for organisations. To increase the response rate and ensure that we received enough meaningful data, the survey was shared with all researchers and host organisations whose contact information was available. In total, we sent 62,882 survey invitations. We received 7,357 survey responses, of which 5,713 from individual researchers and 1,644 from organisations.[299]

Four different surveys were conducted, tailored to the different types of MSCA researchers (individuals) and to participant organisations. The total numbers of responses received were as follows:

- 4,539 responses from fellows (IF, ITN and COFUND);
- 1,128 responses from RISE researchers and staff;
- 46 responses from widening fellows; and
- 1,644 responses from organisations (IF, ITN, COFUND and RISE).

A more detailed breakdown of the sample is presented below.

1.1 Data from the researchers' survey

To enhance the understanding of MSCA researchers' mobility flows, the study team collected comprehensive data on the mobility flows of MSCA researchers under Horizon 2020. A total of 34,529 survey invitations were sent out, and 5,713 responses were received. The lowest response rate was found among RISE researchers and staff, with only 9% of this sample group completing the survey. Meanwhile, fellows under the Widening Fellowships and Individual Fellowships were the most active respondents to the survey. Table 44 shows a breakdown of invitations sent and responses received by action.

[299] *These numbers may differ from CORDA database numbers because they do not include duplicates, inactive e-mail addresses, unsubscribed e-mail addresses and projects that have either not started or have been terminated.*

Table 44. Composition of the researchers survey sample, by type of MSCA

Action	No of invitations sent	No of responses	Share (%)
COFUND	4,195	854	**20%**
IF	6,058	1,442	**24%**
ITN	11,721	2,243	**19%**
RISE	12,447	1,128	**9%**
SUM	**34,421**	**5,667**	**16%**

Source: survey of MSCA fellows (ITN, IF, COFUND) and RISE staff (2022).

The largest share of responses came from academic institutions and research organisations. This is reflective of actual participation in the MSCA, as these are the two largest sectors hosting MSCA researchers and staff. Table 45 provides a detailed breakdown of the host sector by action.

Table 45. Composition of the researchers survey sample, by host sector and type of action

Host sector	COFUND	IF	ITN	RISE	Sum	Share (%)
Higher or secondary education establishments	566	1,121	1,444	595	3,726	**67%**
Research organisations	224	264	467	154	1,109	**20%**
Private for-profit entities (excluding higher or secondary education establishments)	2	32	304	283	621	**11%**
Public bodies (excluding research organisations and secondary or higher education establishments)	0	9	15	28	52	**1%**
Other	0	5	6	68	79	**1%**

Source: survey of MSCA fellows (ITN, IF, COFUND) and RISE staff (2022).

The researcher survey covered each of the scientific panels (see Table 46). The highest number of survey responses was received from researchers in Life Sciences (LIF) and Engineering (ENG). Relatively few responses were received from researchers in Economics (ECO) and Mathematics (MAT). These results are in line with the distribution of participations in the MSCA programme overall. COFUND researchers are not represented in this table, as COFUND projects operate in many science panels, and these data are not available in CORDA.

Table 46. Composition of the researchers survey sample, by action and scientific panel

Scientific panel	IF	ITN	RISE	Total of each scientific panel	Share (%)
LIF	353	608	183	1,144	**24%**
ENG	171	594	278	1,043	**22%**
SOC	405	233	202	840	**17%**
ENV	198	344	167	709	**15%**
CHE	141	227	93	461	**10%**
PHY	117	165	111	393	**8%**
ECO	28	26	63	117	**2%**
MAT	29	46	31	106	**2%**

Source: survey of MSCA fellows (ITN, IF, COFUND) and RISE staff (2022).

One of the most important variables in our analysis of researchers' mobility trends in the MSCA was the country of the host institution. We received responses which we grouped into geographical regions in Table 47. The vast majority of researchers who responded to the survey were hosted in non-widening EU countries including the United Kingdom (78%). 8% of respondents were hosted in widening countries, which does not include responses from widening fellows to the Widening Fellowships survey. This is very much in line with

the overall trends in researchers' participation in the MSCA, in which non-widening countries host the largest share of researchers.

Table 47. Composition of the researchers survey sample, by type of host country

Type of country	MSCA (COFUND, IF, ITN)	RISE	Total of each country group	Share (%)
Non-widening EU countries (including UK)	3,786	611	4 397	**78%**
Widening EU countries	310	124	434	**8%**
H2020 associated	367	18	385	**7%**
Widening H2020 associated	33	32	65	**1%**
Third countries	10	343	353	**6%**
Unknown	33	0	33	**1%**

Source: survey of MSCA fellows (ITN, IF, COFUND) and RISE staff (2022).

Among the survey respondents, 53.9% were early-stage researchers, 44.8% were experienced researchers and 1.3% were technical, managerial and administrative staff.

In addition to the general researchers' survey and to assess the impact of the Widening Fellowships pilot (2018-2020) on mobility flows towards widening countries, the study team also conducted a separate survey of widening fellows. The survey invitation was sent out to all widening fellows. In total, we received 46 responses, i.e. a response rate of 42.6% out of the 108 projects.

Table 48. Composition of the widening fellows survey sample, by response rate

	No of invitations sent	No of responses	Share (%)
Widening Fellowships	108	46	**42.6%**

Source: Widening fellows survey (2021).

1.2 Data from the organisations' survey

The table below presents a breakdown of the sample for the survey of host organisations by number of responses received from each type of MSCA. A total of 27,353 invitations were sent out and 1,644 responses were received. This represents a response rate of 6%. The highest number of responses was received from organisations participating in the ITN action, while the lowest number of responses came from COFUND. This is in line with actual trends in the participation of host organisations in the MSCA.

Table 49. Composition of the organisations survey sample, by action

Actions represented*	No of responses	Share (%)
ITN	1,130	**50%**
RISE	540	**24%**
IF	457	**20%**
COFUND	132	**6%**

Source: survey of MSCA organisations (2022).
*The sum is larger than 1,644 because one organisation can participate in more than one action.

Around 60% of the responses to the survey came from academia. Meanwhile, the smallest number of responses was received from representatives of public institutions. Overall, the distribution of host organisations by sector is in line with actual participation trends for organisations in the MSCA.

Table 50. Composition of organisations survey sample, by sector of respondents

Respondent's sector	No of responses	Share (%)
Higher or secondary education establishments	948	**58%**
Research organisations	353	**21%**
Private for-profit entities (excluding higher or secondary education establishments)	290	**18%**
Other	35	**2%**
Public bodies (excluding research organisations and secondary or higher education establishments)	18	**1%**
SUM	**1,644**	

Source: survey of MSCA organisations (2022).

A large majority of respondents to the organisations survey came from non-widening EU countries, including the United Kingdom. Table 51 below presents the number and share of hosts from each group of countries. The organisations' sample in the survey of organisations is fairly representative of the actual participation rates of organisations from these country groups in the MSCA.

Table 51. Composition of the organisations survey sample, by respondents' country type

Respondent's country type	No. of responses	Share (%)
Non-widening EU countries (including UK)	1,118	**68%**
Widening EU countries	232	**14%**
Non-widening H2020 associated countries	74	**5%**
Widening H2020 associated countries	37	**2%**
Third countries	183	**11%**
SUM	**1,644**	

Source: survey of MSCA organisations (2022).

Overall, both the individual researchers and organisations samples cover a wide range of disciplines and countries, as well as represent researchers in all stages of their career. In addition to large sample sizes, this ensures that the data are both relevant and representative in order to draw meaningful conclusions and recommendations.

2 The use of the MORE4 survey data

To analyse how MSCA researchers' mobility flows compare to the overall researcher's mobility, the study team also incorporated MORE4[300] survey data in their analysis. To ensure that the datasets were comparable certain adjustments were necessary, which are described below.

Unless otherwise indicated, the analysis accounts for MSCA mobility under FP7 and H2020. This was done to ensure a sufficient number of observations in the MORE4 dataset over a comparable period of time and to enable reliable comparisons across the two populations. Due to the MORE4 data accounting for mobilities of early-stage and experienced researchers, the MSCA mobility data have been grouped accordingly.

The analysis provides information on the sample and a post-stratified estimate of the MORE4 data, which removes biases resulting from MORE4's sample construction. The estimate provides information on how mobilities would have been distributed by destination country if the researcher population were distributed similarly by country of origin in the MSCA and MORE4.

[300] *European Commission, Directorate-General for Research and Innovation (2021). MORE4. Support data collection and analysis concerning mobility patterns and career paths of researchers. Survey on researchers in European higher education institutions.*

The MORE4 data include both non-mobile and mobile researchers. Two samples from the MORE4 survey were combined, as they targeted different groups of researchers. The first survey was administered in the EU-27, the United Kingdom, Iceland, Switzerland and Norway. The other survey targeted researchers outside Europe. However, in some instances, these researchers' countries of origin were in Europe. Combining the datasets allowed us to include Member States and all associated countries in the analysis when comparing MSCA and MORE4 mobilities.

Data on non-mobile researchers were cleaned from the MORE4 survey sample. After this cleaning was carried out, the mobility data were categorised into three separate groups: early-stage mobility (PhD mobility); long-term mobility (experienced researchers); and short-term mobility. While the MORE4 survey considered all mobilities longer than three months as long-term mobility, the data were re-coded to include in the group of long-term mobilities only those mobilities that lasted at least a year. This ensured better comparability with the MSCA mobility data.

The MORE4 sampling strategy relied on stratified random sampling, meaning that the survey sample was created and classified according to common characteristics (e.g. country, gender, age). The sample accounted for country-level information and fields of science. To remove any biases present in the MORE4 sample when compared with the MSCA, we post-stratified the data to match the MSCA population.[301] The post-stratification treated MSCA data (FP7 and H2020) as population data. Based on the distribution of countries of origin, we calculated weights for the MORE4 data and subsequent mobilities. This produced an estimate that removes the differences that may arise due to sampling.

At the same time, the gender indicators in the MORE4 analysis are not guaranteed to have an error rate of 5%[302]. These analyses should therefore be approached with caution. Due to the risk of a higher error rate, we present these comparisons only at career stage level. This is done to minimise the risk of misleading conclusions.

3 Interview programme

The study team implemented an interview programme involving individualised interview questionnaires for the following three groups of interviewees:

- National-level policymakers and stakeholders (ministries, relevant agencies or research funding organisations, National Contact Points): 22 interviews
- Individual fellows: 14 interviews
- Host institutions: 7 interviews

The interviews were semi-structured and organized, to a large extent, around a set of predetermined open-ended questions; nevertheless, the study team allowed for other questions to emerge from the dialogue between the interviewer and interviewee. The interviews were used to enrich the survey data as well as to fill out information gaps.

With the permission of the interviewees, the interviews were recorded and transcribed after the interview. Transcribed interviews were coded based on the topics covered. Such a technique allowed an efficient use of the interview data by the study team.

[301] *Post-stratification means that the weights are adjusted so that the weighted totals equal the known population totals.*
[302] *A 5% error rate means that if the survey were to be repeated a hundred times, in 95 cases the outcomes would deviate by no more than +/-5% from the outcomes of the survey (5% max error -p value of 0.05).*

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