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Study on International Cooperation in the Marie Skłodowska-Curie Actions

Final Report

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Abstract

The objective of this study is to provide a clear view and comprehensive analysis of the structure and results of third countries' involvement in the MSCA under FP7 and Horizon 2020, covering both inward and outward mobility of researcher. The study also addresses the impacts of international cooperation in the MSCA under Horizon 2020 (2014-2020) and the predecessor programme (Marie Curie Actions) under the FP7 People Specific Programme (2007-2013). The findings of the study are expected to feed into the final evaluation of H2020, but in particular into the preparation for the future international dimension of the MSCA under Horizon Europe.

Before this study, only anecdotal evidence was available for understanding the reasons and factors influencing the involvement of third countries in the MSCA. In addition, there was no comprehensive qualitative or quantitative assessment, which would allow an informed decision to be taken as to which cooperation should be reinforced to ensure more effective brain circulation. This study provides the first in-depth analysis by taking stock of the structure and impacts of international cooperation within the MSCA. The outcomes of the study and its recommendations will allow the European Commission to better decide on the focus, funding streams and rules regarding third country involvement in the MSCA. Furthermore, the research conducted will help to look beyond the MSCA and embed the MSCA in the wider context of European R&I international cooperation policies.

The study concludes that the programme is and will remain bottom-up, but at the same time efforts should be made to better align it with the EU external policy objectives, given its strong international dimension and the growing role of science diplomacy in foreign policies and strategies. As an overarching line of action, the study therefore recommends that MSCA cooperation issues be systematically addressed during formal S&T policy dialogues held with national authorities from third countries or regional fora, and that the results of these discussions be reflected in corresponding bilateral and regional cooperation roadmaps. The study provides 13 detailed recommendations that should be implemented as part of this overarching framework.

1. Introduction

1.1. About the study

This Final Report is submitted for the implementation of the specific contract No. EAC-2018-0396 on the study of international cooperation in the Marie Skłodowska-Curie Actions, implementing Framework Contract No. EAC/47/2014-2. The study was carried out by PPMI Group in partnership with the Centre for Strategy & Evaluation Services (CSES). This report was produced on the basis of evidence stemming from:

- **12 case studies providing an in-depth analysis of the selected countries' participation in the MSCA.** The analysed third countries include: The United States, Japan, Brazil, China, Kenya, Vietnam, Morocco and Belarus. The analysed EU and associated countries include: The United Kingdom, Israel, Tunisia and Turkey.
- **106 interviews:** 89 of them were implemented for the case studies; 7 were implemented as preparatory interviews with Commission officials in order to fine-tune the methodology and set the expectations for the study; 10 supplementary interviews were implemented with stakeholders in other actively involved countries: South Africa, Thailand, Pakistan, Argentina, Mexico, South Korea, Colombia, Malaysia, Singapore and Russia; and with the EACEA representative to discuss synergies between Erasmus+ and the MSCA.
- **Quantitative analysis** of various data sources:
 - CORDA data on participation of organisations and researchers in FP7 MCA and Horizon 2020 MSCA;
 - Data received from REA on project final reports, evaluation questionnaires and follow-up questionnaires;
 - Data from country fact sheets published in the "MSCA in numbers website";
 - Data from the ICF survey implemented for the interim evaluation of Horizon 2020 MSCA and ex post evaluation of FP7 MCA;
 - Data from CORDIS open data portal.
- **Literature review/desk research** of existing studies and policy documents related to the subject of this study, as well as administrative data.

As requested in the Technical Specifications, the overall objective of this study is to provide a clear view and comprehensive analysis of the structure and results of third countries' involvement in the MSCA under FP7 and H2020, covering both inward and outward mobility. The study addresses the impacts of international (third country) cooperation in the MSCA under H2020 (2014-2020) and the predecessor programme (Marie Curie Actions) under the FP7 People Specific Programme (2007-2013). The findings of the study are expected to feed into the final evaluation of H2020, but in particular into the preparation for the future international dimension of the MSCA under Horizon Europe.

This final report is divided into four main parts. Part 1 provides an introduction, which presents the study and its policy context. Part 2 describes the methodology applied during the study. Part 3 comprises the main part of the report and provides detailed findings of the study. Part 4 provides the main conclusions stemming from joint analysis of all quantitative and qualitative findings. Part 5 provides a list of 13 recommendations, which are structured into general recommendations and recommendations per country group.

Case study reports are attached to this report as Annex 1. Annex 2 of the report provides a list of good practice cases, which includes various activities that contribute to the

successful involvement of third countries in the MSCA. The following types of good practices were identified:

- Information, training and networking events;
- MSCA promotion campaigns;
- Mentoring initiatives;
- Using consultation services to support the MSCA applications;
- Co-funding mechanisms;
- Successful activities of the Marie Curie Alumni Association;
- Award schemes for high-quality MSCA proposals that were not funded by the MSCA;
- Database of potential MSCA beneficiaries;
- Successful MSCA projects with a strong international component;
- Policy dialogue instruments.

Before continuing with the study methodology and the detailed findings, the sub-section below explains the policy context of the study.

1.2. Policy context

Selected key numbers on participation of third country organisations and researchers in the MSCA:

Researchers:

- Currently, around 30% of researchers participating in the Marie Skłodowska Curie Actions (MSCA) come from third countries;
- The share of third country researchers in Horizon 2020 MSCA is a bit lower than in FP7 Marie Curie Actions (32.5%);
- Chinese and Indian researchers are strong leaders in terms of researcher participations, followed by researchers from the US, Argentina and Iran;
- Most of the third country researchers come to the EU from BRIC/emerging economies and developing countries;
- In Horizon 2020, the US is a strong first choice destination for the EU researchers. China and Japan are in distant second and third places;
- Almost half of EU researchers participating in the MSCA are going to high-income countries.

Organisations:

- More than half of all Horizon 2020 participations by organisations from third countries take place in the MSCA projects;
- Around 11% of all participations by organisations in the MSCA are from third countries;
- This is driven by participations from the US, which constitute 40% of all third country participations by organisations in the MSCA under Horizon 2020;
- Other countries in the top 5 in terms of participations by organisations are China, Canada, Australia and Argentina;
- The share of third country participations in Horizon 2020 MSCA as it stands now (10.93%) is a bit lower than in FP7 MCA (12.47%);
- However, the number of active third countries (with over 10 participations) is slightly higher in Horizon 2020 MSCA than it was in FP7 MCA.

Key numbers on third country participations:

Action	Researchers/EU	Researchers/Associated Countries	Researchers/Third Countries	% of researchers/Third Countries	Organisations/EU	Organisations/Associated Countries	Organisations/Third Countries	% of organisations/Third Countries
ITN ¹	4 366	422	2 494	34.2%	8 679	655	373	3.8%

¹ Innovative Training Networks (ITN) support competitively selected joint research training and/or doctoral programmes, implemented by partnerships of universities, research institutions, research infrastructures, businesses, SMEs, and other socio-economic actors from different countries across Europe and beyond.

IF ²	4 681	333	1 511	23.1%	6 191	471	711	9.6%
RISE ³	7 023	903	3 409	30%	2 818	272	1 268	29%
COFU ND ⁴	1 323	132	898	38.1%	748	52	77	8.7%
Total:	17 393	1 790	8 312	30%	18 436	1 450	2 429	10.8%

Source: CORDA data extracted on 16 August 2019.

1.2.1. EU policy and strategy on international cooperation in research and innovation

Research & innovation is the foundation for sustainable wealth and prosperity. Scientific process encourages innovation and leads to the development of new products, processes and services, while also fostering social development. The European Union recognises the importance of international cooperation in research and innovation policy in its Treaties. Article 186 of the Treaty on the Functioning of the European Union (TFEU) foresees cooperation with third countries and states that the EU may include provisions in the framework programmes to support such cooperation. International cooperation in science is also an integral part of the Innovation Union flagship initiative of Europe 2020 Strategy. It acknowledges the necessity to cooperate with non-EU countries on the major challenges such as energy, food security, climate change and ageing populations.

The European Commission has reinforced support for international cooperation activities through its 2012 Communication entitled "Enhancing and focusing EU international cooperation in research and innovation: a strategic approach". The renewed approach of this Communication is expected to contribute to the broader objectives of the EU:

- Tackling global challenges;
- Supporting the EU's external policies through 'science diplomacy'; and
- Strengthening the EU's excellence and attractiveness in research and innovation, while simultaneously boosting its economic competitiveness.

In order to ensure that the instruments used to promote R&I objectives are effective, the EU uses flexible differentiation of partner countries and regions. There is a different cooperation focus for different country groupings:

- For EEA, EFTA and EU enlargement countries the focus is on facilitating their integration into the European Research Area.
- For European Neighbourhood Policy countries, the focus is on supporting a Common Knowledge and Innovation Space, which includes mobility for academics as well as capacity building for these countries.
- For industrialised and emerging economies, the focus is on jointly tackling global challenges and increasing participation in international value chains.
- For developing countries, the focus is on sustainable development and addressing global challenges.

More recently, Commissioner Moedas has set three goals for the EU research and innovation policy:

- Open innovation;

² Individual Fellowships (IF) support the mobility of experienced researchers through European Fellowships and Global Fellowships. IF helps the experienced researchers gain new knowledge and skills, expand networks and advance their research careers.

³ Research and Innovation Staff Exchanges (RISE) fund short-term exchanges of personnel between academic, industrial and commercial organisations throughout the world. RISE action helps researchers and staff develop their knowledge, skills and careers, while building links between organisations working in different sectors of the economy, including universities, research institutes and SMEs.

⁴ Co-funding of regional, national and international programmes (COFUND) provides organisations with additional financial support for their own researcher training and career development programmes. The extra funds are available for new or existing schemes for training researchers. COFUND supports doctoral programmes for PhD candidates, as well as fellowship programmes for experienced researchers.

- Open science; and
- Open to the world.

The inclusion of the third goal demonstrates the EU's strong commitment to international cooperation. The EU recognises the necessity of international cooperation in order to remain a relevant and influential global actor in research and innovation. This goal clearly reinforces the already strong element of international cooperation in the EU R&I international cooperation strategy. As Commissioner Moedas said, "Fostering international cooperation in research and innovation is a strategic priority for the European Union so that we can access the latest knowledge and the best talent worldwide, tackle global societal challenges more effectively, create business opportunities in new and emerging markets, and use science diplomacy as an influential instrument of external policy."

1.2.2. Implementation of the policy and strategy: means & progress

In order to achieve R&I goals, the EU uses different policy instruments (e.g. S&T agreements, strategic partnerships) and funding instruments (European Framework Programme for Research and Technological Development, joint initiatives).

Policy instruments include cooperation with the Member States and Associated Countries through the Strategic Forum for International Science and Technology Cooperation (SFIC) as well as S&T agreements and policy dialogues with key international partner countries, regions and organisations. They serve as a basis for the identification of cooperation opportunities and common interests as well as priority setting.

To ensure that the objectives and activities agreed between the EU and its partners materialise, the EU develops multi-annual roadmaps. The roadmaps cover key partner countries (Australia, Brazil, Canada, China, India, Japan, Mexico, New Zealand, Russia, South Africa, South Korea and United States) and regions (Enlargement countries, Eastern Partnership, Southern Neighbourhood, ASEAN, African Union and CELAC) and these are updated on a regular basis to address the ongoing developments in cooperation activities.

European framework programmes, with the current – and the largest so far – Horizon 2020 – are one of the EU's key funding instruments for implementing the objective of its international cooperation strategy. Horizon 2020 ensures that cooperation actions are implemented on the basis of common priorities and mutual benefits, while taking into account scientific and technological capabilities, market opportunities, expected impact and international commitments.

The strategy has established an obligation for the Commission to report every two years on its implementation. The progress reports published in 2014, 2016 and 2018 have indicated advancements towards the main objectives of the strategy, namely:

- **Improving framework conditions for international cooperation in R&I by reciprocal access to research funding programmes, mutual access to resources and co-funding mechanisms.** The EU seeks to remove obstacles to participation of third country entities in the EU's framework programmes, especially in the light of discontinued funding eligibility for a group of countries, which includes China, India, Mexico, Russia and Brazil. The 2016 progress report indicated that co-funding mechanisms were established in a number of countries, including Mexico⁵, China, Russia, Australia, India, Japan, South Korea, some regions of Brazil and Quebec province in Canada. In 2017, agreement was

⁵ Mexico has discontinued their co-funding mechanism in 2019.

- reached at the 3rd EU–China Innovation Cooperation Dialogue to renew and extend the co-funding mechanism for Chinese entities in H2020 projects in 2018-2020.
- **Working together with international organisations and leading multilateral initiatives.** International cooperation is crucial in addressing global challenges. As a result, the European Commission has enhanced its support to multilateral initiatives in R&I, which is also reflected in Horizon 2020 work programmes. The 2018-2020 work programme of Horizon 2020, for example, will dedicate EUR 250 million to projects that contribute to global health multilateral initiatives. Moreover, in the light of the outbreak of the Zika virus, the EU mobilised substantial political, financial and scientific resources through the Global Research Collaboration for Infectious Disease Preparedness. All progress reports have also confirmed that the European Commission continues to be an active participant in the OECD bodies dealing with R&I policy such as the Global Science Forum, the International Energy Agency, the Committee for Science and Technology Policy and the working group on Technology and Innovation Policy among others.
 - **Reinforcing the international dimension of Horizon 2020.** The programme is designed to be open to the world and promote international cooperation. However, third country participation in Horizon 2020 is lower compared to FP7 (up to this moment, this is also true for the MSCA). For this reason, the international dimension of Horizon 2020 was reinforced as part of the priorities in the 2018-2020 work programme. Since the 2016 progress report, a number of important events have taken place. Joint S&T Cooperation Committee meetings have been successfully organised with a number of partner countries. There were also several regional policy dialogues that include a Ministerial Conference on strengthening Euro Mediterranean cooperation in R&I, a Ministerial Meeting with Western Balkans, an EU-African Union high-level policy dialogue as well as EU-CELAC officials' meetings.
 - **Refining communication strategy to ensure global awareness of the EU's R&I strengths and activities.** The key message of this campaign is "Horizon 2020 – Open to the World". National Contact Points (NCPs), EU Delegations and R&I Counsellors were supporting the Commission in advancing the communication campaign. Moreover, the Service Facility came into operation in 2017; it provides support in R&I international cooperation policy development, priority setting and implementation by providing services for awareness raising and training, support to NCPs, organisation of events and various analysis and monitoring activities.
 - **Strengthening synergies with the EU's external policies.** The importance of R&I is continuously included in the general policy dialogue with the EU's key partners (e.g. China, Brazil, the US, Canada). Other important activities are related to the integration of enlargement and neighbourhood countries into the European Research Area, including through their association to Horizon 2020. New association agreements were applicable from 2015 with Ukraine, and from 2016 with Georgia, Tunisia and Armenia.
 - **Reinforcing partnership with the Member States.** This is being specifically achieved through the Strategic Forum for International S&T Cooperation (SFIC). One of the major achievements indicated in a progress report of 2016 is SFIC's contribution to the ERA Roadmap priority on international cooperation based on the Member States' national priorities. Moreover, SFIC issued opinions on international cooperation in the context of the mid-term review of Horizon 2020 and the preparation of Horizon Europe. Another major development in this area took place in 2018 when the Partnership for Research and Innovation in the Mediterranean Area (PRIMA) was launched.

1.2.3. Transition to Horizon Europe

Building on the achievements and success of the EU's past flagship research and innovation programmes, the Commission has recently proposed a budget of EUR 100 billion for 2021-2027 for the new generation Horizon 2020 successor programme – Horizon Europe. Horizon Europe is built on the evidence and lessons learnt from the Horizon 2020 interim evaluation, and the recommendations of the independent High-Level Group on maximising the impact of EU research and innovation. As was noted in the Impact Assessment of Horizon Europe⁶, the new programme will:

- extend openness to the association of third countries;
- continue its openness to international participation for entities from all third countries;
- continue its funding of entities from developing countries;
- launch targeted actions that are in line with the EU priorities;
- strengthen synergies with other EU programmes.

Stemming from the TFEU, the general objectives of the new Horizon Europe programme are to:

- strengthen EU science and technology thanks to increased investment in highly skilled people and cutting-edge research;
- foster the EU's industrial competitiveness and innovation performance, notably by supporting market-creating innovation via the European Innovation Council and the European Institute of Innovation and Technology;
- deliver on the EU's strategic policy priorities, such as the Paris Agreement on climate change, and to tackle global challenges that affect the quality of our daily lives⁷.

The continuity from Horizon 2020 is reflected in the three-pillar structure that will be retained in Horizon Europe but redesigned for more coherence, both between and within pillars, in support of the programme's specific objectives. The three-pillar structure will include:

- The Open Science pillar to support frontier research projects, researcher mobility and world-class research infrastructures.
- The Global Challenges and Industrial Competitiveness pillar to support research relating to global challenges and reinforce industrial and technological capacities. It will also support EU and national policymakers with independent scientific evidence and technical support through the Joint Research Centre.
- The Open Innovation pillar to make Europe a frontrunner in market-creating innovation. It will also contribute to strengthening the European Institute of Innovation and Technology.

Openness to the world remains a strategic priority for the EU R&I policy as it reinforces R&I excellence, strengthens competitiveness, and helps in tackling global societal challenges.

1.2.4. Place of the Marie Skłodowska-Curie Actions in the overall policy context

The Marie Skłodowska-Curie Actions (MSCA) under H2020 ensure the optimal development and dynamic use of Europe's intellectual capital in order to generate, develop and transfer new skills, knowledge and innovation and, thus, to realise its full potential across all sectors and regions. In addition, the MSCA provide excellent and innovative research training as well as attractive international career and knowledge-

⁶ Impact assessment of Horizon Europe SWD (2018) 307.

⁷ EU funding for Research and Innovation 2021-2027. See: https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-research-innovation_en.pdf

exchange opportunities through cross-border and cross-sector mobility of researchers to best prepare them to face current and future societal challenges. The programme is open to researchers and R&I staff at all stages of their career, irrespective of their age or nationality.

The MSCA are open to universities, research institutions, research infrastructures, businesses, and other players, including civil society organisations, from all countries worldwide. Mobility is a key requirement in the MSCA. Researchers receive funding on the condition that they will move from one country to another to broaden or enhance their competences.

Mobility is also a key tool to develop international cooperation, which strengthens the excellence and attractiveness of R&I in the EU. It provides access to the state of the art and new resources, it develops, attracts and retains high-quality researchers in Europe, and it can lead to connections with research test beds and innovative advances in areas where European countries are less specialised.

The MSCA play a key role in terms of being open to the world, building international collaboration and attracting and retaining researchers in Europe through dedicated actions. All MSCA schemes support international cooperation, with in particular IF and RISE specifically targeting mobility to third countries: RISE through the intersectoral/international eligibility criterion and IF through the Global Fellowships, which allow some of Europe's leading researchers to carry out research outside of Europe, with an in-built return phase. Furthermore, both ITN and COFUND attract international participants at an above average rate (compared to other actions of Horizon 2020) even if they are not specifically targeting third countries.

Under the MSCA, the vast majority of legal entities from third countries currently do not participate as beneficiaries but as partner organisations and therefore do not receive funding directly from the EU. However, if eligible, they are reimbursed through the European project coordinator. Researchers may apply from any country in the world and receive funding through the MSCA when coming to an EU Member State or H2020 Associated Country (AC); likewise, researchers from within the EU and AC can do some of their training in any country in the world.

Before this study, however, only anecdotal evidence was available for understanding the reasons and factors influencing the involvement of third countries in the MSCA. In addition, there was no comprehensive qualitative or quantitative assessment which would allow an informed decision to be taken as to which cooperation should be reinforced to ensure more effective brain circulation. **This study provides the first in-depth analysis by taking stock of the structure and impacts of international cooperation within the MSCA.** The outcomes of the study and its recommendations will allow the European Commission to better decide on the focus, funding streams and rules regarding third country involvement in the MSCA. Furthermore, the research conducted will help to look beyond the MSCA and embed the MSCA in the wider context of European R&I international cooperation policies.

2. Methodology

This section describes the methodology of the study and provides a concise explanation as to how five main research methods were applied in order to arrive at the study results and conclusions. The dedicated sub-chapters below provide a break-down of the key steps under each of the five methods:

- Case studies;
- Interview programme;
- Extraction, compilation and analysis of quantitative data;
- Desk research;
- Validation seminar.

2.1. Case studies

Country case studies were at the very core of this assignment. It was the largest and most resource-consuming methodological item of the study. Much of the literature review and most of the interviews fed into the preparation of the case studies. We have prepared 12 case studies: 9 case studies of third countries and 3 control case studies of the EU and Horizon 2020 associated countries. The design of the test control cases was requested by the Technical Specifications and insisted on by the Steering Group. The final case study selection was agreed on during a meeting with the European Commission that took place in Brussels on 13 September 2018 and is as follows:

	Eligible for EU funding		Non-eligible for EU funding	
	ENP non-associated	Developing	BRIC/Emerging	High-income
Test group:	Morocco, Belarus	Kenya, Vietnam	Brazil, China	USA, Japan
Control group:	Turkey	Tunisia	Israel	UK

Implementation of the case studies entailed seven main items:

1. Selection of case studies based on discussions with the relevant Commission officials;
2. Development of the case study structure, guidelines, template and the implementation work plan;
3. Implementation of desk research for case studies;
4. Implementation of interviews for case studies;
5. Identification and analysis of good practices;
6. Writing-up of case study reports;
7. Cross-case analysis.

The case study implementation process was based on rigorous case study guidelines and a template that were prepared and coordinated with the Commission shortly after the inception of the study. The case study guidelines and template have helped to ensure that (1) all experts drafting the case studies were on the same page, i.e. had the same understanding of the requirements and expectations for the case studies; and that (2) our approach was aligned with the Commission's expectations.

Two data gathering methods were applied to collect comprehensive information for the case studies: desk research and interviews. Sources for desk research for the case studies included:

- Quantitative and qualitative information from the CORDA database;
- Data from country profiles prepared by the Commission and shared on the "MSCA in numbers" website;
- CORDIS data (open source) on selected projects with participations by organisations or fellows from the selected third countries;

- Analysis of various literature/documents on R&I policies in the selected countries, which were indicated in the openly accessible sources and various academic databases or proposed by the interviewees.

While desk research provided a good context and preliminary information for the case studies, interviews were the core method used to gather new primary data and to extract judgements on the drivers, barriers, benefits and added value of international cooperation involving the selected countries. The structure of the overall interview programme is presented in more detail in the dedicated chapter below. Interviews for case studies included two main groups of interviewees:

- Stakeholders, who have a good overview of the overall cooperation between the analysed country and the EU: relevant Commission officials, national policymakers, representatives of national research funding organisations, MSCA NCPs, EURAXESS representatives, among others;
- Participants in the MSCA projects involving organisations and/or fellows from the analysed countries.

Overall, we implemented 89 interviews for case studies: 5-11 interviews for each case study resulting in 7.4 interviews per case study, on average. Table 1 provides statistics on interviews implemented for the case studies.

Table 1. Statistics on interviews implemented for case studies

Country	The United States	Japan	The United Kingdom	Brazil	China	Israel	Kenya	Vietnam	Tunisia	Morocco	Belarus	Turkey	Overall
Number of interviews implemented	8	10	8	5	8	8	11	5	8	5	5	8	89

Based on the case studies, we carried out a cross-case analysis in order to extract the key insights and generalisations from the case study research. The results from the cross-case analysis are presented among the findings in Section 3.

2.2. Interview programme

Table 2 summarises the scope of our overall interview programme. As the table shows, **in total, we carried out 106 interviews**. Our interview programme involved three types of interviews:

1. Exploratory interviews with Commission officials and EU-level stakeholders;
2. In-depth interviews for the case studies;
3. Supplementary interviews to collect additional evidence and fill-in potential information gaps after completion of other data collection and analysis tasks.

Table 2. Interview programme outline & progress

Interview type	Number of interviews implemented up to this moment	Purpose
Exploratory interviews with the Commission officials, whose work is related to the issue addressed by the study	7	Exploratory interviews have deepened our understanding of the overall study context and informed the development of the questionnaire for the case study programme.
In-depth interviews for case studies	89	Case study interviews have provided the research team with in-depth understanding of participation trends in the MSCA in 12 selected countries.
Supplementary interviews	10	Supplementary interviews (outside the scope of the case study programme) allowed us to collect additional evidence and fill in potential information gaps after completion of other data collection and analysis tasks. Supplementary interviews were implemented with EACEA and stakeholders from the following countries, participating in the MSCA relatively actively (1 interview per country): South Africa, Thailand, Pakistan, Argentina, Mexico, South Korea, Colombia, Malaysia, Singapore, Russia.
Total:	106	

2.3. Extraction, compilation and analysis of quantitative data

The following quantitative data sources were extracted, prepared and analysed for this study:

- CORDA data on participation of organisations and researchers in FP7 MCA and Horizon 2020 MSCA. This data set includes observations on the MSCA (1) projects, (2) participating organisations and (3) participating researchers.
- Data received from REA on project final reports, evaluation questionnaires and follow-up questionnaires.
- Data from country fact sheets published in the “MSCA in numbers website”.
- Data from the ICF survey implemented for the interim evaluation of Horizon 2020 MSCA and ex post evaluation of FP7 MCA.

We conducted two types of statistical analyses: descriptive and inferential statistics. We used descriptive statistical analysis techniques to uncover basic distribution patterns in the administrative and survey data. To this end, we computed various metrics such as shares, frequency counts, means, and medians. These metrics have allowed us to reduce the complexity of the data down to a single number or a few numbers, which has helped us answer the study questions. We used cross-tabulations to present how the metrics that we compute are distributed across various dimensions. When we uncovered substantial differences, we employed inferential statistics to test whether they are statistically significant and to identify the underlying factors for such differences.

2.4. Desk research

Desk research consisted of two stages:

- Literature review;
- Analysis of monitoring and administrative data.

The literature review mainly considered the following types of sources:

- Previous and ongoing studies and evaluations related to the subject of the study;
- Relevant EU policy documents;

- Academic literature on the (international) mobility of researchers;
- National-level studies, monitoring reports and evaluations in promoting research careers and mobility, focusing on non-EU countries and regions in particular.

The main purpose of the literature review was to understand the study context and map the existing findings relevant for the current study.

The second element of desk research was (non-quantitative) analysis of administrative and monitoring data. For this task, we have mainly used CORDA (and CORDIS) information on the MSCA projects and participants. Non-quantitative analysis of administrative and monitoring data mainly fed into the case studies. To the extent feasible and relevant, administrative and monitoring data were also used directly to answer certain study questions. In addition to the purposes mentioned above, desk research has also contributed to continuous adjustment/development of other research tools such as case study guidelines and interview questionnaires.

2.5. Validation seminar

On 18 June 2019, the study team organised a validation seminar at the Commission's premises in Brussels. The key aim of the event was to present the main findings of the study to the European Commission officials and a wider audience of approximately 20 experts and stakeholders. The seminar involved representatives from EURAXESS Worldwide, Marie Curie Alumni Association (MCAA), ETH Zurich Euresearch office, League of European Research Universities (LERU), European Council of Doctoral Candidates and Junior Researchers (Eurodoc), MSCA Programme Committee, the Coimbra Group, the Guild of European Research-Intensive Universities and missions of third countries to the EU.

In preparation for the validation seminar, the study team prepared a discussion paper, outlining the key objectives and expected results of the event, the main preliminary findings, conclusions and recommendations of the study and questions for discussion with experts. This discussion note was distributed to all participants a week before the seminar together with information about the venue and agenda of the event. Before dissemination, all material was coordinated and agreed with the Commission. The results of the validation seminar were summarised in a stand-alone document and fed into the preparation of this Final Report.

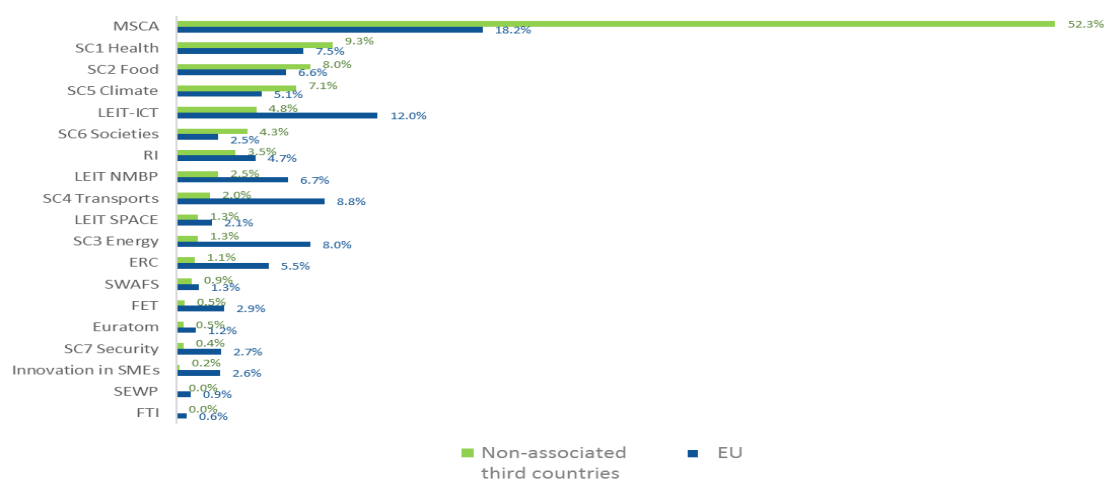
3. Detailed findings

3.1. How are the organisations and researchers of third countries involved in the MSCA and what are the key drivers to getting them involved?

3.1.1. Organisations

The MSCA are by far the most international part of Horizon 2020. As Figure 1 shows, more than half of all Horizon 2020 participations by organisations from third countries take place in the MSCA projects. This corresponds to 11% of all participations and 0.1% of the EU investment in Horizon 2020 MSCA. This is driven by participations from the USA, which constitute 40% of all third country participations by organisations in the MSCA under Horizon 2020.

Figure 1. Participation from non-associated third countries by programme part (% of participations in country group)



Source: From Horizon 2020 to Horizon Europe. Monitoring flash #3 on international cooperation. February 2019.

Figure 2 and Figure 3 show the total number of participations by third country organisations in Horizon 2020 MSCA and FP7 MCA from those countries, where the total number of participations is 10 or higher.⁸ First, these graphs reveal that organisations from the US were by far the most active participants in the MSCA both in Horizon 2020 and in FP7.

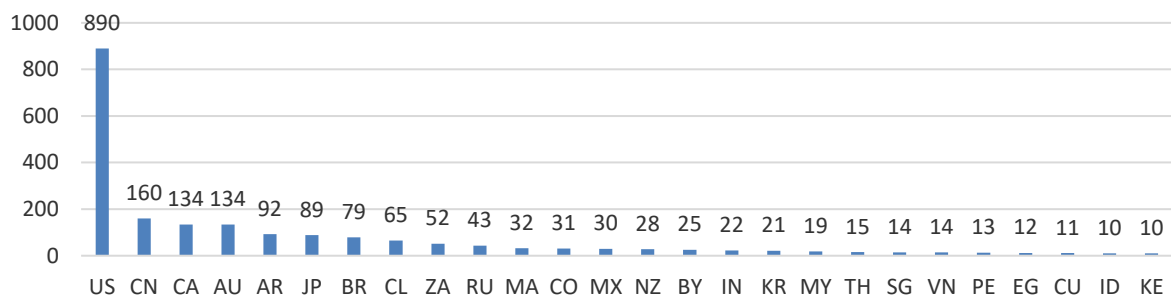
Another interesting finding is that **after 5 years of Horizon 2020 there are slightly more third countries that already have at least 10 participating organisations (26) than during all 7 years of FP7 (22)**. This may have resulted from the fact that a number of emerging economies are not eligible for funding anymore in Horizon 2020 and this seems to have helped to 'redistribute' their opportunities to participate in Horizon 2020 to organisations from some of the developing countries, which were less active in FP7 (namely Colombia, Peru, Cuba, Malaysia, Thailand, Vietnam and Kenya, to name the most active ones).

Finally, **the share of third country participations in Horizon 2020 as it stands now (10.93%) is lower, than in FP7 (12.47%)**. The reader should note that the share of third country participations in Horizon 2020 may increase by the end of the

⁸ This is done in order to make the graphs readable, as including all countries with very low participation levels would reduce the comprehensibility of the numbers. Where relevant, insights about countries that are not included in the graphs are provided in the text.

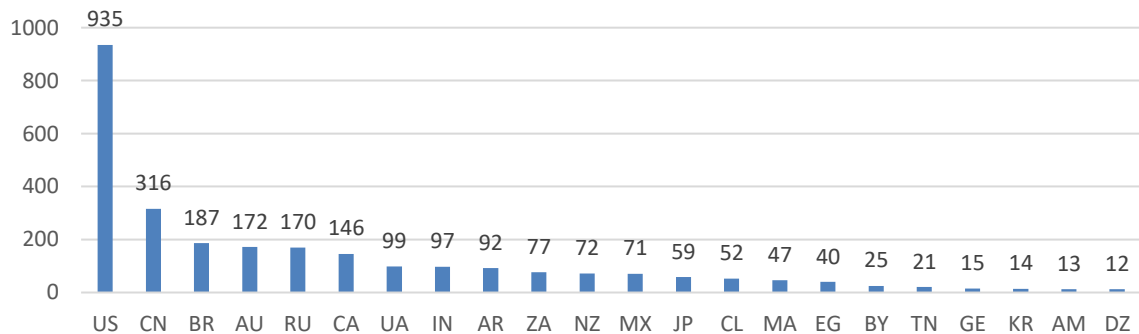
programme. Three main reasons can explain the lower share of third country participations than in FP7. First, several very active countries, which were previously third countries, became associated to Horizon 2020, namely Ukraine, Armenia, Georgia and Tunisia. This means that they were calculated as third countries in FP7 and therefore have increased the share of third country participations in FP7. Secondly, Horizon 2020 is an ongoing programme and many fellowships and secondments will still be implemented in the coming years. Third, a number of large third countries (BRIC + Mexico) are no longer eligible for funding in Horizon 2020, which had a negative effect on participations of their organisations.

Figure 2. Total number of participations by third country organisations in Horizon 2020 MSCA (by country)



Source: CORDA. Data extracted on 13 September 2018. **The graph includes only those countries, where the total number of participations is 10 or higher.**

Figure 3. Total number of participations by third country organisations in FP7 MCA (by country)



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website: https://ec.europa.eu/research/mariecurieactions/msca-numbers_en. **The graph includes only those countries, where the total number of participations is 10 or higher.**

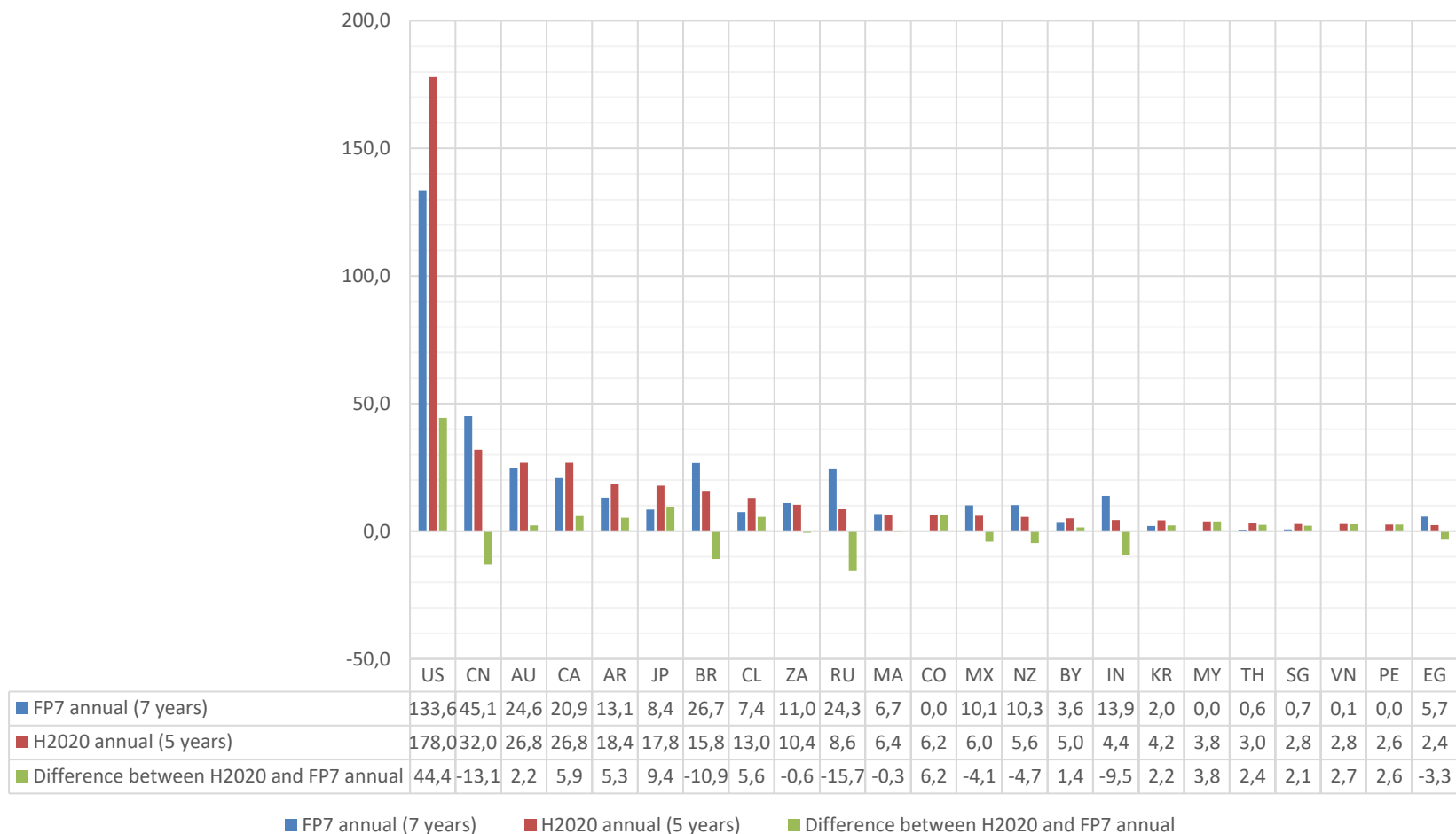
Figure 4 analyses the change in the number of participations between FP7 and Horizon 2020 for the 23 third countries that are most active in Horizon 2020. To be accurate (since Horizon 2020 is still ongoing), for comparison we have used the annual average of organisation participations per country. The following 10 countries top the list of those that became more active in Horizon 2020 in terms of organisation participations, compared to FP7: the United States (+44.4 of annual participations), Japan (+9.4), Colombia (+6.2), Canada (+5.9), Chile (+5.6), Argentina (+5.3), Malaysia (+3.8), Vietnam (+2.7), Peru (2.6), Thailand (+2.4).

The following ⁹ countries top the list of those that became less active in Horizon 2020 in terms of organisation participations, compared to FP7: Russia (-15.7), China (-13.1), Brazil (-10.9), India (-9.5), New Zealand (-4.7), Mexico (-4.1), Egypt (-3.3). Since this

⁹ Here we list only 7 countries, since other countries either had an almost negligible drop in participations or increased the number of their average annual participation in Horizon 2020.

list involves almost all countries (BRIC + Mexico) that became ineligible for funding in Horizon 2020, it can be concluded that **the change in funding eligibility had a strong negative effect on participations of organisations from the emerging economies.**

Figure 4. Difference between annual average number of participations by third country organisations in FP7 and Horizon 2020 (leading 23 countries)

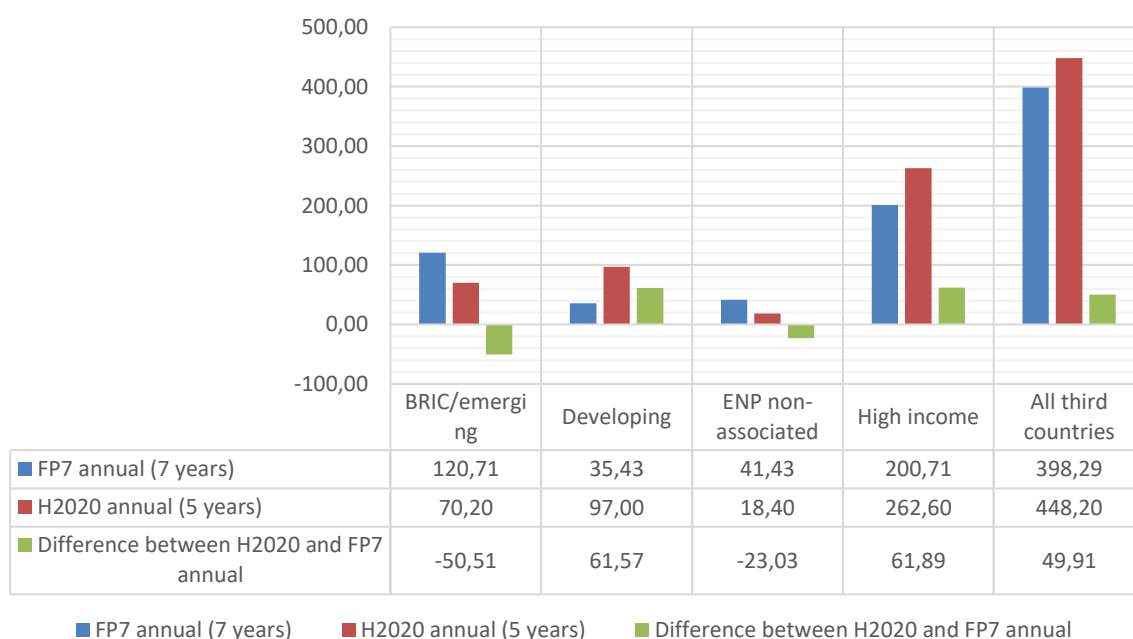


Source: For Horizon 2020: CORDA. Data extracted on 13 September 2018. For FP7: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 5 provides a more in-depth analysis of participations by third country organisations by looking at four country groups, in line with the EU R&I international cooperation policy: high-income countries; BRIC/emerging economies; developing countries, and ENP non-associated countries. The figure reveals several important findings. First, **the number of annual participations by organisations from BRIC/emerging countries has decreased significantly in Horizon 2020 compared to FP7** (-51 annual participations in Horizon 2020 compared to FP7). As shown by previous findings in this section, this was clearly an effect of change in funding eligibility. Second, **the number of annual participations has increased significantly for developing countries** (+62) and high-income countries (+62). Third, the number of annual participations from the European Neighbourhood Policy (ENP) countries that are not associated with Horizon 2020 decreased rather significantly (-23) mainly due to the fact that several active countries have become associated with Horizon 2020 (Ukraine, Armenia, Georgia, Tunisia). Fourth, **overall, the number of annual participations has increased for all third countries in Horizon 2020 compared to FP7** (+50). Fifth, developing countries overtook both BRIC/emerging economies and ENP non-associated countries to become the second most actively participating group of countries (after high-income economies), in terms of participations by organisations, in Horizon 2020 MSCA.

The evidence allows concluding that **organisations from all BRIC/emerging countries suffered significantly from the change in funding eligibility**. It is not obvious, to what extent this has favoured developing countries vs. high-income countries, since the number of participations increased to almost the same extent in both groups. However, **the increase in annual participations has been 'shared' much more equally among developing countries than among high-income countries**. While organisations from many developing countries started participating more actively in Horizon 2020 compared to FP7, increase in annual participations from high-income countries (+62) has been 'shared' by only few countries: mainly by the US (+44 annually), Japan (+9) and Canada (+6).

Figure 5. Difference between annual average number of participations by third country organisations in FP7 and Horizon 2020 according to country groups (all countries)



Source: For Horizon 2020: CORDA. Data extracted on 13 September 2018. For FP7: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Looking at the distribution of third country organisations by action (see Figure 6), **third country organisations participate most actively in RISE (around 56% of all participations). This trend has not changed since FP7**, where third country organisations participated most in IRSES (57.5% of all participations). The figure also compares participations of third country organisations to participations of all organisations, which allows concluding that third country organisations participate in RISE more actively than organisations from the EU Member States and the Associated Countries.

The evidence below reveals several other interesting insights. First, third country organisations started participating significantly more actively in ITNs (1% of participations in FP7 compared to 16% in Horizon 2020) and somewhat less actively in IFs (39.6% in FP7 compared to 25.2% in Horizon 2020). Second, while third country organisations have not participated in COFUND in FP7 at all, 3.4% of participations in Horizon 2020 were in COFUND action. However, in Horizon 2020, there are more participations in ITNs and COFUND, and less participations in IF, than in FP7, in the overall population as well.

Figure 6. Share of participations by third country organisations per type of action, compared to participations by overall organisations' population (Horizon 2020 and FP7)

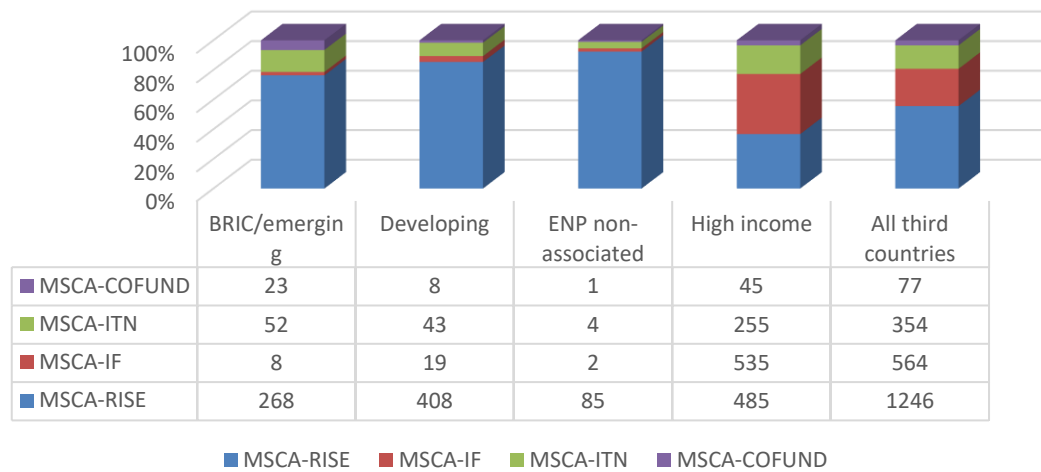


Source: For Horizon 2020: CORDA. Data extracted on 13 September 2018. For FP7: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 7 (Horizon 2020) and Figure 8 (FP7) provide analysis of organisation participations per type of MSCA structured according to country groups in line with the EU R&I international cooperation policy. It is evident that **both in Horizon 2020 and in FP7 organisations from BRIC/emerging, developing and ENP non-associated countries have participated first and foremost in RISE/IRSES**. The following share of all participations were in RISE/IRSES per country group: ENP non-associated (87.93% in FP7 and 92.39% in Horizon 2020), BRIC/emerging (84.38% and 76.35%); developing (75% and 85.36%); high-income (31.96% and 36.74%). This means that all country groups, except for BRIC/emerging countries, have slightly increased their share of participations in RISE in Horizon 2020 relative to participations in other actions. On the other hand, **organisations from high-income countries were responsible for the absolute majority of participations in IFs**.

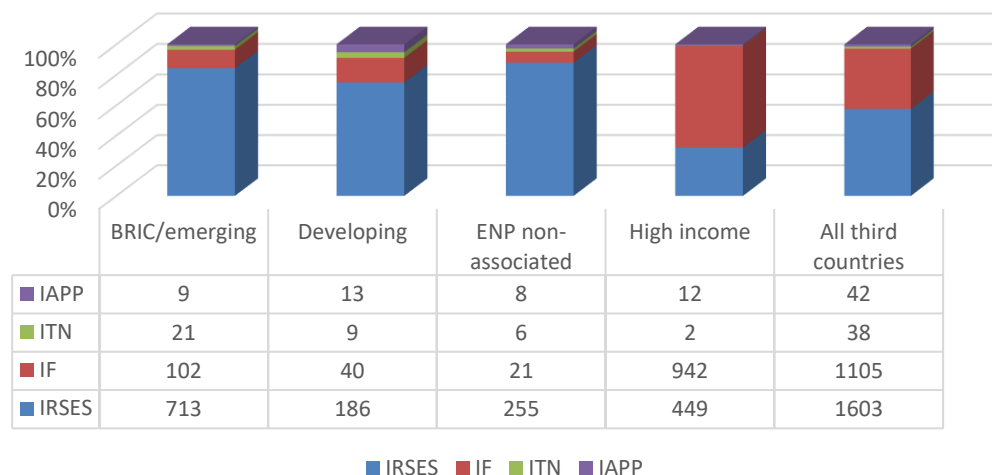
Second, organisations from all groups of third countries, except for ENP non-associated countries, started participating significantly more actively in ITNs in Horizon 2020 compared to FP7. Finally, organisations from all groups of third countries started participating significantly less actively in IFs in Horizon 2020 than in FP7.

Figure 7. Participations per type of MSCA four country groups in Horizon 2020



Source: CORDA. Data extracted on 13 September 2018.

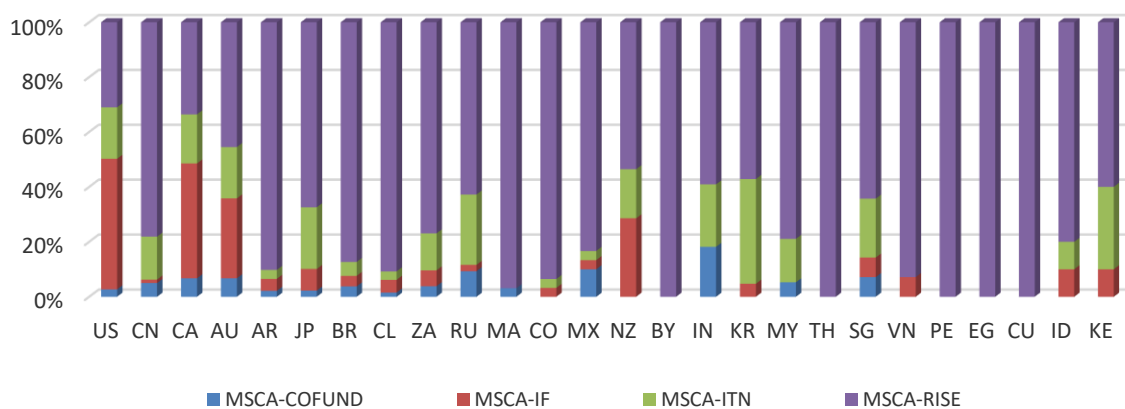
Figure 8. Participations per type of MCA for country groups in FP7



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

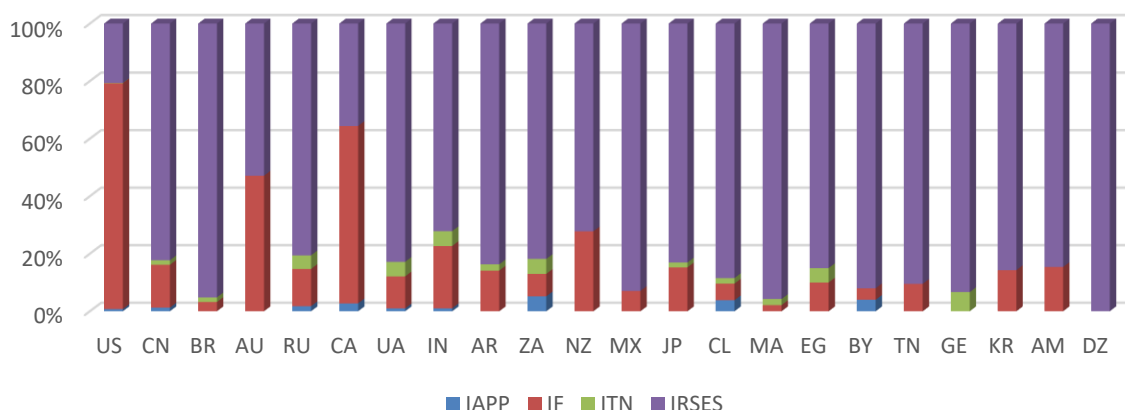
Figure 9 (Horizon 2020) and Figure 10 (FP7) allows looking deeper at the patterns of participations by organisations at country level (for countries leading in terms of number of participations). From these two figures, **it is evident that organisations from several high-income countries are responsible for the majority of non-RISE/IRSES participations in both Horizon 2020 and FP7**, namely: the USA, Canada, Australia, New Zealand Japan and South Korea. The relative increase in participations in ITNs and the relative decrease in IFs in Horizon 2020 is evident for all countries that were regularly participating in non-RISE/IRSES actions in FP7.

Figure 9. Participations per type of MSCA for the leading 26 countries in Horizon 2020 in terms of organisation participations



Source: CORDA. Data extracted on 13 September 2018.

Figure 10. Participations per type of MCA for the leading 22 countries in FP7 in terms of organisation participations



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

During case studies and interviews, we found several primary drivers that motivate (mainly academic) organisations from third countries to participate in the MSCA, and primarily in RISE/IRSES:

- Most of the organisations from all third country groups (but in particular from emerging and developing economies) see RISE as an **opportunity to strengthen their research capacities**. Seconding researchers and staff to the European organisations helps develop their research and research management skills. Receiving seconded researchers and staff from Europe (for teaching or research) contributes to improving their research culture and research activities.
- Secondly, representatives of third country organisations saw RISE as an **opportunity to build research networks with the European research organisations**, which may work as a 'ladder' for future Horizon 2020 funding, both via the MSCA and via other programmes.
- Third, we also found cases when third country organisations were invited by the European organisations to join RISE consortium only **in order to meet the requirement of having an international partner**, or an international partner in a very specific country.

Organisations (both academic and businesses) from high-income countries see the MSCA as **a way of attracting excellent researchers from Europe** primarily through IF action (and increasingly through ITNs). Internationalisation to such institutions also tends to lead to an **improved overall reputation/international visibility of an institution**, as well as a better level of acquaintance with the EU research systems.

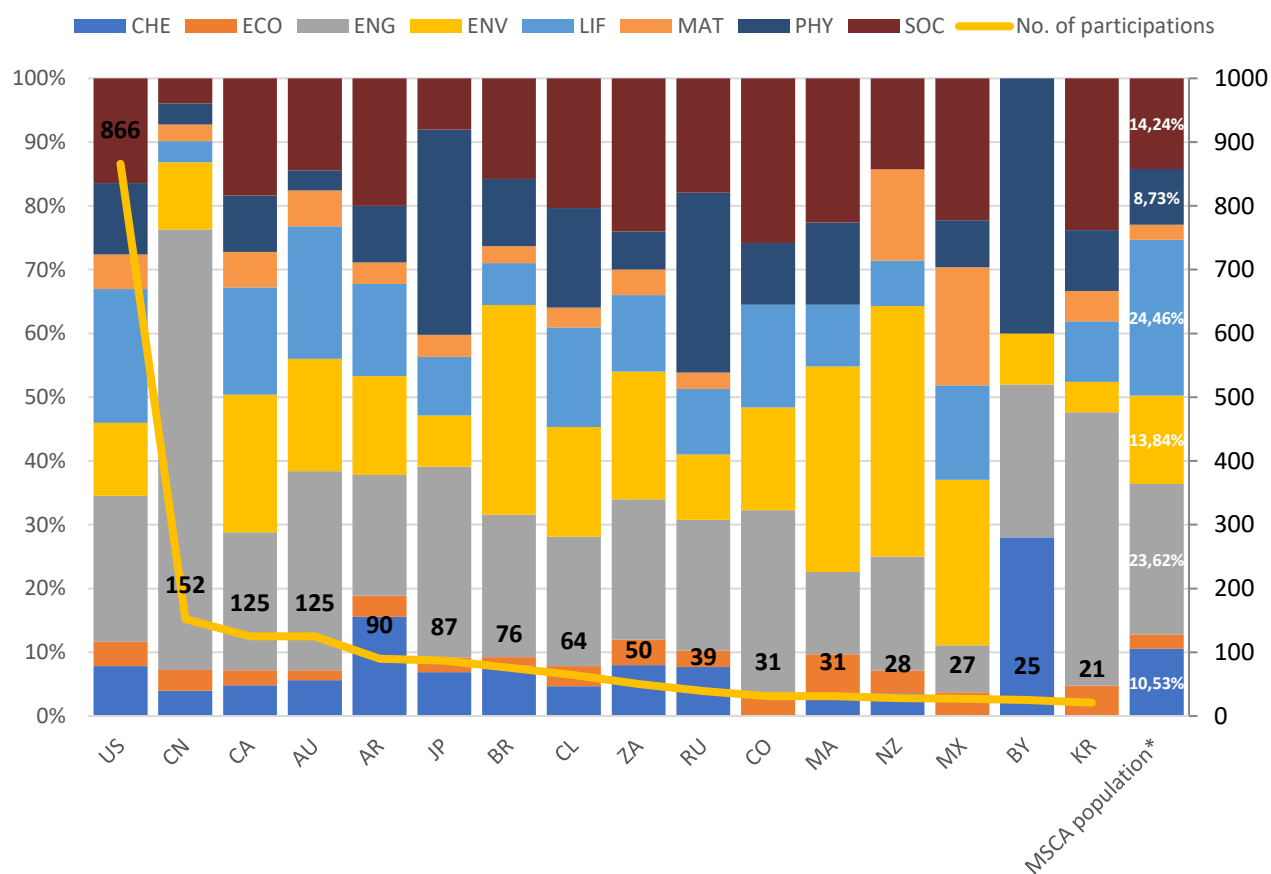
Figure 11 analyses third country participations by organisations per science panel for the leading third countries (where there are more than 20 participations overall)¹⁰ in H2020. Such data can be provided only for Horizon 2020, since FP7 CORDA data on participations include only beneficiaries and do not include partner organisations. As the majority of participating organisations from third countries are partner organisations, FP7 CORDA data do not allow third country participations in FP7 per science panel or type of organisations (academic/non-academic) to be accurately analysed.

The figure below reveals the following:

- The structure of the US participations in terms of science panels is very similar to the structure of overall MSCA participations in terms of science panels. Participations from Canada, Australia and South Africa also follow a very similar pattern. **This may signal that the EU and the high-income countries, such as the US, Canada and Australia, are working on very similar challenges.** This is in line with the EU R&I international cooperation strategy, which says that in cooperation with high-income countries the EU should focus on tackling global challenges.
- Organisations from China participated in the ENG science panel significantly more actively than the overall MSCA population. More than 69% of CN participations were in the ENG science panel. Chinese organisations have participated significantly less in LIF (3.29% vs 24.46%) than the overall MSCA population. Finally, China had one of the lowest participation rates among third countries in social sciences (3.95% vs 14.24% in the overall MSCA population).
- **Most of the most active third countries participated more actively in projects on social sciences than the overall MSCA population** (except for China, Japan and Belarus). On the basis of deeper analysis of CORDA monitoring data and interviews, we can conclude that a significant share of projects in social sciences were focusing on the analysis of different world cultures or certain world-level historical phenomena and therefore needed to involve partners from third countries. This aspect may have contributed to the overall aim of the EU R&I strategy to focus on science diplomacy through better understanding of other cultures.
- The case of Belarus was very specific, as Belarusian organisations have not participated in any projects on social sciences. Belarusian organisations have participated significantly more actively than the MSCA population in Chemistry (28% vs 10.53% average) and Physics (40% vs 8.73% average). Interviews with the Belarusian representatives revealed that cooperating with EU partners on the social sciences projects was discouraged by the Belarusian research funders, as this may be seen as interfering with government policies.
- Organisations from New Zealand and Mexico were significantly more active in the MAT science panel than the overall MSCA population (14.29% and 18.52% respectively vs 2.33% average).
- Organisations from Japan participated significantly more actively in the PHY science panel than the overall MSCA population (32.18% vs 8.73% average).
- Organisations from all third countries participated in the LIF science panel less actively than the overall MSCA population.

¹⁰ When there are less than 20 participations per country, it becomes inaccurate to analyse shares of participations per science panel.

Figure 11. Third country organisation participations (where there are more than 20 overall) in H2020 per science panel



Source:

MSCA population here includes 19 625 participations. It excludes 871 participations, where either a scientific panel (870 cases) or a country (only 1 case) were not indicated in CORDA. Excluded participations do not influence the overall trends, since they are dispersed among the countries equally to the number of participations. Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

3.1.2. Analysis of applications by third country organisations

Table 3 analyses third country participation in terms of total submitted applications, eligible proposals and retained proposals in Horizon 2020. A number of noteworthy findings emerge:

- Organisations from high-income countries submitted by far the largest number of applications and eligible proposals;
- Organisations from developing countries are slightly more successful in terms of retained/successful proposals than organisations from other groups.

Table 4 provides a more clear-cut division of country groups according to the different criteria in question.

Table 3. Categorisation of countries: applications and proposals per category (H2020)

	High income (including overseas territories)	BRICS/emerging	ENP associated non-associated	Developing

Applications	8 084	2 004	1 075	2 035
Eligible proposals	6 976	1 505	836	1 599
Eligible proposals / applications	86.29%	75.10%	77.77%	78.7%
Retained proposals	1 089	265	138	306
Proposal success rate Retained proposals / applications	13.47%	13.22%	12.84%	15.04%

Source: Horizon Dashboard from the Single Electronic Data Interchange Area (SEDIA), retrieved from <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard> on 12 April 2019.

Table 4. Categorisation of countries: ranking of applications and proposals per category (H2020)

Rank	Applications	Eligible Proposals (% of applications)	Retained Proposals (% of applications)
1	High income	High income	Developing
2	Developing	Developing	High income
3	BRICS/emerging	ENP non-associated	BRICS/emerging
4	ENP non-associated	BRICS/emerging	ENP non-associated

Source: Horizon Dashboard from the Single Electronic Data Interchange Area (SEDIA), retrieved from <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard> on 12 April 2019.

In line with success rates, it is also worth pointing out that the programme continues to experience a high oversubscription rate. Findings in the Table 5 appear to be in line with the findings of the earlier 'FP7 ex post and H2020 interim evaluation of Marie Skłodowska-Curie actions (MSCA)' report (see Table 6).

Table 5. Categorisation of countries: success rates and oversubscription per category (H2020)

Oversubscription rate ¹¹				
	High income	BRICS/emerging	ENP non-associated	Developing
Horizon 2020 (MSCA)	641%	568%	606%	523%
Proposal success rate				
	High income	BRICS/emerging	ENP non-associated	Developing
Horizon 2020 (MSCA)	13.47%	13.22%	12.84%	15.04%

Source: Horizon Dashboard from the Single Electronic Data Interchange Area (SEDIA), retrieved from <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard> on 12 April 2019.

¹¹ [(Number of high quality proposals/number of retained proposals (mainlist))-1] * 100; retrieved from <https://ec.europa.eu/research/mariecurieactions/sites/mariecurie2/files/interim-evaluation-msca-report.pdf> p. 42.

Table 6. Categorisation of actions: success rates and oversubscription per action (FP7 & H2020)

Oversubscription rate					
	ITN	IF	IRSES/IAPP /RISE	COFUND	Total
FP7 (MCA)	482%	220%	67%	38%	213%
Horizon 2020 (MSCA)	988%	424%	129%	204%	444%
Proposal success rate					
	ITN	IF	IRSES/IAPP /RISE	COFUND	Total
FP7 (MCA)	11%	22%	39%	52%	22%
Horizon 2020 (MSCA)	8%	16%	28%	40%	11%

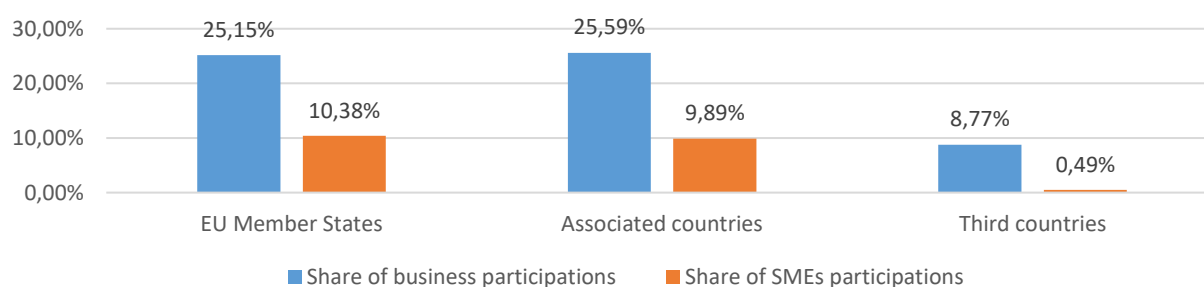
Source: ICF CORDA analysis. Retrieved from:

<https://ec.europa.eu/research/mariecurieactions/sites/mariecurie2/files/interim-evaluation-msca-report.pdf>

3.1.3. Business organisations

Figure 12 shows the level of participations of private for-profit companies in Horizon 2020 MSCA sorted by group of countries. It is evident from the data that **businesses from the EU and associated countries participated much more actively than businesses from third countries**. Overall, businesses constituted 8.77% of total participations from third countries (196 total participations). It must also be noted that many of the organisations that are qualified as businesses are actually more similar to what one would call private research institutions. Furthermore, only 11 SMEs from third countries have participated so far in Horizon 2020, constituting 0.49% of total third country participations. This means that **almost all businesses from third countries participating in the MSCA were large companies heavily focused on doing research and development**.

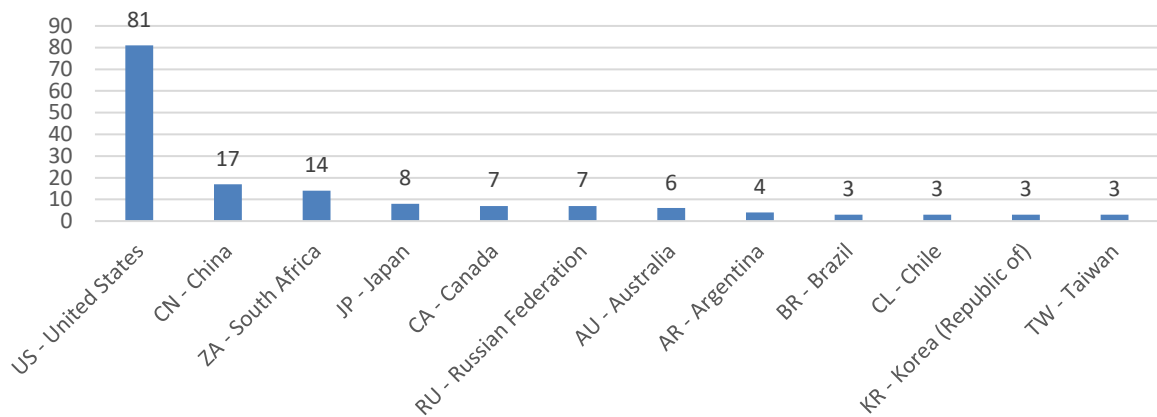
Figure 12. Business participations as a share of total participations in H2020 MSCA



Source: Open data from Cordis website accessed on 10 April 2019.

Figure 13 lists the top 12 third countries with the highest number of business participations. The United States leads the list (41.3% of all business participations) with China and South Africa in distant second and third places.

Figure 13. Number of business participations (top 10 third countries)



Source: Open data from Cordis website accessed on 10 April 2019.

Table 7 shows the most active business participants from third countries. The table includes all 6 companies that participated in Horizon 2020 more than once. The Sandia National Laboratories from the US was the most active private for-profit participant with 3 participations overall.

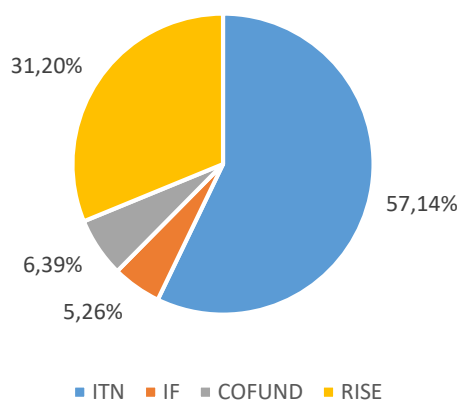
Table 7. Most active businesses from third countries in Horizon 2020 MSCA

Legal Name	Country	City	Number of participations
Sandia Corporation	United States	ALBUQUERQUE	3
CHINA ELECTRIC POWER RESEARCH INSTITUTE (SEAL) SOE	China	BEIJING	2
MANKIND CORPORATION	United States	VALENCIA	2
MICROSOFT CORPORATION	United States	REDMONT WA	2
SIAR RESEARCH AND CONSULTING LLC	Kyrgyzstan	BISHKEK	2
Yandex	Russian Federation	MOSCOW	2

Source: Open data from Cordis website accessed on 10 April 2019.

Figure 14 shows that private companies from third countries were most actively involved in ITN and RISE actions, while their involvement in individual fellowships and COFUND was very limited.

Figure 14. Number of business participations from third countries by type of MSCA



Source: Open data from Cordis website accessed on 10 April 2019.

To summarise, the following would be a representative picture of an average business from a third country participating in the MSCA: a large company heavily focused on R&D activities participating in ITN or RISE, mostly from the United States, but sometimes from another high-income or emerging economy.

Triangulation of these results with findings from our previous study of business participation in the MSCA¹² reveals a number of relevant insights regarding motivations and obstacles for businesses from third countries to participate in the MSCA:

- First, large companies from third countries that participated in both ITN and RISE were motivated by an opportunity to expand their collaborative network and, especially, to acquire contacts in leading European universities and research organisations.
- Second, large companies from third countries that participated in ITNs (the most common case) were, in addition to the above, driven by the opportunity to gain access to highly skilled and talented young researchers, who may go on to become employees of a participating company.
- Third, large companies from third countries that participated in RISE were, in addition to the above, motivated by an opportunity to train their employees by sending them for a secondment in leading European universities. Since most of the companies from third countries participating in the MSCA are heavily focused on R&D, the opportunity to strengthen and update the research skills of their employees was a key driving factor.
- Fourth, as revealed by our previous study of business participation in the MSCA, SME participation in the programme is driven mainly by their objective to support product or service development. Furthermore, SMEs are particularly unwilling to send their employees away or to commit resources to activities, which are not directly related to their core business. Therefore, SMEs from third countries should be much more interested in other types of Horizon 2020 projects than the MSCA. Adding to this a low success rate, necessity to dedicate at least some resources to prepare a proposal, lengthy time-to-grant, and insufficient knowledge about the EU procedures, these all explain the virtually non-existent participation of SMEs from third countries in the MSCA. Having in mind the needs of SMEs, another pilot programme of the EU – SME Innovation Associate –

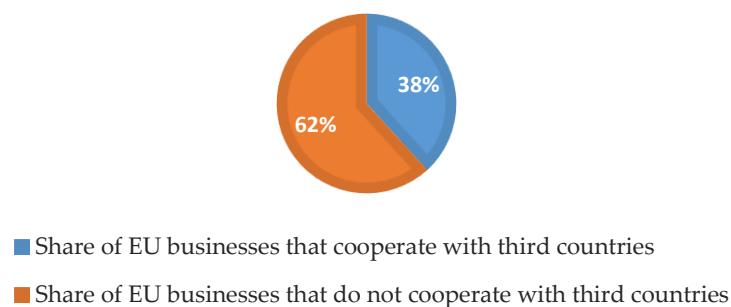
¹² PPMI, "Study of business participation and entrepreneurship in Marie Skłodowska-Curie actions (FP7 and Horizon 2020)", Final Report, 2017.

provides a much better framework for the SMEs to attract strong researchers to their organisations.

- Fifth, obstacles for large companies from third countries to participate in the MSCA were very similar to those faced by the European businesses: reluctance to dedicate resources with a small chance of success; lack of awareness about the MSCA (especially salient for third country businesses); reluctance to send own staff away on secondments in RISE; fear that academic institutions have little to offer in terms of applied research; fear of administrative overhead associated with participation; and fear of losing intellectual property. Finally, insufficient knowledge of EU law and procedures emphasised the risks related to the above-mentioned obstacles. In short, many large companies from third countries (who considered participating in the MSCA) probably thought that costs related to participating in the MSCA may outweigh the benefits.

We have also analysed the extent to which the EU businesses participating in the Horizon 2020 MSCA cooperate with organisations from third countries. The EU strategy for international cooperation in R&I indicated “facilitating access to new and emerging markets” a strategic priority for international cooperation in R&I. As shown by Figure 15, **38% (or 1 645) of EU businesses participating in the Horizon 2020 MSCA had a third country organisation as a partner in their project**. While quantitative analysis cannot provide us with conclusions about the strengths of these partnerships, we know that more than a third of all EU businesses participating in the MSCA were in one or another way partnering with third country organisations.

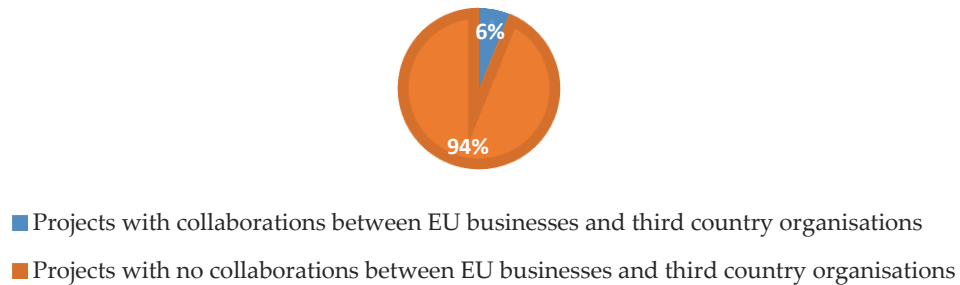
Figure 15. The extent to which the EU businesses participating in Horizon 2020 MSCA cooperate with third country organisations



Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

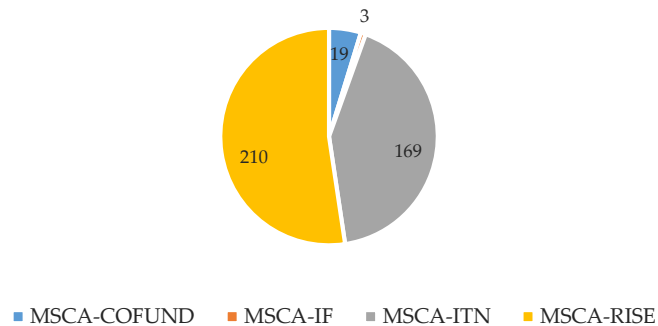
However, as further revealed by Figure 16, **all of these partnerships were concentrated in 6% (401) of the projects**. Figure 17 shows that most of the partnerships between the EU businesses and third country organisations **took place in RISE and ITN projects**. For ITNs, partnerships between the EU businesses and third country organisations took place overwhelmingly in ETNs, while some partnerships happened also in EIDs and EJDs.

Figure 16. Share of projects with collaborations between the EU businesses and third country organisations



Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

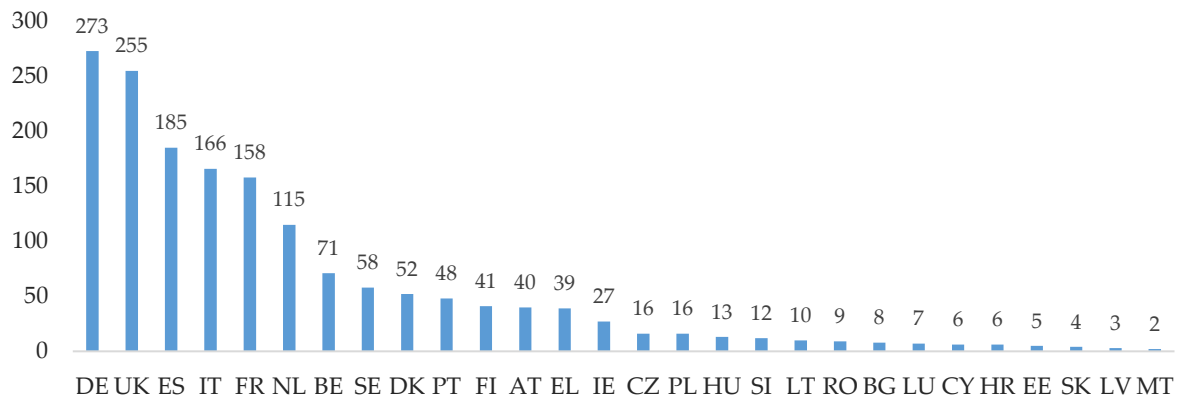
Figure 17. Number and share of projects with partnerships between the EU businesses and third country organisations (by type of action)



Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

As Figure 18 reveals, **German and UK businesses cooperated with third country organisations most actively**, while Spain, Italy and France were also in the top 5 according to this measure. While many different EU businesses cooperated with third country organisations, some of the “usual suspects” lead the way: Philips (the Netherlands, various branches, 27 partnerships with TC organisations), Siemens (Germany, various branches, 27 partnerships), ELVESYS (France, 22 partnerships) AstraZeneca (UK, 17 partnerships), GlaxoSmithKline (UK, 17 partnerships), DSM (the Netherlands, various branches, 15 partnerships), BASF (Germany, 12 partnerships).

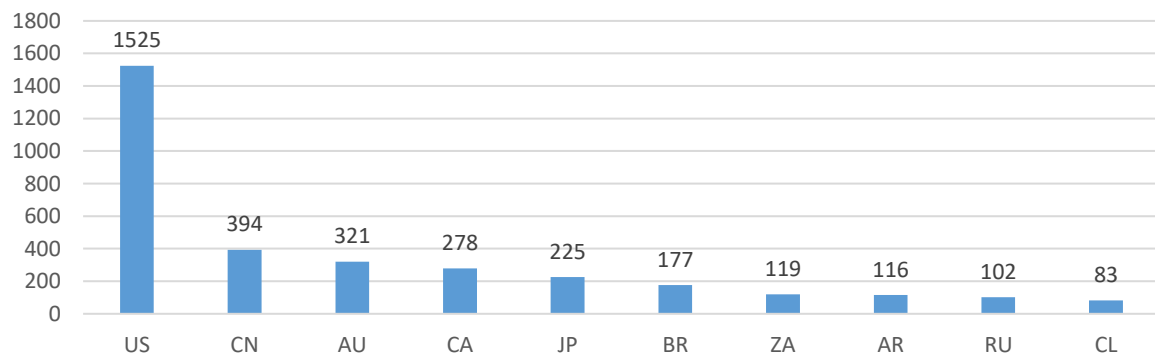
Figure 18. Instances of EU businesses cooperating with third country organisations in Horizon 2020 MSCA projects



Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

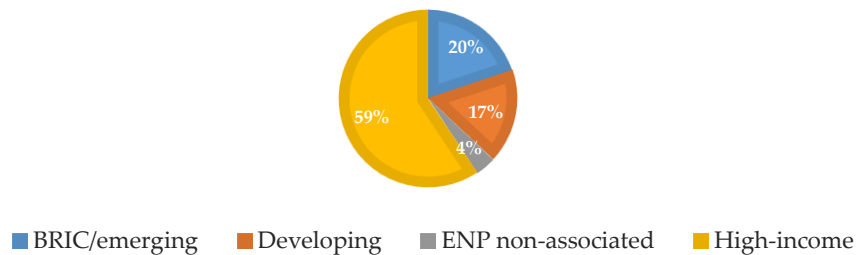
Figure 19 shows that in a strong majority of cases (more than 1/3) EU businesses cooperated with organisations from the US. The figure also shows the number of partnerships for the other top 10 third countries. Figure 20 shows that in most cases the EU businesses cooperated with organisations from high-income economies, while 20% of partnerships happened with organisations from BRIC/emerging countries and 17% – developing economies. This finding is **in line with the objectives of the EU strategy on international cooperation in R&I, which mentions “business opportunities and access to new markets” as a priority for cooperation with industrialised and emerging economies.**

Figure 19. Number of instances when the EU businesses cooperated with organisations from the following third countries:



Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

Figure 20. Number of instances when the EU businesses cooperated with organisations from the following third countries:



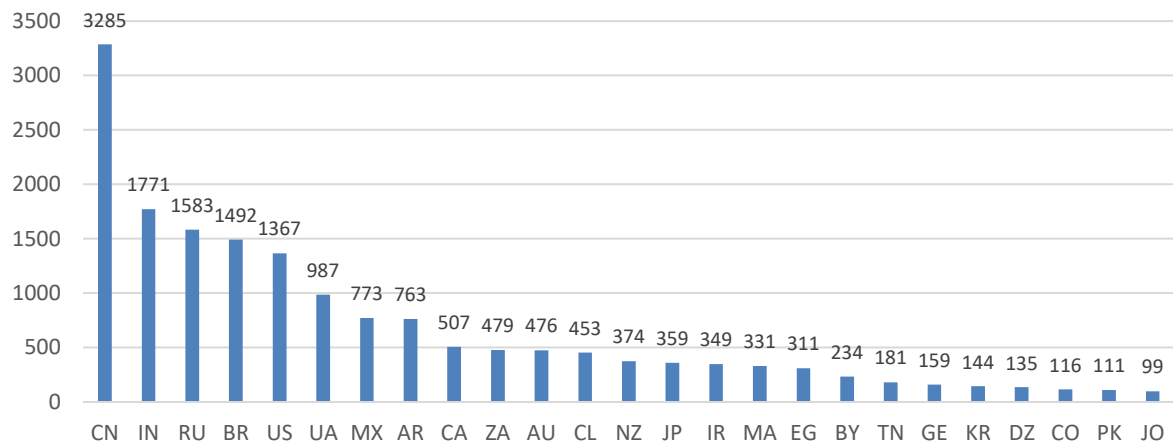
Source: CORDA data on MSCA participations extracted on 12-13 September 2018.

3.1.4. Third country researchers

This section analyses the structure and trends of third country researchers' participations in the MSCA (including both the MSCA fellows and seconded researchers and staff). Analysis was carried out (1) by framework programme (FP7 & Horizon 2020), (2) by country, (3) by country groupings in line with the EU R&I international cooperation policy, and (4) by type of action. This section also provides analysis of changes in researcher participation trends between FP7 and Horizon 2020.

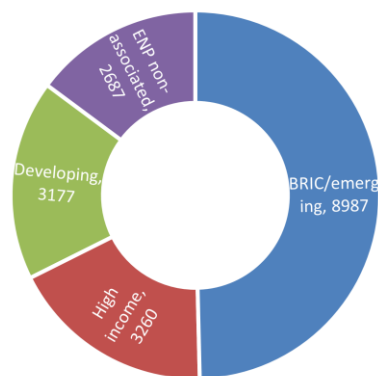
Figure 21 provides a list of 25 third countries with the highest number of their national researchers participating in FP7 MCA, while Figure 22 structures these numbers according to country groups in line with the EU R&I international cooperation policy. **Chinese researchers were by far the most active in FP7 MCA**, compared to researchers from other third countries. Researchers from India, Russia, Brazil and the United States were also extremely active. Looking at Figure 22, it is evident that **researchers from BRIC/emerging economies were by far the most active in FP7 MCA and constituted almost half of all third country researchers participating in FP7 MCA**. Other country groups shared the remaining half of participating third country researchers in very similar proportions, with ENP non-associated countries being the least active group.

Figure 21. Number of researchers from third countries participating in FP7 MCA (leading 25 countries)



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 22. Number of researchers from third countries participating in FP7 MCA by country group

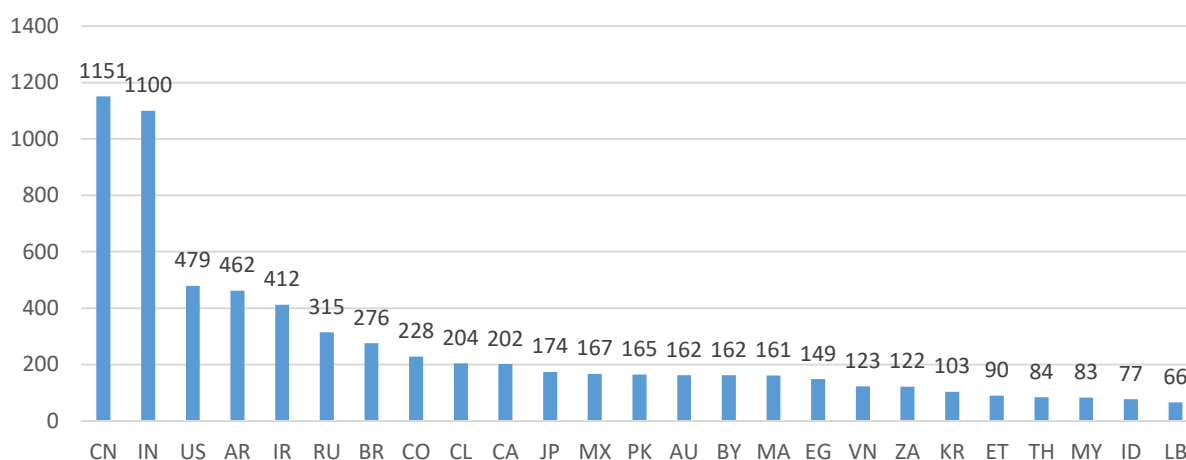


Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 23 and Figure 24 provide analysis of the same type of numbers for Horizon 2020 MSCA. From the list of 25 third countries leading in terms of the numbers of their national researchers participating in the MSCA, one can conclude that **in Horizon 2020 this list is led not by one, but by two BRIC/emerging economies: China and India**. The US, Argentina and Iran are also in the top 5.

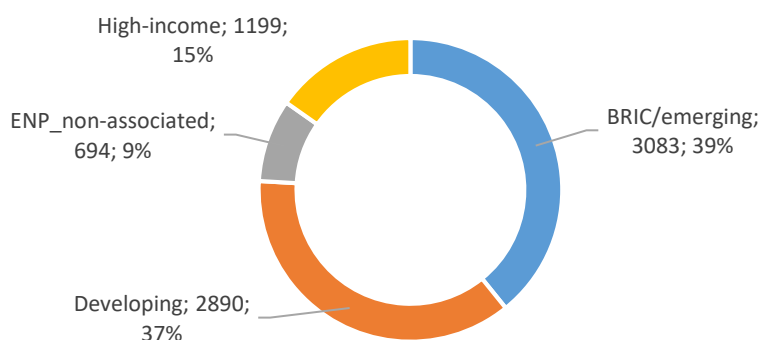
If we look at the number of national researchers participating in Horizon 2020 MSCA by country group, the BRIC/emerging economies are much less dominant in this aspect in Horizon 2020 than they were in FP7. **In Horizon 2020 MSCA, researchers from BRIC/emerging economies (39% of all MSCA third country researchers) and developing countries (37%) participate in similar numbers.** In Horizon 2020, the share of researchers from high-income and ENP non-associated countries participating in the MSCA has decreased quite significantly (from 18% to 15% for high-income economies, and from almost 15% to 9% for ENP non-associated countries). Such strong decrease in the number of researchers coming from the ENP non-associated countries can be explained in (large) part by the fact that Ukraine, Georgia, Tunisia and Armenia became associated to Horizon 2020.

Figure 23. Number of researchers from third countries participating in Horizon 2020 MSCA (leading 25 countries)



Source: CORDA data received on 25 April 2019.

Figure 24. Number of researchers from third countries participating in Horizon 2020 MSCA per country group



Source: CORDA data received on 25 April 2019.

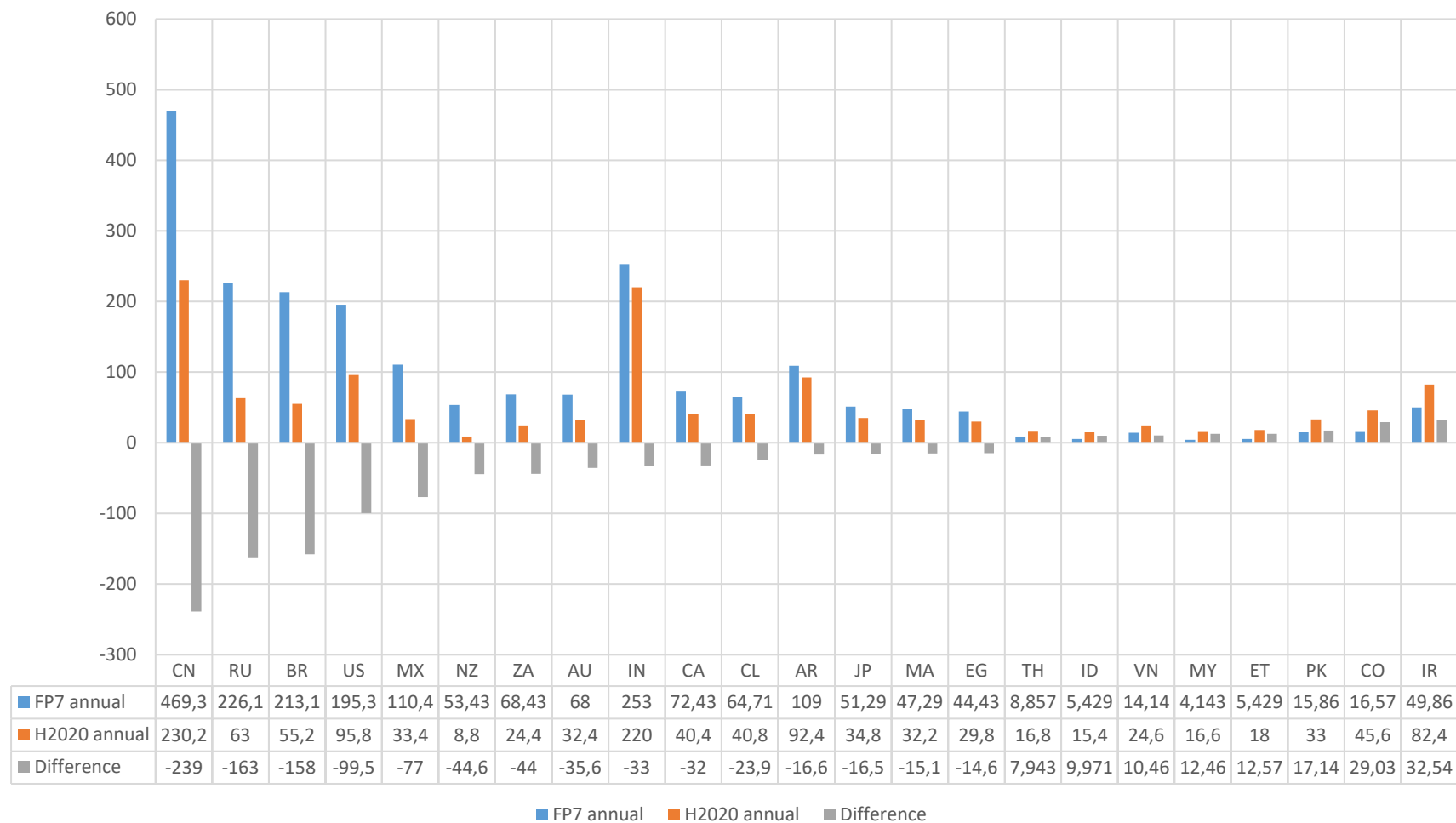
To compare third country researcher participations in Horizon 2020 MSCA and FP7 MCA, Figure 25 shows the difference between the annual average number of participations by third country researchers in FP7 and Horizon 2020 for 23 leading countries. As in the analysis of participations by organisations, in order to standardise the comparison, we have used the number of annual average participations instead of the absolute number of participations by third country researchers. This analysis reveals that **third country researchers from the majority of third countries have so far been less active in Horizon 2020 MSCA than they were in FP7 MCA**. This finding is also valid for the total population of researchers from third countries: on average, 1 014 fewer researchers from third countries have participated in Horizon 2020 annually for the first 5 years of the programme compared to the whole duration of FP7. This finding is most prominent in the cases of China (239 fewer researchers are participating annually in Horizon 2020 than in FP7), Russia (-163), Brazil (-158), the US (-99.5) and Mexico (-77).

However, in this case we would suggest not making the overall conclusion that third country researchers in general are less active in Horizon 2020 than they were in FP7. The share of third country nationals among the total population of Horizon 2020 MSCA researchers currently stands at around 30%. i.e. almost at the same level

as, albeit a bit lower than, during FP7 (32.5%). Furthermore, the difference between Horizon 2020 and FP7 in the number of annual average participations of researchers from the EU and associated countries also stands at around -1 700. This means that, on average, far fewer researchers from all countries have participated annually in Horizon 2020 so far than in FP7. This may be due to the fact that many secondments are still planned for the remaining years of Horizon 2020.

The following third countries are leading the list of those that became more active in terms of national researchers participating in Horizon 2020 MSCA compared to FP7 MCA: Iran (+32.5 annual average researcher participations), Colombia (+29), Pakistan (+ 17), Ethiopia (+12), Malaysia (+12) and Vietnam (+10).

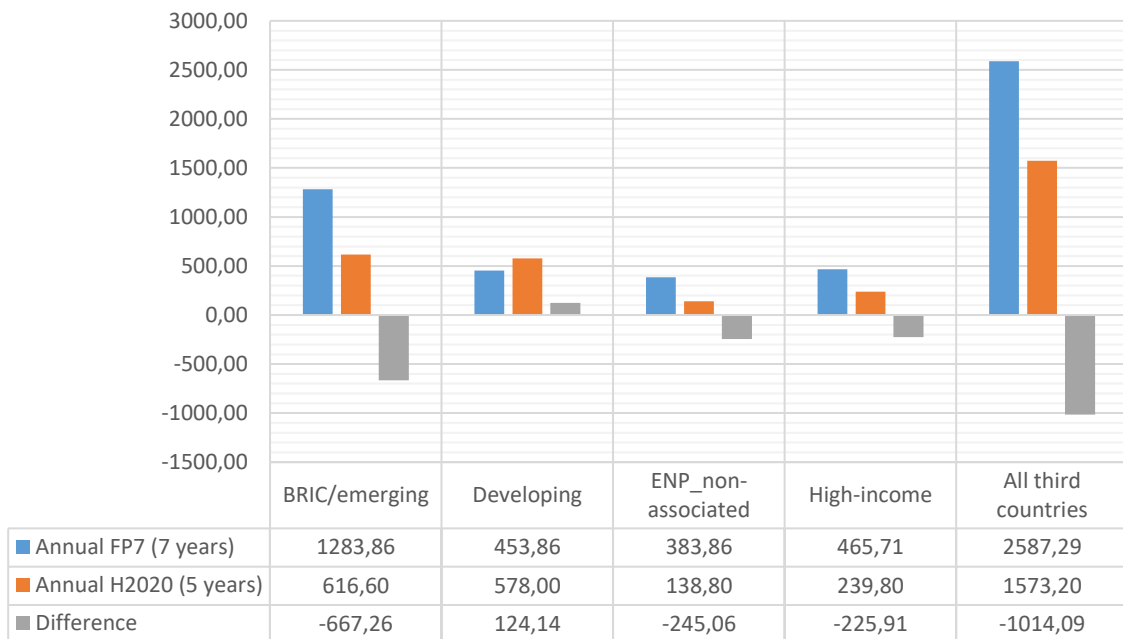
Figure 25. Difference between annual average number of participations by third country researchers in FP7 and Horizon 2020 (countries with the largest positive and negative change)



Source: CORDA data received on 25 April 2019 and country factsheets of participations in FP7 from the MSCA in Numbers website.

As shown by Figure 26, **only researchers from developing countries started participating more actively in Horizon 2020 compared to FP7** (124 more of annual participation in Horizon 2020). As mentioned above, all third country researchers in total have annually participated, on average, 1 014 times less in Horizon 2020 than in FP7. The negative change is most prominent for researchers from BRIC/emerging economies, which on average had 667 fewer researcher participations per year during Horizon 2020 than during FP7. As emphasised in other parts of this report, this is almost definitely due to the new funding rules which no longer allow for automatic funding for certain countries.

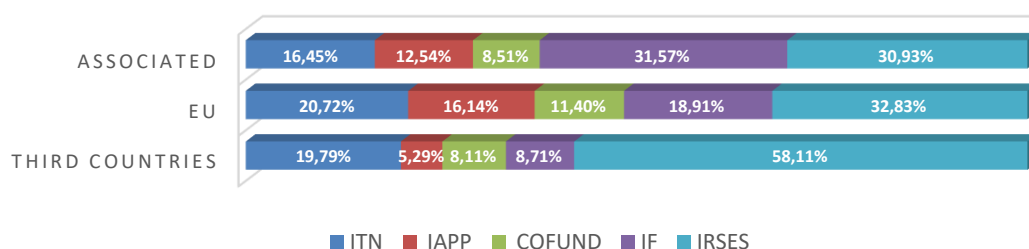
Figure 26. Difference between annual average number of participations by third country researchers in FP7 and Horizon 2020 according to country groups (all countries)



Source: CORDA data received on 25 April 2019 and country factsheets of participations in FP7 from the MSCA in Numbers website.

The figures below provide classifications of researcher participations by type of MSCA, both for FP7 and Horizon 2020. Figure 27 shows that **researchers from third countries tended to participate most actively in the IRSES action in FP7 MCA**; significantly more actively in this action than both EU and associated countries. Furthermore, **third country researchers were significantly less present in IFs and IAPP actions than the EU and associated countries' researchers**, while there were no significant differences between the three country groups in terms of researcher participations in ITNs and COFUND actions.

Figure 27. Share of researchers from third countries and EU/Associated countries participating in FP7 MCA (per type of action)



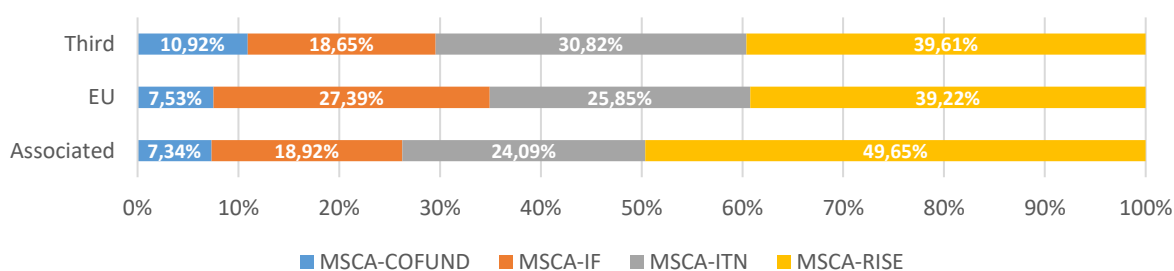
Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

One of the key immediate takeaways from Figure 28, which summarises researcher participations in Horizon 2020 MSCA, is that **in Horizon 2020, participation patterns of EU researchers and third country researchers were extremely similar**, whereas EU researchers participated slightly more actively in IFs and third country researchers participated more actively in ITNs in comparison to the other group.

Regarding key changes in participation patterns of third country researchers between Horizon 2020 and FP7:

- **Third country researchers are significantly less active in RISE in Horizon 2020 compared to IRSES in FP7:** 39.61% vs 58.11% of participations.
- Compared to FP7, in Horizon 2020 **third country researchers are significantly more active in:**
 - **ITNs:** 30.82% of participations in Horizon 2020 compared to 19.79% of participations in FP7;
 - **IFs:** 18.65% of participations in Horizon 2020 compared to 8.71% of participations in FP7.

Figure 28. Share of researchers from third countries and EU/Associated countries participating in Horizon 2020 MSCA (per type of action)



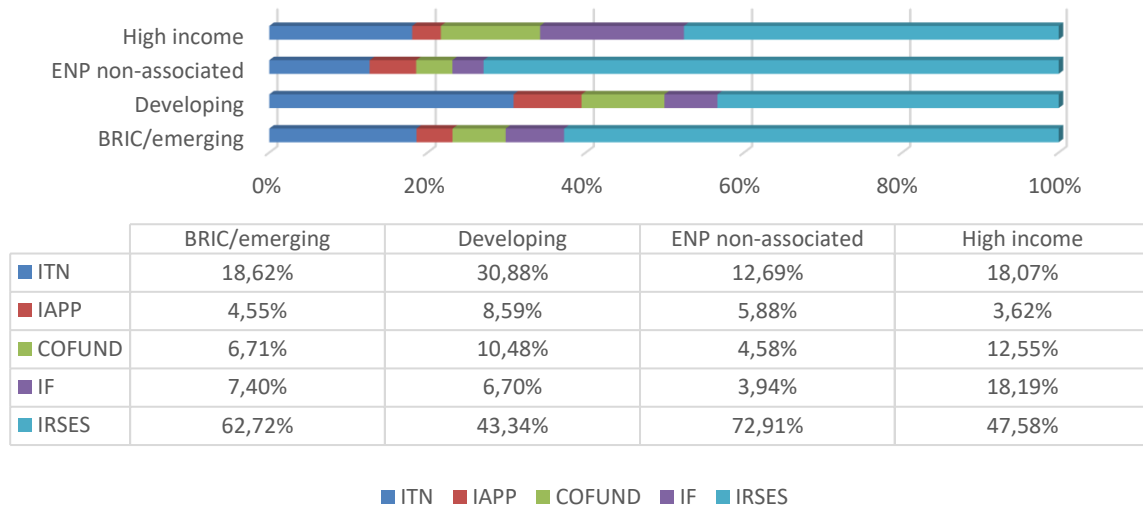
Source: CORDA data received on 25 April 2019.

Figure 29 reveals that in FP7 MCA researchers from different third country groups showed similar participation trends, varying only in proportions. **IRSES was the most common action for researchers from all third country groups in FP7 MCA**, with researchers from ENP non-associated countries (72.91% of researchers in IRSES) and BRIC/emerging countries (62.72%) leading the way and researchers from high-income countries (47.58%) and developing countries (43.34%) being somewhat less active in IRSES.

The figure below also reveals several other interesting insights. First, **researchers from developing countries were more active than researchers from other third**

country groups in ITNs – almost 31% of all researcher participations in this group were in ITN actions. **Researchers from high-income countries were more active than other researchers from third countries in IFs** – more than 18% of researchers from high-income countries participated in IF actions in FP7. Researchers from high-income countries were also somewhat more active than other third country researchers in COFUND actions.

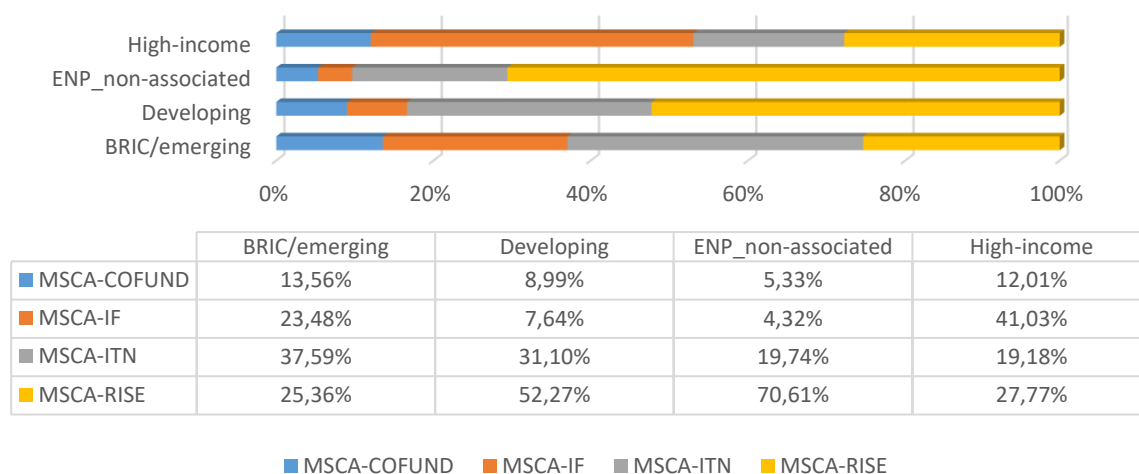
Figure 29. Share of researchers from third countries participating in FP7 MCA by country group and type of action



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 30 breaks down the participation patterns of third country researchers from different country groups in Horizon 2020 MSCA. Four key findings emerge from the analysis. First, **an even higher share of researchers from high-income countries have participated in IF in Horizon 2020 (41%)** compared to FP7 (18.19%). This country group continued to be a significant leader in terms of researchers participating in IFs. Second, **the share of researchers participating in IF has increased significantly for BRIC/emerging economies: from 7.40% in FP7 to 23.48% in Horizon 2020**. Third, researchers from high-income and BRIC/emerging economies have participated significantly less in RISE in Horizon 2020 compared to FP7, while RISE remained by far the most popular action for researchers from ENP non-associated and developing countries. Fourth, **the share of researchers from BRIC/emerging economies participating in ITNs has increased significantly in Horizon 2020 to 37.59% compared to 18.62% in FP7**.

Figure 30. Share of researchers from third countries participating in Horizon 2020 MSCA by country group and type of action



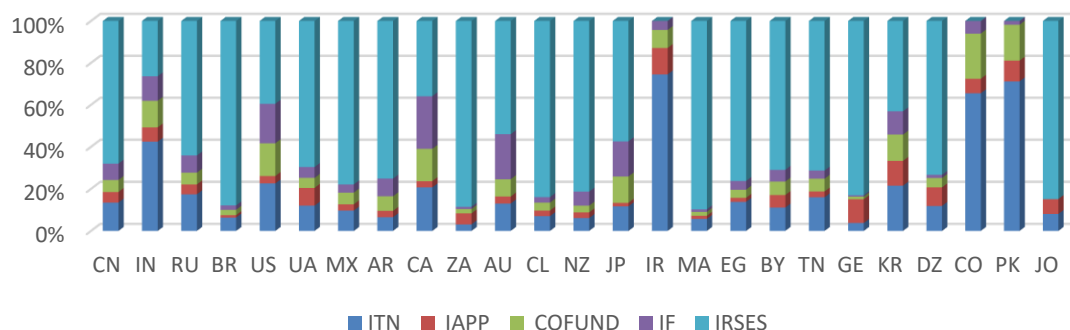
Source: CORDA data received on 25 April 2019.

Looking at numbers country-by-country may help explain the differences stated above (see Figure 31, which shows researcher participations per action for the 25 most active countries in FP7). It is clear that in FP7, IRSES was the most common action for researchers from most of the third countries. However, there were several leading third countries, the researchers from which largely abstained from participating in IRSES, including Iran, Colombia and Pakistan. For several other third countries, IRSES also had less than 50% of all participations: India, the US, Canada and South Korea.

The graph also reveals that the participation of a high number of researchers from high-income countries in IFs can be explained mainly by researcher participations from not only the US, Canada, Australia, Japan and South Korea, but also from India and China.

The high number of researchers in ITNs from the developing countries can be explained by researcher participations from India, Iran, Colombia and Pakistan with an extremely high share of researchers participating in ITNs in FP7.

Figure 31. Share of researchers from third countries (leading 25 countries) participating in FP7 (per type of MSCA)



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

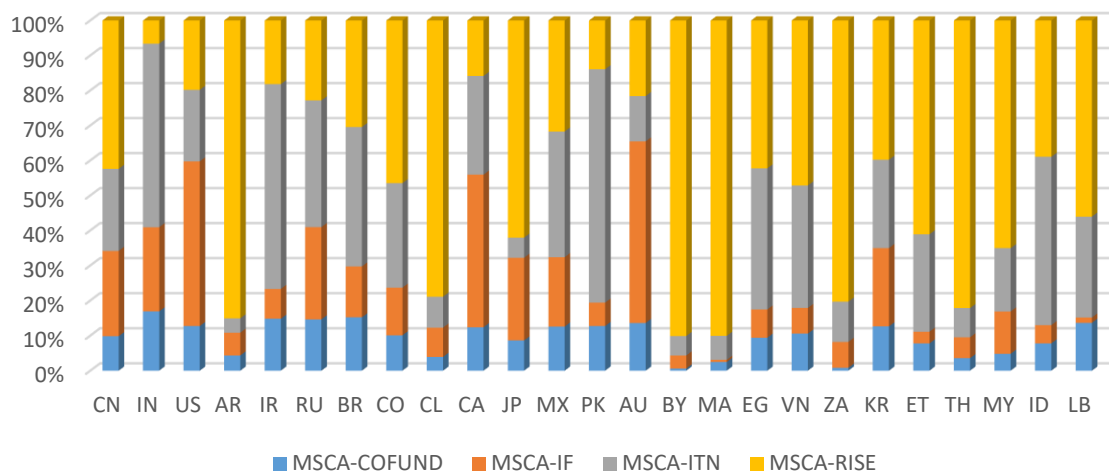
As already discussed above, Figure 32 reveals a **significantly higher share of participations from many third countries in IFs and ITNs in Horizon 2020, compared to FP7.**

While researchers from many countries started participating more actively in IFs, researchers from the US, Canada, and Australia led the way (in line with the results for FP7). However, in Horizon 2020, IF was also much more actively discovered by researchers from China, India, Russia, and Mexico, while researchers from Japan and Korea continued participating in IFs as actively as in FP7.

Researchers from many third countries have also started participating more actively in Horizon 2020 ITNs, with researchers from India, Iran and Pakistan being relatively most active in this type of action.

Researchers from Argentina, Chile, Belarus, Morocco, South Africa and Thailand participated most actively in RISE actions in Horizon 2020.

Figure 32. Share of researchers from third countries (leading 25 countries) participating in Horizon 2020 (per type of MSCA)

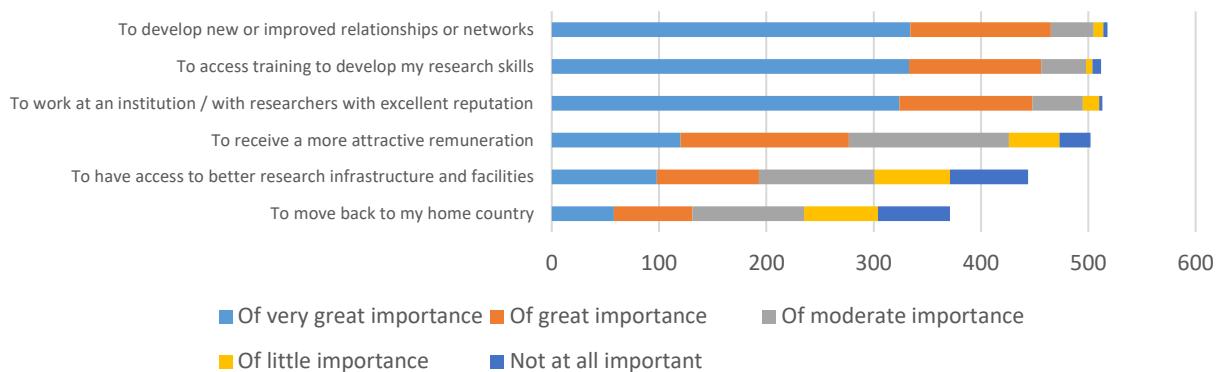


Source: CORDA data received on 25 April 2019.

The four figures below provide the data from the survey of fellows implemented by ICF as part of their recent ex post evaluation of FP7 MCA and interim evaluation of Horizon 2020 MSCA. These data show the motivations to participate in the MSCA (both FP7 and Horizon 2020) for third country fellows, classified into four country groups: BRIC/emerging economies, developing countries, high-income countries and ENP non-associated countries. Each graph shows the three most motivating and least motivating factors for each country group.

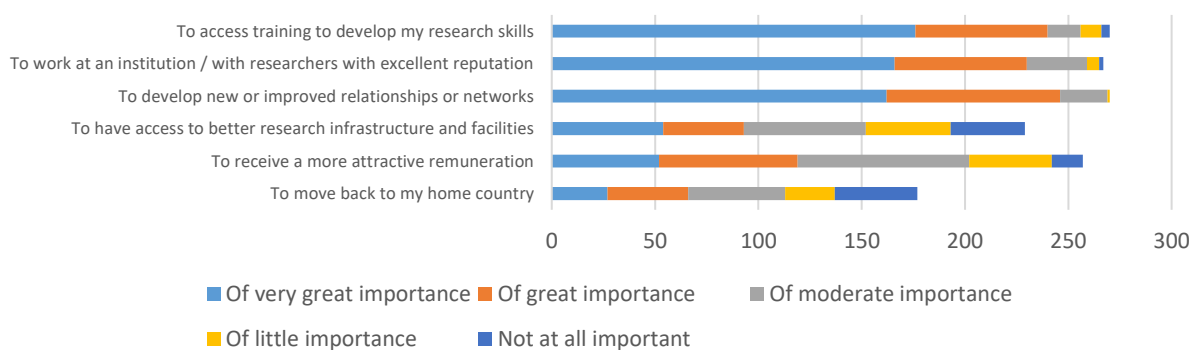
While many motivations are similar for researchers from all country groups, the survey has also revealed important differences. Researchers coming from BRIC/emerging and developing countries were mainly motivated by (1) developing new or improving old relationships or networks, (2) accessing training to develop personal research skills and (3) working at an institution/with researchers with excellent reputation. Interestingly, researchers from both of these two country groups were least motivated by the same list of aspects: moving back to home country, receiving more attractive remuneration and accessing better research infrastructures.

Figure 33: How important were the following as motives for your application for the MSCA fellowship? (answers from research fellows from **BRIC/emerging** countries who participated in MSCA under ITN, IF, IAPP/IRSES/RISE and COFUND actions), n=529



Source: ICF survey.

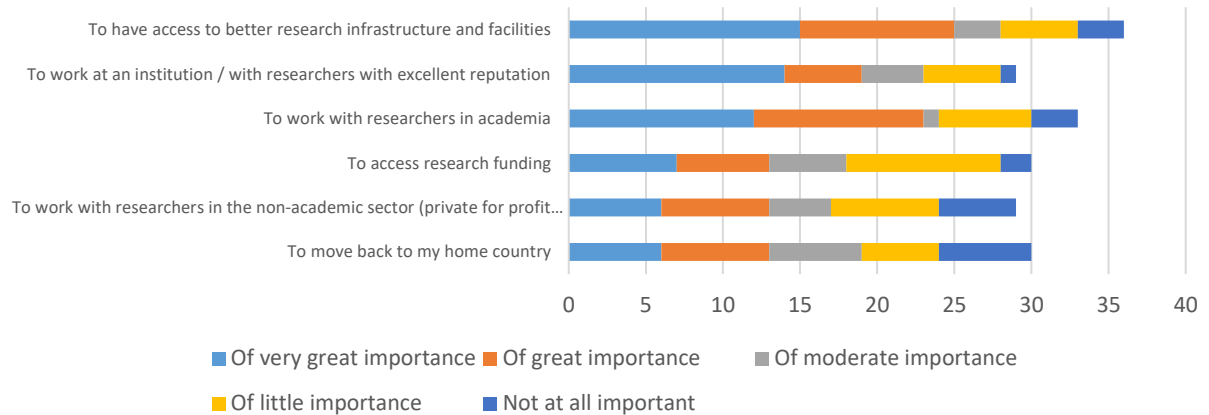
Figure 34: How important were the following as motives for your application for the MSCA fellowship? (answers from research fellows from **Developing** countries who participated in MSCA under ITN, IF, IAPP/IRSES/RISE and COFUND actions), n=274



Source: ICF survey.

Researchers coming from ENP non-associated countries were mainly motivated by (1) having access to better research infrastructure and facilities, (2) working at an institution/with researchers with excellent reputation and (3) working with institutions in academia. They were least motivated by moving back to home country, working with non-academic sector and accessing research funding.

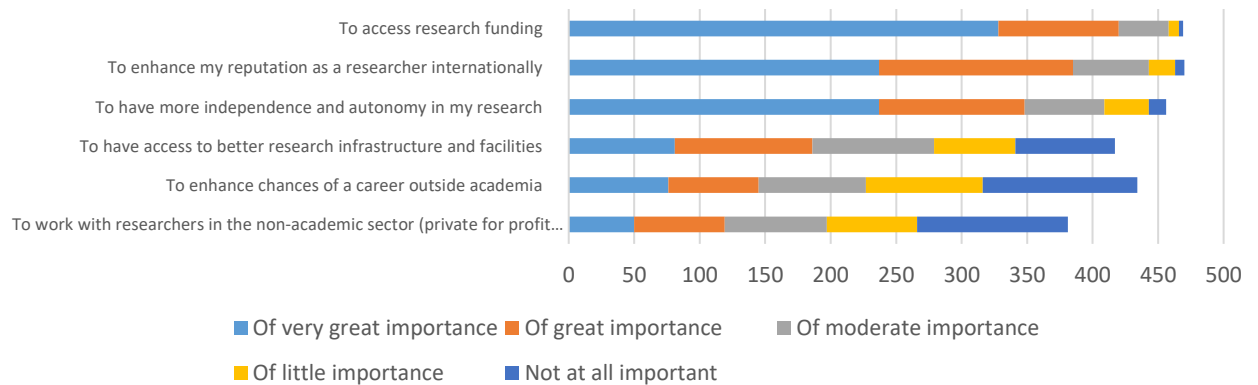
Figure 35: How important were the following as motives for your application for the MSCA fellowship? (answers from research fellows from **ENP non-associated** countries who participated in MSCA under ITN, IF, IAPP/IRSES/RISE and COFUND actions), n=41



Source: ICF survey.

Researchers coming from high-income countries were mainly motivated by (1) accessing research funding, (2) enhancing international reputation as a researcher and (3) having more independence and autonomy in research. They were least motivated by working with researchers from the non-academic sector, enhancing career outside of academia and access to better research infrastructures.

Figure 36: How important were the following as motives for your application for the MSCA fellowship? (answers from research fellows from **high-income** countries who participated in the MSCA under ITN, IF, IAPP/IRSES/RISE and COFUND actions), n=481



Source: ICF survey.

3.1.5. Relative engagement of third countries in the MSCA in terms of the share of their national researchers participating in the programme

To provide a deeper insight into the extent to which third countries are relatively engaged in the MSCA through participation of their national researchers, we have calculated an index by taking the number of third country researchers and dividing it by the total researcher population in the respective country. In short, it measures the share of researchers from third countries that have participated in the MSCA and allows to standardise the measurement of third country researcher involvement by taking into account the size of researcher populations in each individual country. Table 8 reveals several interesting insights in this regard. First, in terms of the MSCA researchers per

total researcher population, **researchers from Latin American countries were generally very engaged in the programme.** Six countries from the Latin American region made it into the leading country list in terms of this indicator throughout FP7. In particular, Chile was ahead of the second most participating country in terms of the relative engagement in the MSCA by 2.09% – a margin of nearly 60%. In Horizon 2020, Colombia was leading in terms of engagement of its researchers with Chile in second place.

Aside from the Latin American region, **researchers from countries that are part of the European Neighbourhood Policy – Ukraine, Belarus, Tunisia, Morocco, Georgia – have also displayed a high level of engagement throughout FP7 MCA.** This argument holds for Horizon 2020 MSCA as well.

Colour coding in the table aims to indicate homogenous clusters of countries in terms of how actively their national researchers participate in the MSCA. If countries are in the same cluster, it means that they are similarly active to other countries in the same cluster, and relevantly different from countries in other clusters.

Table 8. Leading third country participants: % share of outgoing researchers from the total researcher population in the country

Country (FP7)	% share of outgoing researchers from the total researcher population in the country	Country (H2020)	% share of outgoing researchers from the total researcher population in the country
Chile	5.60%	Colombia	4.11%
Jordan	3.51%	Chile	2.52%
Georgia	3.32%	Ethiopia	2.06%
Mexico	2.54%	Argentina	0.89%
Ukraine	2.17%	Iran	0.75%
Colombia	2.09%	Mexico	0.55%
New Zealand	2.03%	South Africa	0.50%
South Africa	1.98%	Venezuela	0.48%
Argentina	1.46%	India	0.39%
Belarus	1.38%	Indonesia	0.33%
Brazil	1.04%	Pakistan	0.30%
Morocco	0.92%	Philippines	0.24%
Tunisia	0.90%	Vietnam	0.19%
Iran	0.64%	Brazil	0.19%
India	0.63%	Thailand	0.14%
Egypt	0.49%	Malaysia	0.12%
Australia	0.44%	Hong Kong	0.11%
Russia	0.35%	China	0.07%
Canada	0.31%	Russia	0.07%
China	0.20%	Taiwan	0.03%

Note: Countries where the number of researchers participating in MCA was lower than 50 were omitted (less than 40 for the MSCA due to the drop in participations) to provide a more realistic image of third country engagement. Countries such as Cape Verde, Mauritius, or Burkina Faso have relatively few researchers overall and thus distort overview of engagement levels by committing a few participants. Colour coding is based on

the biggest change between homogenous clusters. Source: MSCA in Numbers, retrieved from: https://ec.europa.eu/research/mariecurieactions/msca-numbers_en on 11 January 2019.

Overall, in terms of researcher engagement, a general trend can be observed (see Table 9) – **only researchers from developing countries started participating more actively in terms of engagement levels** throughout H2020, while researchers from high-income countries, BRICS/emerging and particularly ENP non-associated countries, displayed lower levels of interest in Horizon 2020, compared to FP7. Less active engagement of researchers coming from BRICS/emerging countries can be explained in part by the fact that most of them were removed from the list of eligible countries for funding for Horizon 2020. Consequently, it is likely that this has opened more opportunities for researchers from developing countries to partake in the MSCA. Table 10 provides a more clear-cut image of how active different groups of countries are in terms of MSCA researchers per total researcher population.

Table 9. Categorisation of countries: average engagement per country group (FP7 & H2020)

Programme/Country Categories	High income (including overseas territories): e.g. United States, Japan, Singapore, New Zealand	BRICS/emerging: e.g. Brazil, Russia, Taiwan, Macao	ENP non-associated: e.g. Algeria, Azerbaijan, Belarus, Egypt	Developing: e.g. Rwanda, Pakistan, Venezuela, Jamaica
FP7	0.434%	0.627%	1.527%	0.835%
H2020	0.096%	0.352%	0.790%	2.333%
Change	(-0.338%) ▼	(-0.275%) ▼	(-0.737%) ▼	(+1.498%) ▲

Note: average engagement for a category is calculated by adding together each country's outgoing MSCA researcher population/total researcher population and then calculating the overall mean Source: Country factsheets of participations in FP7 from the MSCA in Numbers website and CORDA data on Horizon 2020.

Table 10. Categorisation of countries: ranking of average engagement per category (FP7 & H2020)

Rank	Country engagement (FP7)	Country engagement (H2020)
1	ENP non-associated	Developing
2	Developing	ENP non-associated
3	BRICS/emerging	BRICS/emerging
4	High income	High income

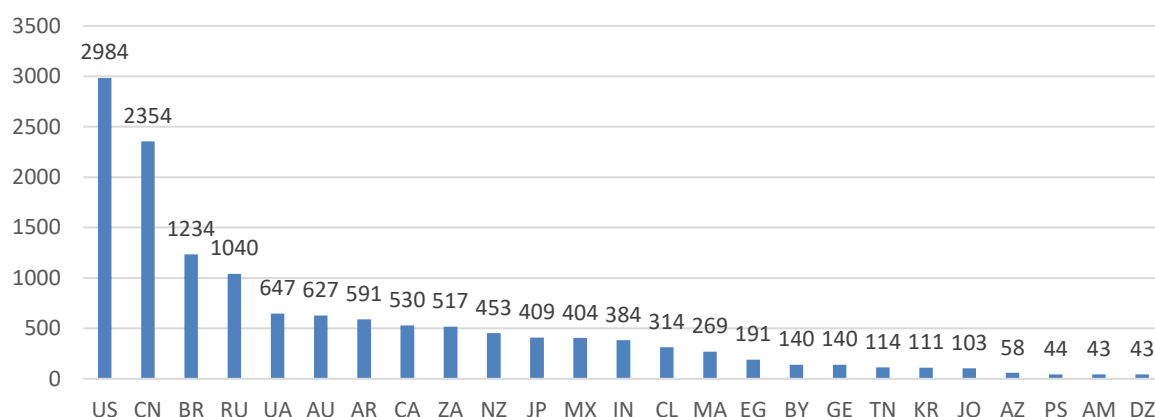
Source: Country factsheets of participations in FP7 from the MSCA in Numbers website and CORDA data on Horizon 2020.

3.1.6. Researchers going to third countries

Figure 37 lists the leading 25 third countries in terms of European researchers¹³ going to these countries in FP7 MCA, while Figure 38 classifies these numbers in terms of groups of third countries in line with the EU R&I international cooperation policy. **The US and China were by far the leading destinations among third countries in terms of receiving European researchers in FP7 MCA.** Brazil and Russia were also among the top destinations. When it comes to most popular third country groups, here BRIC/emerging and high-income countries are equally popular as top destinations, leading ENP non-associated countries and developing countries by a large margin.

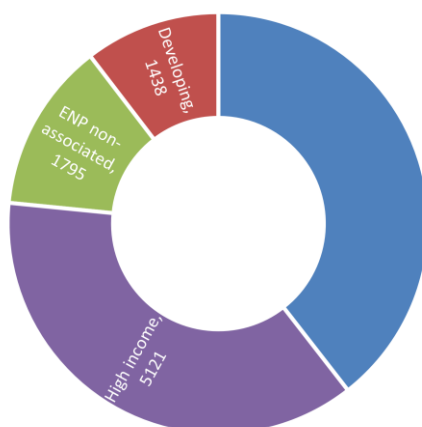
¹³ Note that we used the nationality of a researcher to establish where a researcher is coming from, and not the country of residence at the beginning of a fellowship/secondment. These data are more accurate for analysis, as for ITNs, IFs and COFUND there is no such thing as a "sending country".

Figure 37. Number of researchers going to third countries in FP7 MCA (leading 25 countries)



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

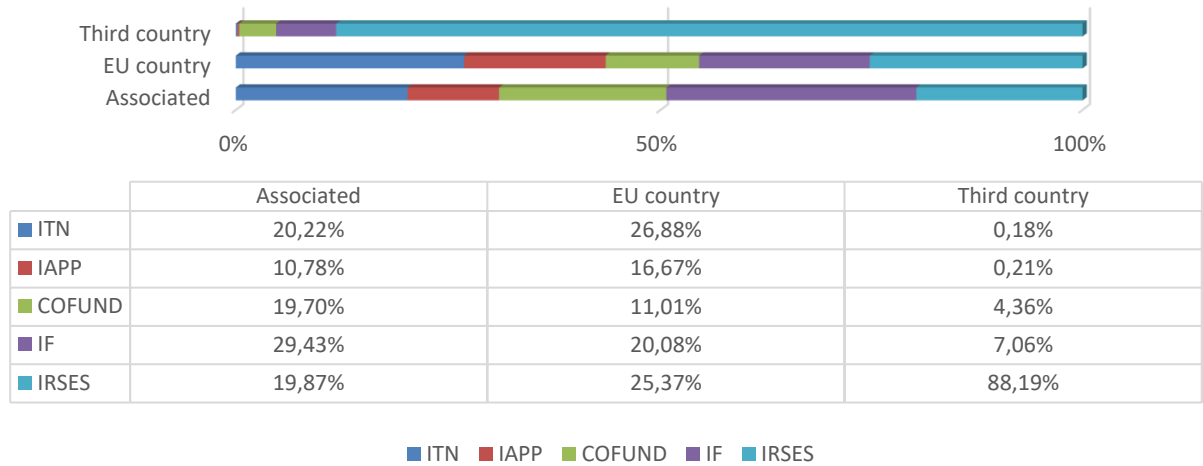
Figure 38. Number of researchers going to third countries in FP7 MCA by country group



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

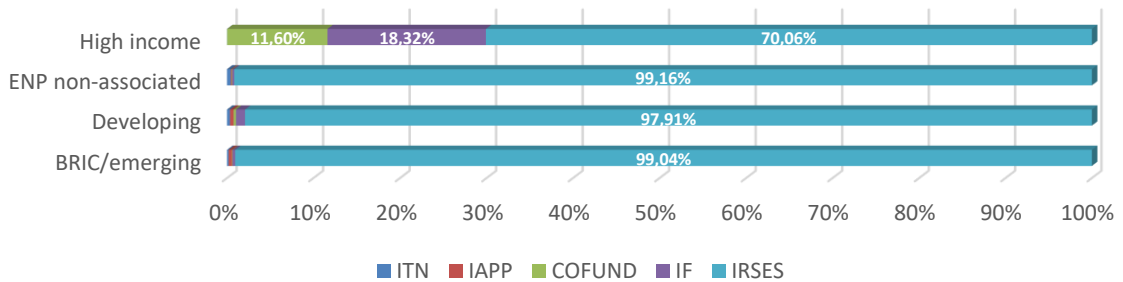
As Figure 39 shows, researchers going to third countries in FP7 MCA were overwhelmingly participating in the IRSES action (more than 88%). This share was much higher than for researchers going to EU or Associated countries in FP7 MCA. Just 7% of researchers going to third countries in FP7 were participating in IFs, while another 4% participated in COFUND actions. As shown by Figure 40 and Figure 41, all these participations can be explained by the choice of researchers going to high income countries, and in particular to the US, Australia and Canada. Figure 46 shows that this trend has not changed in Horizon 2020.

Figure 39. Share of researchers going to third countries and going to EU/Associated countries in FP7 MCA (per type of MSCA)



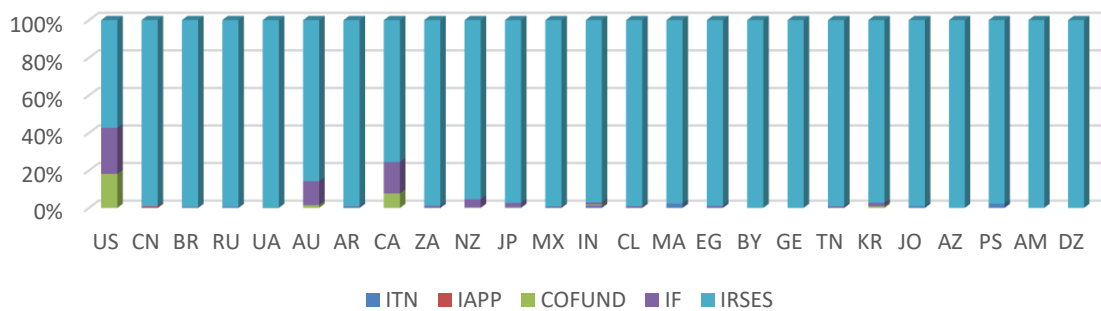
Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 40. Share of researchers going to third countries in FP7 MCA by country group



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

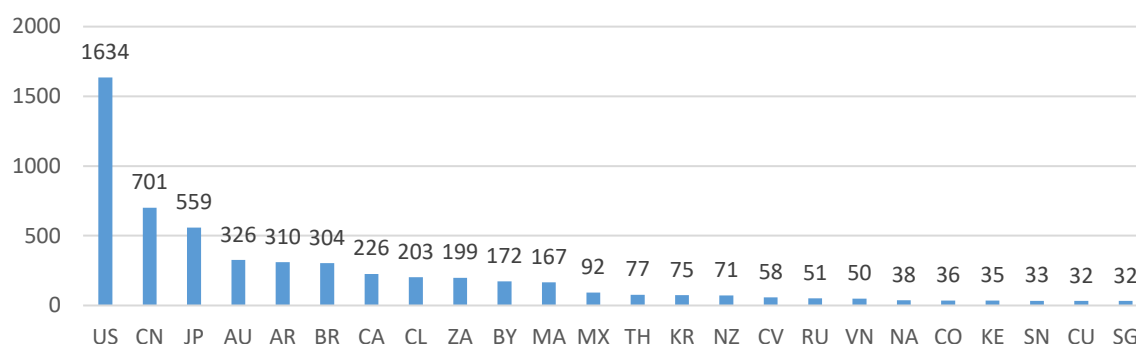
Figure 41. Share of researchers going to third countries (leading 25 countries) in FP7 MCA (per type of MCA)



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

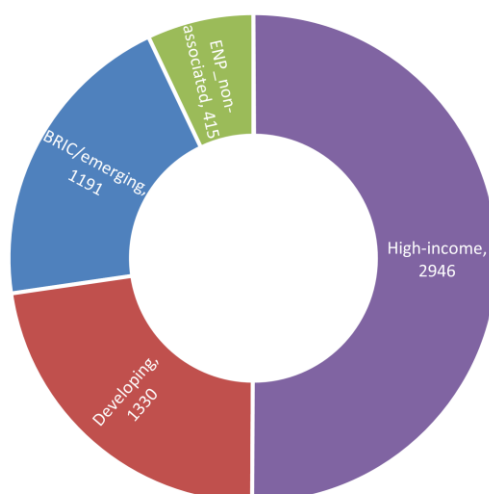
Figure 42 reveals that the US is by a large margin a leading third country in terms of researchers going to third countries in Horizon 2020 MSCA. China and Japan are in strong second and third places. Figure 43 shows that **high-income countries were a top destination for Horizon 2020 MSCA researchers among third country groups** (around 50% of third country incoming researchers went to high-income economies).

Figure 42. Number of researchers going to third countries in Horizon 2020 MSCA (leading 25 third countries)



Source: CORDA data received on 25 April 2019.

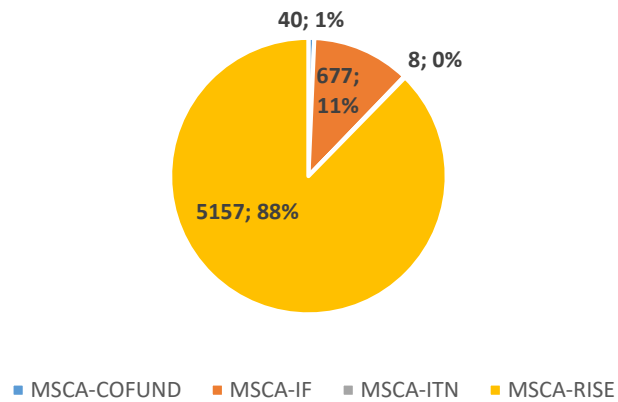
Figure 43. Number of researchers going to third countries in Horizon 2020 MSCA by third country group



Source: CORDA data received on 25 April 2019.

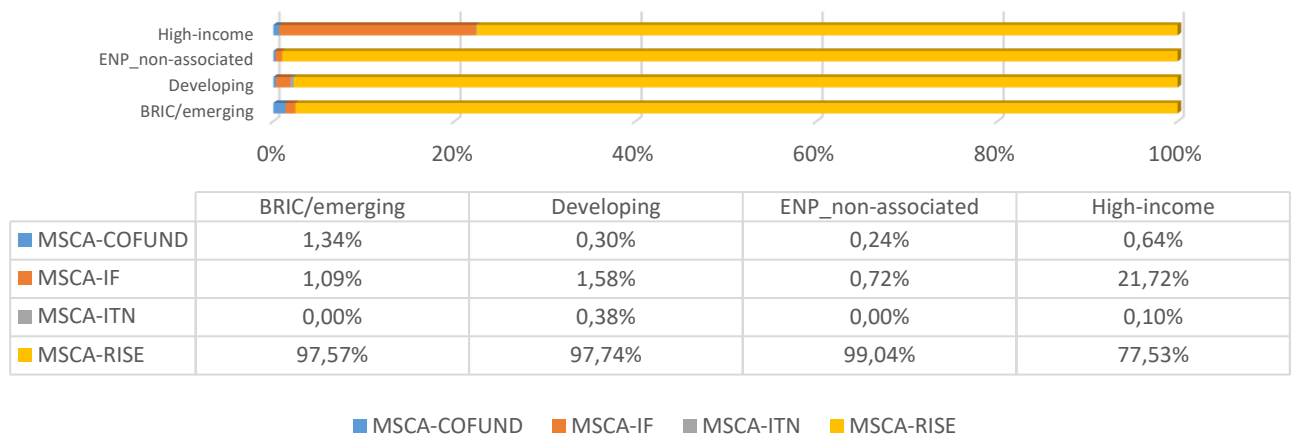
Figure 44 shows that, in Horizon 2020 MSCA, by far the highest share of researchers going to third countries participated in RISE (88%), revealing the same trend as in FP7 MCA. A significantly larger share of researchers going to third countries in Horizon 2020, compared to FP7, participated in IFs (11% vs 7%). As can be seen from Figure 45, **almost all participations in IFs can be explained by researchers going to high-income countries and in particular to the US, Canada and Australia** (see Figure 46).

Figure 44. Researchers going to third countries in Horizon 2020 per type of MSCA



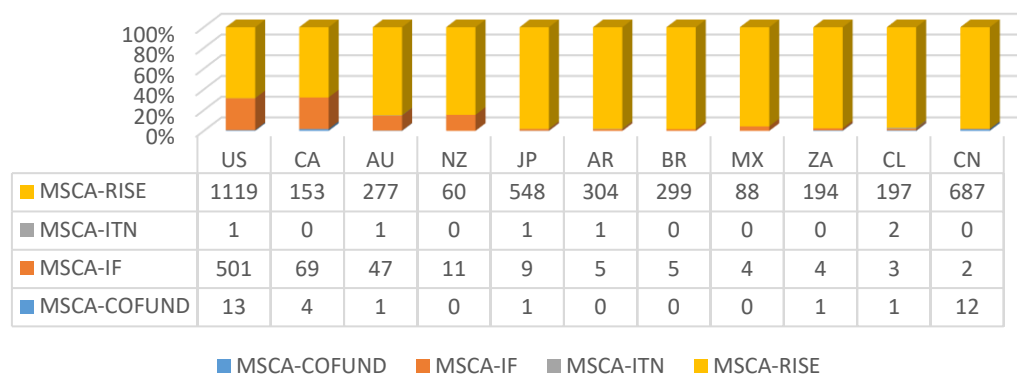
Source: CORDA data received on 25 April 2019. Please note that COFUND "pie" is almost invisible, since only 8 researchers went to third countries via COFUND, which constitutes close to 0 %.

Figure 45. Researchers going to third countries in Horizon 2020 MSCA by country group



Source: CORDA data received on 25 April 2019.

Figure 46. Researchers going to third countries by type of action (where there was the highest number of non-RISE participations)



Source: CORDA data received on 25 April 2019.

Figure 47 shows the difference in terms of researchers going to third countries annually between Horizon 2020 MSCA and FP7 MCA. The figure lists the countries with the largest negative (on the left) and positive (on the right) difference. In order to standardise the comparison, we have used the number of annual average researcher participations instead of the absolute number of participations by third country researchers. This figure is best interpreted together with Figure 48, which shows the differences between Horizon 2020 and FP7 in terms of annual averages of researchers going to third countries per third country group.

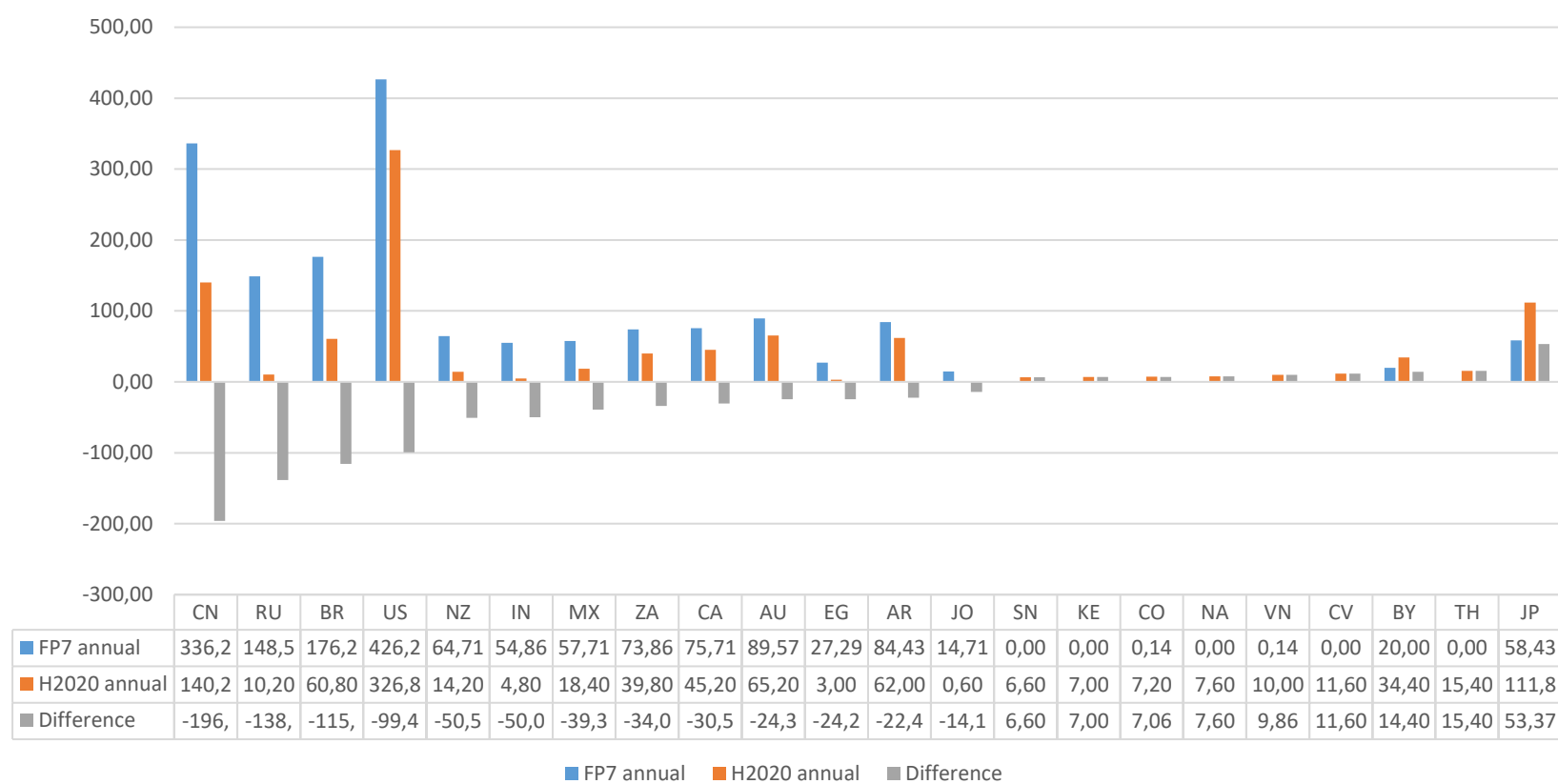
Both figures reveal that the number of researchers annually going to all third countries has decreased for Horizon 2020, compared to FP7 (-794.89 incoming researchers annually). The reader should note that the results are affected by the fact that Horizon 2020 is still an ongoing programme and this number may change by the end of its implementation. **The annual decrease in incoming researchers is explained mostly by the strong decrease in the number researchers going to BRIC/emerging economies (-539.66).** This, in turn, is explained mainly by the decrease of participations by organisations from BRIC/emerging economies in RISE in Horizon 2020 due to the change in funding eligibility. The number of incoming researchers has also decreased significantly for high-income and ENP non-associated countries.

The following countries saw the largest decrease in terms of annually received researchers in Horizon 2020, compared to FP7: China (-196), Russia (-138.3), Brazil (-115.4) the US (-99.49), New Zealand (-50.1) and India (-50.06).

Only for developing countries has the annual number of received researchers increased for Horizon 2020, compared to FP7 (+60.57). Some of the individual high-income and ENP non-associated countries also saw an increase in annually received researchers.

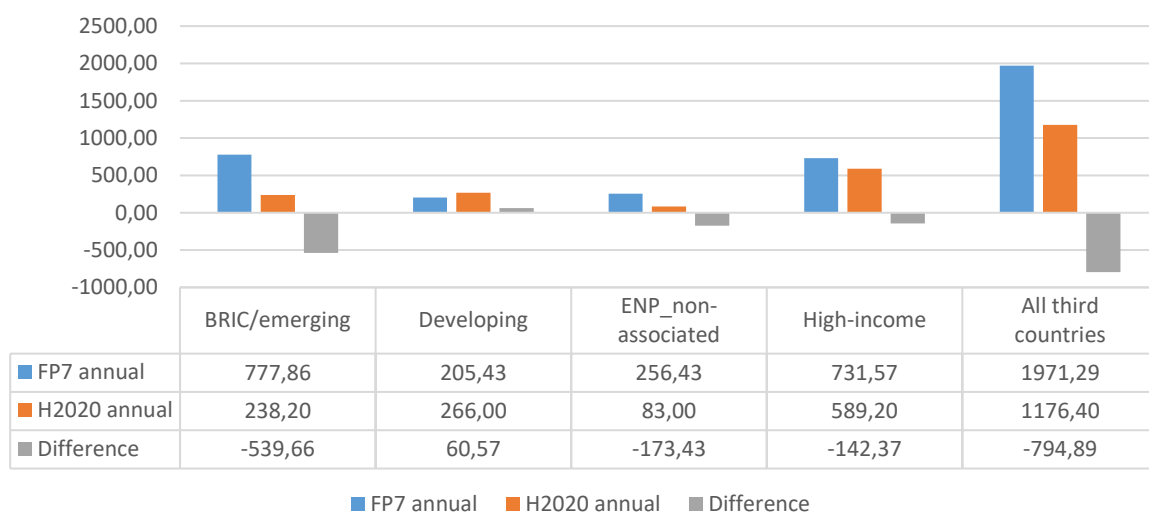
The following countries saw the largest annual increase in received researchers in Horizon 2020, compared to FP7: Japan (+53.37), Thailand (15.4), Belarus (+14.4), Cape Verde (+11.6; an outlier – no researchers went to Cape Verde in FP7), Vietnam (+9.86).

Figure 47. Difference between the annually received researchers to third countries in FP7 MCA and Horizon 2020 MSCA (countries with largest positive and negative change)



Source: CORDA data received on 25 April 2019.

Figure 48. Difference between the annual average number of received researchers to third countries in FP7 MCA and Horizon 2020 MSCA according to country groups (all countries)



Source: CORDA data received on 25 April 2019.

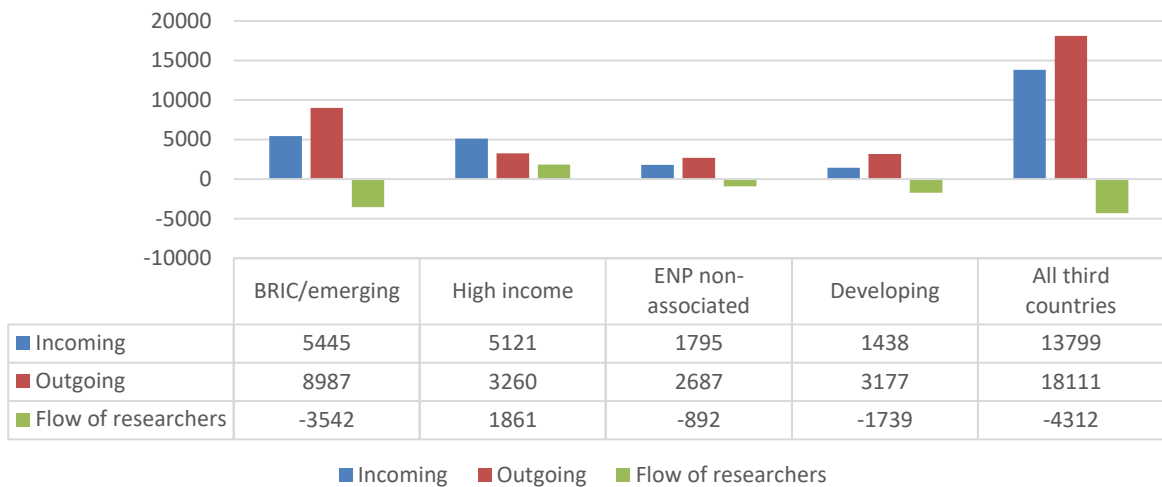
3.1.7. Flow of researchers

Figure 49 (FP7) and Figure 50 (Horizon 2020) analyse the flow of researchers from and to third countries by country group in line with the EU R&I international cooperation policy. First, the figures show that **third countries overall had more outgoing than incoming researchers during both FP7 and Horizon 2020** (flow of researchers: - 4 312 in FP7 and - 1 684 in Horizon 2020). Second, BRIC/emerging countries were leading the way in both framework programmes in terms of the negative flow of researchers (-3 542 in FP7 and - 1 892 in Horizon 2020), while developing and ENP non-associated countries followed. **Only high-income countries had a significantly positive flow of researchers in both FP7 (1 861) and Horizon 2020 (1 749)**, meaning that these countries received more researchers during FP7 than the number of their researchers moving to other countries.

A more in-depth analysis reveals further relevant insights about the trends in the flow of researchers per different country groups:

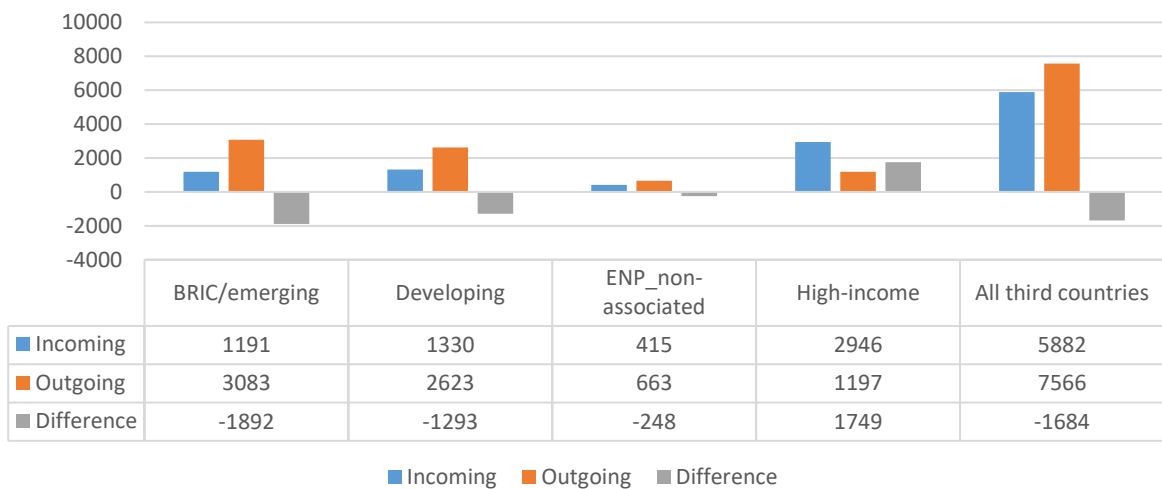
- First, although the flow of researchers for all third countries in Horizon 2020 is still negative, the same as in FP7, **the negative direction started slowing down and was significantly less negative in Horizon 2020** (-616 annual average in FP7 vs -336.8 in Horizon 2020).
- Second, this can be explained by the **increasingly positive flow of researchers to high-income countries** (+240 annually in FP7 vs +349.8 in Horizon 2020) and **significantly less negative flow of researchers from BRIC/emerging economies** (-506 annually in FP7 vs -378 in Horizon 2020) and ENP non-associated countries (-127 annually in FP7 vs -49.6 in Horizon 2020). The reader should note that the ENP non-associated group of countries was influenced significantly by Ukraine, Georgia, Tunisia and Armenia becoming associated countries in Horizon 2020.
- Third, **the trend in flow of researchers is becoming increasingly negative for the developing countries** (-248 annually in FP7 vs -336.8 in Horizon 2020).

Figure 49. Flow of researchers from and to third countries (by country group) in FP7 MCA



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

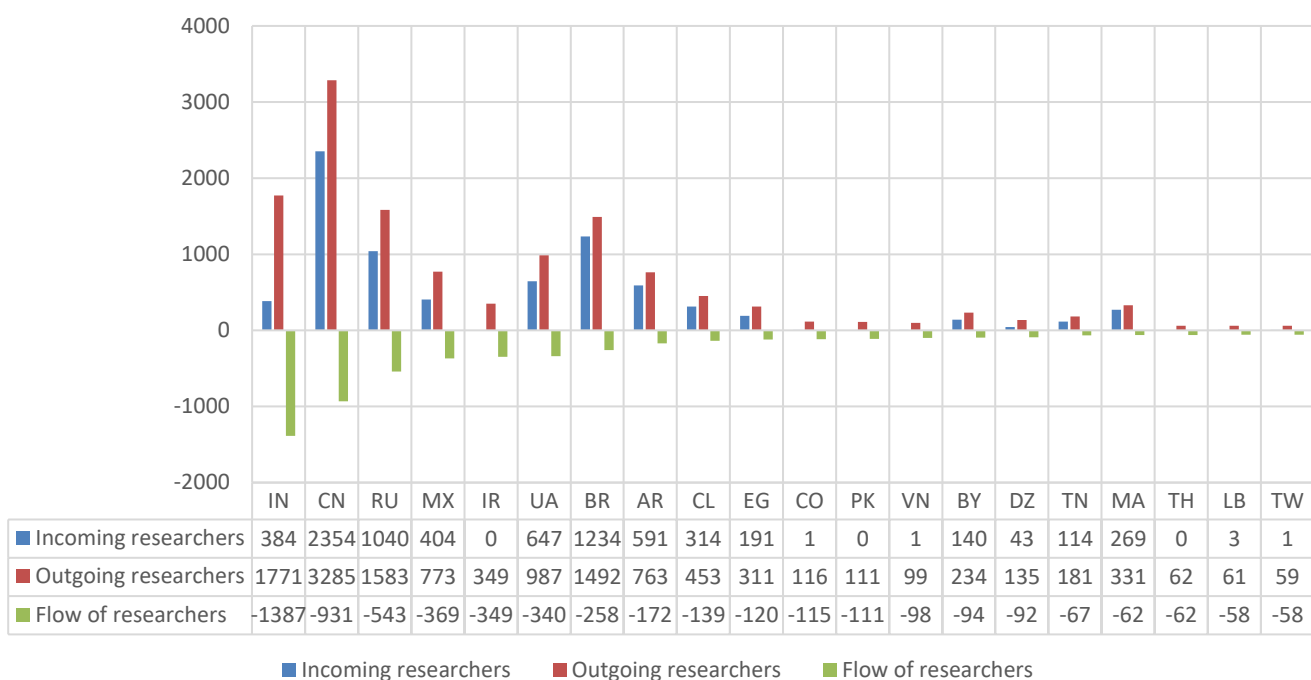
Figure 50. Flow of researchers from and to third countries (by country group) in Horizon 2020 MSCA



Source: CORDA data received on 25 April 2019.

The figures below allow the flow of researchers to be analysed in more depth, at country level. As Figure 51 shows, the majority of third countries (except for several mainly high-income countries) had a negative flow of researchers. During FP7 MCA, the list was led by India (-1 387), China (- 931), Russia (-543), Mexico (-369) and Iran (-349). It is interesting to point out that no researchers in FP7 went to Iran, Pakistan or Thailand.

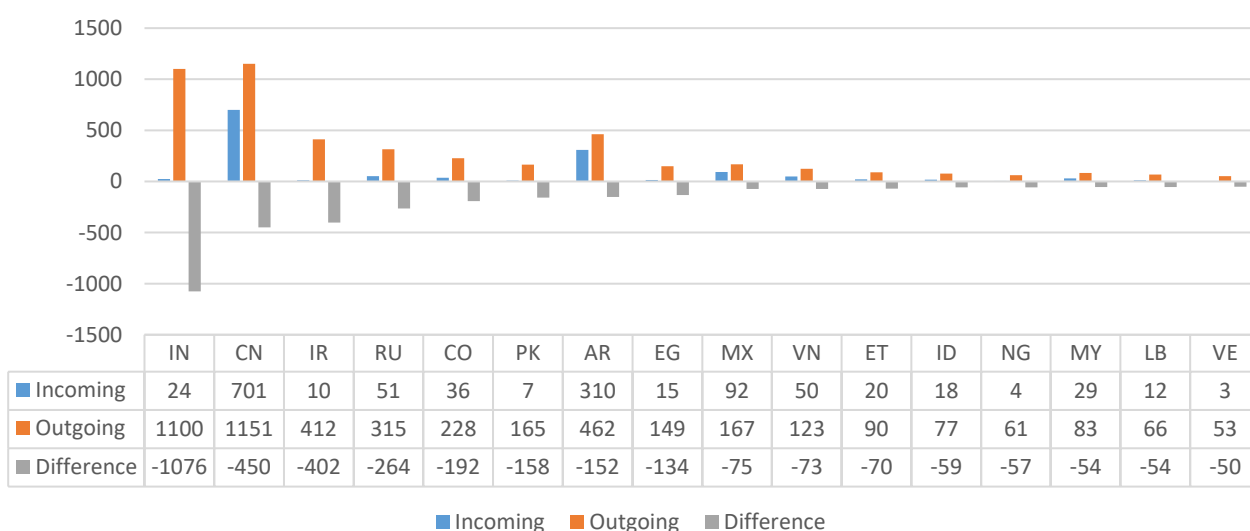
Figure 51. Third countries with the largest negative flow of researchers in FP7



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

Figure 52 shows that very similar trends exist so far in Horizon 2020. India (-1 076), China (-450), Iran (-402), Russia (-264) and Colombia (-192) are the leading countries in terms of the negative flow of researchers in Horizon 2020.

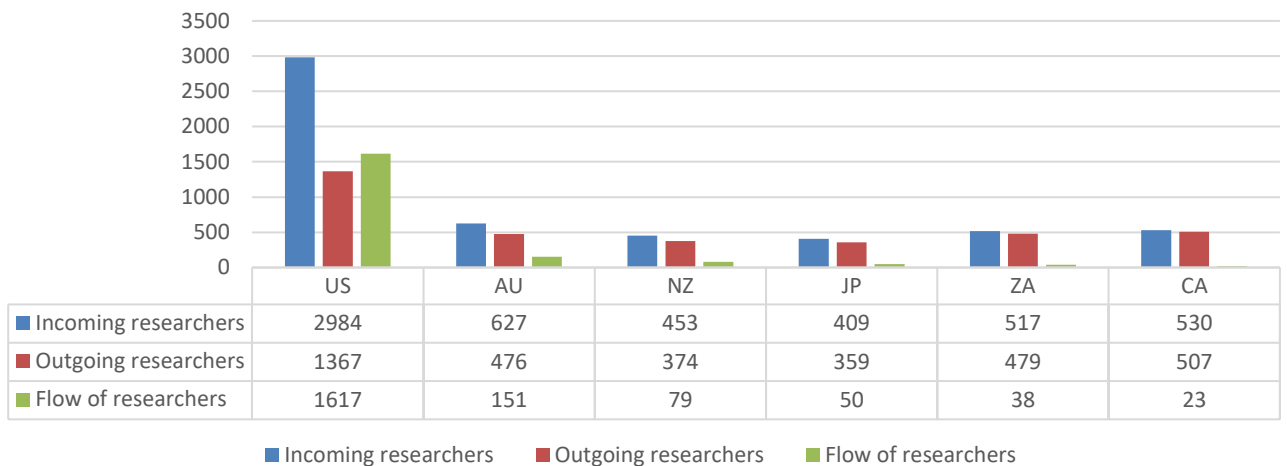
Figure 52. Third countries with a largest negative flow of researchers in Horizon 2020



Source: CORDA data received on 25 April 2019.

Figure 53 shows that only the US, Australia and New Zealand had a strongly positive flow of researchers in FP7 MCA, while Japan, South Africa and Canada also had a somewhat positive flow of researchers.

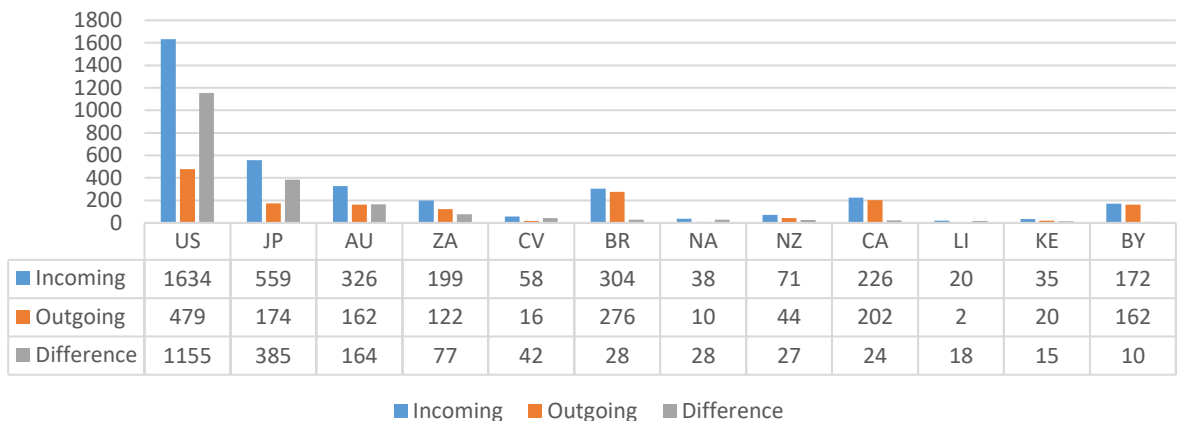
Figure 53. Third countries with a positive flow of researchers in FP7



Source: Country factsheets of participations in FP7 from the MSCA in Numbers website.

As shown by Figure 54, a very similar situation exists in Horizon 2020, where the US, Japan and Australia are leading the way in terms of positive flow of researchers. Here, three things are notable. First, Japan has significantly strengthened its positive flow of researchers. Second, for the US the positive difference between incoming and outgoing researchers is significantly larger than in FP7 (in relative terms). Third, there are more third countries with a positive flow of researchers in Horizon 2020 than in FP7.

Figure 54. Third countries with the largest positive flow of researchers in Horizon 2020



Source: CORDA data received on 25 April 2019.

3.1.8. Flow of researchers between individual EU countries and third countries

Table 11 and Table 13 provide an overview on researcher flows between the EU and third countries in FP7 MCA and H2020 MSCA, respectively. For the period of FP7, numbers on the country of origin and country of destination were not available, only the ranking of the most popular destination countries. Therefore, a ranking method has been applied by providing the top three countries both in terms of incoming and outgoing researchers for each EU Member State. A colour coding method has been applied to group the countries to allow for a better overall picture. Furthermore, since the FP7 programme had multiple actions within it, the classification is shown, as provided in the MSCA in Numbers, i.e. fellowships (IF+ITN+COFUND) and IRSES.

In terms of the main origins of the incoming third country fellows in FP7, **most of the researchers to all of the EU countries came from India, followed by China and Russia**. Only a few EU countries, receiving a lower number of fellows overall, revealed different patterns. For example, Estonia received the highest number of fellows from Ukraine, while Canadians were the top group coming to Latvia and Malta. The largest group in Slovakia was researchers from Kazakhstan.

As for outgoing EU fellows, the top destinations for European researchers in FP7 were the US, Canada and Australia. This trend was very strong and even researchers from countries with a smaller researcher population followed suit. There were also a few exceptions. A top destination for fellows from Finland was China, which was also among the top destinations for Greek fellows. Finally, Brazil was the third top destination for Portuguese fellows.

With respect to IRSES, the largest share of research staff in FP7 came to the EU countries from China, Ukraine and Russia. However, here a larger variation was evident (see the table below). For example, Belgium received the highest number of researchers from Morocco, Cyprus – from Egypt, Luxembourg – from Argentina, Malta – from Australia. **The European researchers seconded under the MSCA IRSES most frequently went on mobility to China, followed by the US and Ukraine**.

Table 12 provides the same information on incoming and outgoing researchers for the most active third countries.

Table 11. EU-Third country ties in FP7 MCA: incoming and outgoing researchers

Country Name	Incoming Fellowships			Outgoing Fellowships			Incoming IRSES			Outgoing IRSES		
Austria	India	US	China	US	Canada		Ukraine	Australia	US	US	China	Australia
Belgium	India	Ukraine	China	US	Australia	Canada	Morocco	Russia	South Africa	South Africa	Ukraine	Russia
Bulgaria	US	Russia	Chile	US			Ukraine	Russia	China	Russia	Ukraine	China
Cyprus	US	Australia	India	US	Canada		Egypt	India	Mexico	US	India	Chile
Croatia	Russia	Australia	China	US	Australia		Brazil	Jordan	Argentina	Jordan	Brazil	India
Czechia	Russia	China	US	US			Russia	Chile	China	Russia	China	Chile
Denmark	China	US	India	US	Australia		China	New Zealand	India	US	China	India
Estonia	Ukraine	China	Russia	Australia	Canada		Brazil	New Zealand	Russia	Russia	India	Brazil
Finland	China	Russia	India	China	US	Australia	China	Russia	Brazil	China	Russia	Brazil
France	India	Russia	Canada	US	Australia	Canada	China	Russia	Brazil	China	US	Brazil
Germany	India	China	US	US			China	Argentina	Brazil	China	US	Brazil
Greece	India	China	US	US	China		China	Chile	US	US	China	South Korea
Hungary	China	Thailand	India	US	Canada		China	Ukraine	Russia	China	Ukraine	Russia
Ireland	US	China	South Africa	US	Canada	Australia	India	Australia	Brazil	Australia	Canada	India
Italy	India	Russia	China	US	Canada		Brazil	China	Mexico	US	China	Brazil
Latvia	Canada	Indonesia	India	Russia			Ukraine	Russia	Belarus	Russia	Ukraine	Australia
Lithuania	India	Belarus	Ukraine	US			Ukraine	Russia	Georgia	Ukraine	Russia	US
Luxembourg	China	Iran	Senegal	US	Canada		Argentina	China		China	Canada	Argentina
Malta	Canada						Australia			Australia		
Netherlands	India	China	US	US	Australia		China	Brazil	South Africa	China	South Africa	US
Poland	India	Russia	Iran	US			Ukraine	Russia	China	Ukraine	Russia	US
Portugal	India	Brazil	Russia	US	Canada	Brazil	Brazil	Russia	China	Brazil	US	Russia
Romania	China	Brazil	India	US			Ukraine	Brazil	China	Ukraine	Russia	Brazil
Slovakia	Kazakhstan	Ukraine	India	US			Ukraine	Russia	US	US	Ukraine	Russia
Slovenia	India	Japan	Russia	US	Canada		South Korea	New Zealand	China	South Korea	South Africa	New Zealand
Spain	India	Argentina	China	Canada	Australia		Brazil	Mexico	Argentina	Brazil	Argentina	US
Sweden	China	India	US	US			China	Russia	South Africa	China	US	Russia
United Kingdom	China	Russia	Canada	US	Australia	Canada	China	Brazil	Russia	China	US	Brazil
Most Frequent	India	China	Russia	US	Canada	Australia	China	Ukraine	Russia	China	US	Ukraine

* Ranking is constructed as follows: the most frequent cell is taken for the first column, then followed by the most frequent cell in the second column while being cross-checked with the first column for values. The same principle applies for deciding the rank in the third column. Only countries that were mentioned more than once are colour coded. Source: MSCA in Numbers.

Table 12. Third country-EU ties in FP7 MCA: incoming and outgoing researchers

Country Name	Incoming Fellowship			Outgoing Fellowship			Incoming IRSES			Outgoing IRSES		
China	Greece	Spain	Ireland	United Kingdom	Germany	France	United Kingdom	Germany	Spain	United Kingdom	Italy	Netherlands
India	France	United Kingdom	Austria	United Kingdom	Germany	France	United Kingdom	Spain	Italy	United Kingdom	Spain	Italy
Russia	Estonia	Italy	Latvia	United Kingdom	Germany	France	United Kingdom	Italy	Poland	United Kingdom	Germany	Spain
Brazil	Portugal	Spain	France	United Kingdom	Germany	France	Italy	Portugal	France	Italy	Spain	Portugal
United States	Austria	Spain	Italy	United Kingdom	Germany	France	Italy	France	Greece	Italy	United Kingdom	Spain
Ukraine	Italy	United Kingdom		Belgium	United Kingdom	Germany	Poland	United Kingdom	Spain	Poland	United Kingdom	Spain
Mexico	Italy	Poland	United Kingdom	Germany	Spain	United Kingdom	Spain	Italy	United Kingdom	Spain	Italy	United Kingdom
Argentina	Belgium	France	Italy	Spain	Germany	United Kingdom	Spain	Italy	Germany	Spain	Germany	Italy
Canada	Italy	Spain	France	United Kingdom	France	Germany	France	Spain	Italy	France	Spain	Italy
South Africa	France	Netherlands	Portugal	Ireland	United Kingdom	Germany	United Kingdom	Netherlands	Italy	United Kingdom	Netherlands	Germany
Australia	France	United Kingdom	Spain	United Kingdom	France	Germany	United Kingdom	France	Spain	United Kingdom	France	Germany
Chile	Germany	Spain		France	Germany	Italy	Spain	France	Italy	Spain	France	United Kingdom
New Zealand	Spain	France	Austria	United Kingdom	Germany	Netherlands	United Kingdom	Germany	France	United Kingdom	Germany	France
Japan	Spain	France	Italy	United Kingdom	Germany	France	Germany	United Kingdom	Italy	Germany	United Kingdom	France
Iran				United Kingdom	Germany	Italy						

* Ranking is constructed as follows: the most frequent cell is taken for the first column, then followed by the most frequent cell in the second column while being cross-checked with the first column for values. The same principle applies for deciding the rank in the third column. Only countries that were mentioned more than once are colour coded. Source: MSCA in Numbers.

In Table 13, the colour coding indicates the size of the number of researchers incoming to, and outgoing from, the EU countries under the H2020 MSCA. The more researchers there are, e.g. US in the case of Italy, the greener the indicator, and vice versa. The table reveals several interesting insights. First, **most of the MSCA researchers in Horizon 2020 are coming to the EU from India, followed by China**. Furthermore, the proximity argument holds in the case of Lithuania and Latvia vis-à-vis Belarus, as evident incoming and outgoing flows can be observed. Bulgaria and Portugal have received a fair share of Belarusian researchers, too.

In terms of outgoing European researchers in H2020 MSCA, the most popular destination is the US, followed by Japan and China. Much like throughout the FP7 duration, researchers from Malta did not go to any of third countries over the course of H2020. Finally, **a large number of researchers from Argentina went to Spain and vice versa**. The same pattern can be observed throughout the previous generation of the MSCA programme.

Table 13. EU-Third country ties (H2020): incoming & outgoing researchers

Country Name	Incoming			Outgoing		
Austria	India			US	Japan	
	21			14	10	
Belgium	India	China		US		
	57	36		20		
Bulgaria	Belarus	Morocco	Georgia	Japan	Azerbaijan	Brazil
	8	6	5	15	8	8
Cyprus	India	Mexico	Bangladesh	US	Canada	
	2	2	1	8	2	
Croatia	Belarus	Venezuela	Colombia	US		
	8	6	1	7		
Czechia	India			US	Australia	Kenya
	6			26	8	7
Denmark	China			US	Australia	
	38			13	4	
Estonia	Kazakhstan	Vietnam		US	Vietnam	Kazakhstan
	9	5		6	4	3
Finland	India	China		South Africa	US	Namibia
	25	12		29	20	18
France	India	China	Morocco	Brazil	US	Japan
	96	59	50	65	59	53
Germany	India	China		US	Japan	
	123	71		109	66	
Greece	India			US		
	17			41		
Hungary	India			US		
	3			8		
Ireland	India			US	Chile	
	27			24	6	
Italy	India	Argentina		US	China	Japan
	74	70		318	106	100
Latvia	Belarus			Belarus		
	4			8		
Lithuania	Belarus	Egypt		Belarus	Egypt	Morocco
	14	2		20	6	5
Luxembourg	Argentina	China	Brazil	Japan	US	
	6	3	1	1	1	
Malta	South Africa	India				
	7	1				

Netherlands	India	China		US		
	60	57		36		
Poland	India	Belarus		US	Japan	
	23	18		57	30	
Portugal	Belarus	India		US	Cape Verde	
	43	18		38	31	
Romania*	Colombia	Morocco	India	US	China	
	11	8	1	37	8	
Slovak Republic	US	Thailand		US		
	6	4		16		
Slovenia	South Korea	China		US	Japan	South Korea
	5	4		14	10	10
Spain	Argentina	Chile	India	US	Argentina	
	175	69	56	166	75	
Sweden	China	India	Iran	China	US	Ethiopia
	44	32	24	9	9	5
United Kingdom	China	India		US	China	Japan
	240	151		91	60	42

Source: MSCA in Numbers data and CORDA data on MSCA participations extracted on 12-13 September 2018.

Table 14 provides the same information on incoming and outgoing researchers for the most active third countries.

Table 14. Third country-EU ties (H2020): incoming & outgoing researchers

Country Name	Incoming			Outgoing		
China	Italy	United Kingdom	Germany	United Kingdom	Germany	France
	47	47	40	204	58	51
India	Slovakia	United Kingdom	Germany	United Kingdom	Germany	France
	5	2	2	183	136	110
United States	Italy	Spain	Germany	United Kingdom	Netherlands	Germany
	268	141	95	82	32	27
Argentina	Spain	Italy	France	Spain	United Kingdom	Italy
	59	39	17	139	48	47
Iran	Spain			Germany	Netherlands	United Kingdom
	4			39	32	32
Russia	Bulgaria	Germany	United Kingdom	Germany	United Kingdom	France
	7	4	4	47	40	23
Brazil	France	Germany	Spain	Germany	United Kingdom	France
	48	21	21	32	20	18
Colombia	Spain	Poland	Germany	Spain	Germany	United Kingdom
	6	4	3	34	32	20
Chile	Spain	Italy	United Kingdom	Spain	Germany	United Kingdom
	43	12	9	46	22	18
Canada	Italy	France	United Kingdom	United Kingdom	France	Netherlands

	33	20	19	41	19	14
Japan	Italy	Germany	France	United Kingdom	Germany	France
	95	58	47	25	19	14
Mexico	Spain	Italy	Austria	Spain	Germany	France
	9	8	5	20	16	16
Pakistan	United Kingdom	Germany	Italy	United Kingdom	France	
	33	26	20	3	1	
Australia	United Kingdom	Italy	France	United Kingdom	France	Germany
	34	30	28	43	16	13
Belarus	Lithuania	Portugal	Poland	Portugal	Germany	Poland
	16	14	12	33	31	18

Source: CORDA data received on 25 April 2019.

By combining all the evidence, the three major drivers for EU researchers to go to third countries can be identified. First, as a huge number of EU researchers go to third countries via RISE/IRSES schemes, this move is mainly driven by the willingness of the organisations involved **to expand their collaborative networks in third countries, to help third country organisations improve their capacities** (via doing research together, teaching) **as well as to improve own research capacities** through improving skills of own researchers and receiving competent researchers from third country organisations.

Second, many EU researchers participate in IFs, which often take place in well-known universities or research organisations in high-income countries. In this case, **the main motivation of EU fellows is to perform excellent research, to become a known researcher internationally and to meet the best researchers in the field.**

Finally, **some of the EU fellows go on mobility to third countries due to their specific features**, i.e. rapid sectoral development, unique environment, climate, population and culture. This mainly happens via RISE secondments. However, IFs driven by this motivation are rather rare compared to the IFs motivated by doing excellent research.

3.2. What are the main obstacles for the involvement of third countries in the MSCA?

3.2.1. ENP non-associated countries

The main obstacle observed in this country group is related to **job security and administrative restrictions in the home country**. In some cases, the regulations of institutions in the ENP non-associated countries do not allow the researchers to leave on prolonged periods of mobility or training. For example:

- Interviewees in Belarus have explained that in cases when a researcher leaves a country for a longer period, he or she can lose their position in the home institution.
- In Morocco, the difficulty is related to the requirements of the MSCA RISE actions, which demand that a secondment of research staff must be at least 30 days long. According to the interview evidence, in many cases, Moroccan researchers cannot leave their home institutions for such period of time due to the administrative requirements in Moroccan organisations. The interview respondents indicated that it would be more convenient, if secondments could

be divided among different personnel or if the minimum period for one researcher could be further reduced.

Another obstacle at the individual level was the **difficulty to acquire a visa**. In the case of Morocco, for Moroccan researchers to get residence visas for their mobility periods in Europe was a long and complicated process, which was a burden for participants. For example, in the case of the MARSU project, some Moroccan researchers had to wait for more than 2 months to have their visa applications confirmed, while for others the initial visa application was denied, and they had to restart the application process.

In the case of Belarus, the **government attempts to limit research migration as it is seen as an ongoing brain drain**, especially when it comes to IF and ITN actions. This is not applicable to the RISE action, which is viewed as a favourable mobility option. As a result, most of the promotion activities in Belarus are concentrated on the RISE action, while other actions are consciously underpromoted. There were concerns that strong promotion of other actions could be perceived as an attempt to promote the brain drain.

Insufficient RISE top-up allowances were also seen as a barrier to ENP non-associated countries' participation in the MSCA, namely RISE. Higher living standards in some European countries, especially Western European countries, mean that RISE funding (top-up allowance) is not always sufficient to cover all the costs related to the mobility periods in Europe. Interview respondents indicated that they use their own resources to cover a sizeable share of costs. However, the mobile staff must often cover both their obligations at home and substitute some additional mobility costs from salaries that are much lower compared to their European counterparts.

Regarding the control case country, Turkey participates rather actively and does not experience major barriers at the level of individual researchers or organisations. However, some obstacles were observed on the systemic level. First, in FP7, Reintegration was a separate action (IRG/CIG), in which Turkey was quite successful. In H2020, however, it was transformed into the Reintegration Panel and its budget was decreased. Additionally, Turkey does not have coordinators for ITN projects. Turkish organisations prefer to be partners in ITN-ETN projects, while ITN-EJD and ITN-EID projects are considered to be rather unsuitable for Turkey's higher education system. Therefore, Turkish researchers do not usually apply for these actions.

3.2.2. Developing countries

One of the main obstacles for the developing countries is **insufficient awareness among relevant organisations and researchers about the MSCA**. Researchers and research organisations in some of the developing countries often do not know about the programme and the opportunities it provides. Moreover, researchers and research organisations often lack basic knowledge of the requirements and the application procedures. Many developing countries do not have a dedicated organisation or a person locally who would be able to consult them (for example, an NCP).

Additionally, researchers and organisations in some developing countries **lack project management skills and are not familiar with the EU funding mechanisms**. In the cases of Kenya and Vietnam, it was indicated during the interview programme that the **expected high rate of failure is a limiting factor for participating in international mobility programmes**, including the MSCA. Kenyan researchers and organisations are reluctant to dedicate their time and human resources to activities that lead to an unsatisfactory result. Fellows expressed a concern that there are **no support services at either the organisation level or at the national level**.

Developing countries also face some **structural barriers that hinder their successful participation in the MSCA**; these include lower quality of education, the lack of high-quality infrastructures, the low number of researchers in senior positions etc. Nevertheless, this country group is large, and it includes countries with varying levels of development. These issues are more applicable to countries that have less developed research systems. For example, Vietnam faces an issue of low research capacity, especially in public universities, and this continues to persist due to the low mobility of early-career researchers and insufficient quality of postgraduate education.

Another major obstacle that some developing countries face is that they **do not have well-established partnerships and networks in Europe**. This limits their chances of finding partners or of being invited into consortia. The evidence suggests that organisations in Kenya, for example, would be willing to participate if European organisations were to initiate the cooperation and invite them to join. However, these organisations also **lack international visibility**. Even though some of them have substantial research and human resources capacities, they are largely unknown to European or international partners.

At the individual level, another important obstacle for some of the developing countries was **the difficulty in receiving a visa**. In some cases, getting residence visas for third country researchers from developing countries was a complicated and lengthy process, which overburdened the cooperation. In some cases, the initial applications are being denied and researchers have to restart the process. There are also instances where third country researchers are being denied visas and cannot continue with their projects.

Another concern expressed by interviewees is that third country staff exchanged with European organisations and Europeans exchanged to third country organisations receive **significantly unequal salaries (due to significantly lower salary at home and insufficient RISE top-up allowance)**. Due to much higher living costs in some European countries, salaries and top-up allowances received by third country researchers were not sufficient to cover all the costs related to the secondment periods in Europe.

The interview respondents from Europe indicated that one of the obstacles faced by them in cooperating with some of the developing countries is related to the **lack of international visibility of research organisations from the developing countries**. Even though most of these countries have a number of strong academic institutions, they are largely unknown in the European academic community. European partners are often unaware of the research performed in these organisations and therefore lack trust in the quality of research and doctoral education in developing countries. As a result, European organisations often **lack strongly established cooperation links** with organisations in some developing countries. The existing ones are often based on personal connections rather than strategic partnerships.

Regarding the control country (Tunisia), we observed some similarities and differences to the developing countries. Some similarities include issues with visas, the insufficiency of project management skills among Tunisian researchers, the lack of international visibility of research organisations and doctoral schools. In some cases, Tunisian researchers had to wait longer than expected for visas or had to re-submit their applications, whereas in other cases, the secondments had to be cancelled because the researchers did not receive visas at all, as happened in the MSCA RISE project TROPSENSE. There were also cases where Tunisian researchers were denied visas to European countries, even when official documents from the European Commission were provided to the embassies.

One major obstacle that is applicable to Tunisia, but not applicable to developing countries, is related to the different status of Tunisia. Tunisia became an associated country in 2016. Since then, it is **no longer possible for Tunisian academic institutions to conduct secondments to other academic institutions in Europe under the RISE action**. They can only cooperate with business organisations. Since RISE is the main activity with the highest Tunisian involvement, this rule has negatively affected the participation of Tunisian organisations and researchers in the MSCA overall. The main problem is that it is very difficult for the Tunisian academic institutions to find non-academic partners in Europe, mainly because they do not have established contacts and lack cooperation experience with European businesses. In addition, one of the key motives of the Tunisian academic institutions to participate in the MSCA is to learn new skills and knowledge from the European partner academic institutions, which are often more developed, experienced and have more advanced infrastructures. Preventing Tunisian academic institutions from doing secondments to European academic institutions reduced significantly the main motive to participate in MSCA.

Another obstacle identified by Tunisian interviewees is the **timing of payments for researchers to cover the costs of mobility**. Tunisia has comparatively low living standards and salaries, which makes it difficult for researchers from Tunisia to cover all mobility costs without prior compensation from the European Commission.

3.2.3. BRIC/emerging countries

The evidence suggests that **the abolition of funding eligibility** for this country group has caused a decline in participations in the MSCA for organisations and, therefore, researchers participating in RISE. Even though co-funding mechanisms between a number of BRIC countries and the EU were established, as discussed above, both quantitative and qualitative interview data suggest that the decrease in funding eligibility had a significant negative impact on the possibilities to participate. For example, in China, even though the country provides substantial co-funding opportunities, the interview data indicate that the abolition of funding eligibility has negatively impacted organisations' abilities and willingness to participate. This co-funding mechanism requires organisations to first go through the application process for H2020 programmes and only then can they apply to receive funding from the co-funding mechanism managed by the Ministry of Science and Technology (MoST). This means that the organisations do not have guarantees that their project will be funded even in the case of a successful application to H2020. Even though a lot of organisations usually manage to guarantee some other external funding in cases of unsuccessful applications to MoST to continue with their project, the funding they receive does not necessarily cover all the expected expenses.

Another major obstacle is related to the **insufficient political support for R&I and international cooperation more specifically**. For example, the change of the government in Brazil has meant that levels of R&I funding were reviewed and therefore many Brazilian organisations and researchers are unsure about future funding. For this reason, they are cautious about planning medium-term involvement in the MSCA or other H2020 programmes.

Another barrier at the systemic level in China is related to the **increased competition among mobility programmes**. There is a growing number of regional mobility programmes in China, which might encourage more Chinese researchers to conduct their research at home. Nevertheless, international experience is still regarded as prestigious and has a more positive impact on the advancement of researchers' careers. At the same time, China is increasingly investing in attracting and retaining local and foreign top talent by introducing programmes focused on excellence and research

mobility. This means that there are an increasing number of mobility opportunities in China that are similar to the MSCA. For example, the Thousand Talents Plan specifically targets elite researchers overseas in efforts to bring them to China. They are provided with full-time positions at prestigious universities and institutes with larger than usual salaries and resources. By 2015, the programme had signed up some 4 100 Chinese expatriates and foreign experts with impeccable credentials.

The obstacles at the organisational and individual level are rather minor as most of the BRIC/emerging countries (except for India) have rather strong research systems and therefore its researchers and organisations are generally well equipped to participate in the MSCA. However, one minor obstacle for Chinese researchers is the **language barrier**.

Regarding the control country, Israel does not face any major issues. Like in BRIC/emerging countries, its organisations and researchers have sufficient capacities to actively participate in the programme.

3.2.4. High-income countries

In general, there are no major obstacles for this country group to participate in the MSCA, as also revealed by the preceding sections on participation patterns. They have strong research systems with well-equipped organisations and researchers. However, Japan is an interesting example in this country group as its research system is more closed compared to the other countries analysed during case studies.

The evidence suggests that **Japanese researchers are less willing to participate in mobility programmes due to the absence of job security**. In many cases, a longer leave of absence from their home institution results in a loss of domestic networking or job position. Therefore, international mobility programmes are perceived as lasting too long and researchers are often reluctant to take part in them. In some cases where researchers are keen to participate in mobility programmes, the hierarchical nature of Japan's R&I system makes it difficult. If a lead researcher disallows any form of leave, a lower ranking researcher will often accept this.

Moreover, **domestic researcher mobility programmes are more actively promoted** while international opportunities are given less airtime. Several interviewees in Japan indicated that agencies try to promote internal programmes for students, young researchers and more seasoned scientists so as to avert their initiative to go to Europe or the US. Moreover, the **mentality of self-sufficiency** is deeply engrained within Japanese culture. As such, some researchers do not emphasise the importance of international collaboration. This also leads to researchers staying in the same lab for more than 10 or 20 years to receive a full professor position, as they are unwilling to take the risk to travel to other countries.

Regarding the US, it faces some minor obstacles. The **administrative processes** related to Horizon 2020 and MSCA grants are often perceived as excessive in comparison to the US system and are indicated to be a barrier for participation. Another barrier is related to the difficulties that researchers funded under Horizon 2020 may face when **granting a licence for their work to a non-European company**. This requirement also affects major research-performing institutions, such as the Massachusetts Institute of Technology (MIT), as such arrangements limit MIT's possibilities to explore commercialisation of innovations. The issues with granting an exclusive licence for researchers' work to a non-European company were also indicated in the interview data.

Regarding the control country, like other high-income countries, the UK also has a strong research system and in general it did not face any major obstacles to participating in the MSCA. However, currently, the main barrier is related to the uncertainty of Brexit. The major worry for higher education institutions is what will happen after – or even if – the UK exits the EU, and on what conditions UK institutions will participate in the EU framework programmes. Given the uncertainty of the future, it is difficult for the UK institutions to develop detailed mitigation action plans.

To summarise, the analysis above shows that all country groups are faced with some barriers to successfully participate in the MSCA. However, it is clear that ENP non-associated and developing countries face more obstacles at all levels of analysis. Another finding is that some of the obstacles apply to several country groups. For example, both ENP non-associated and developing countries face issues related to visas and low salaries at home. The language barrier was identified as an issue for researchers in developing, BRIC/emerging and high-income (namely Japan) countries. Some distinctive obstacles include lower levels of commercialisation in Europe and changed funding eligibility for BRIC/emerging countries.

3.3. What is the impact of international cooperation in the MSCA for the EU and third country researchers and organisations?

3.3.1. System level impacts of international cooperation in the MSCA

Study evidence indicates that at system level international cooperation under MSCA contributes to the EU's international research policy priority of jointly tackling global challenges by influencing the policy priorities of third countries. More specifically, interviews and case studies revealed that support for **MSCA had R&I policy-setting impact on the research funding bodies in third countries**, since these bodies are willing to provide additional funds for the MSCA participants and in this way contribute to the research policy agenda promoted by the MSCA and Horizon 2020 in general. A number of third countries from high-income and BRIC country groups have developed MSCA co-funding mechanisms thereby indirectly contributing to the policy agenda and priorities of MSCA and H2020 (for more details see section 3.6 of the report).

In some cases, MSCA with international involvement resulted in very significant and tangible impacts for the whole research system in the third countries involved. More specifically, **the MSCA projects led to the set-up and the development of complex research infrastructures inside the third countries**. A good example here is the RISE project MARSU. The project focused on atmospheric research gaining new knowledge and reducing the uncertainty about the effect of aerosols deriving from the air-sea exchange on climate and atmospheric composition connected to air pollution. At the beginning of the project there was a lack of data on atmospheric chemical composition in certain geographical areas, including North Africa. Consequently, the project has led to the building of a new research infrastructure in Morocco – the ATLAS-MOHAMMED V Atmospheric Research Station (ATLASM5), which is operated by the project partners, Mohammed V University (UM5) Rabat, Centre National de la Recherche Scientifique (CNRS-ICARE, Orléans) and Orléans University. The facility has been continuously monitoring and collecting data related to atmospheric chemical composition since July 2017. These examples indicate that MSCA directly contributes to the EU's international research cooperation policy priorities, particularly for EU enlargement/European Neighbourhood Policy countries, where the focus is on fostering integration into the European Research Area by improving research competences and infrastructure in these countries¹⁴.

¹⁴ 2012 Commission Communication "Enhancing and focusing EU international cooperation in research and innovation: a strategic approach"

The collected evidence shows that the MSCA projects with the involvement of third country partners significantly contribute to the **advancement of certain new and emerging research areas** that are highly relevant for tackling particular global challenges common for Europe and its neighbouring countries. For instance, the RISE project DiasporaLink is a significant achievement and made progress in researching the third country diaspora in Europe as well as the returnee migrants in their countries of origins, including their economic and social activity. As a result of the project, a joint publication on the topic, a special issue in the *Journal of Ethnic and Migration Studies* containing 9 articles by the leading researchers in the diaspora research field who participated in this MSCA project, was published.

Finally, interviews and case studies indicate that the involvement of third country organisations and the mobility of researchers between Europe and third countries under the MSCA have the potential to **improve the international relations between the countries involved**. More specifically, active involvement and mobility to Europe of researchers from countries like Belarus, Iran and Russia help to cross cultural boundaries and to bring the public institutions on both sides closer. As a consequence, this scientific diplomacy can improve often tense political relations between Europe and the countries.

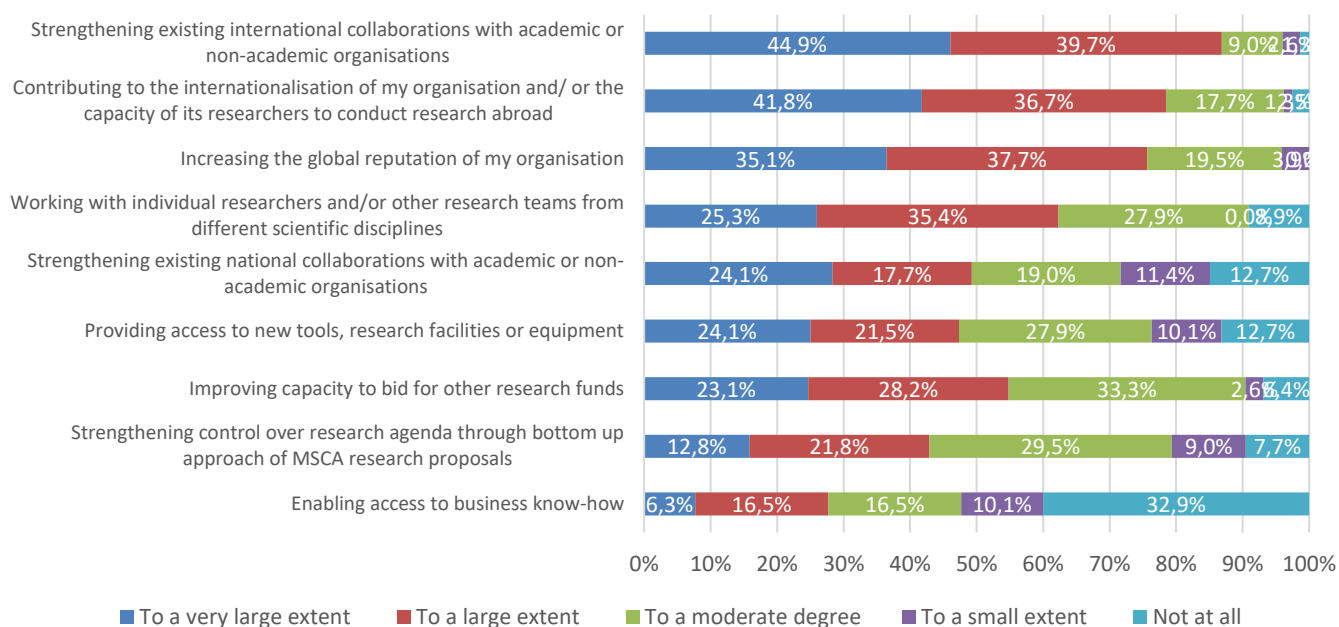
3.3.2. MSCA international cooperation impacts on organisations

Both quantitative and qualitative evidence collected during the study indicate that **strengthening research collaborative ties between European and third country organisations and exchange of knowledge that would not have taken place without MSCA** support is the single most important organisation-level impact of MSCA: the overwhelming majority of third country organisations (85%) that participated in RISE/IAPP/IRSES actions reported that their project contributed to strengthening existing international collaborations with academic or non-academic organisations “to a very large/to a large extent; contributed to internationalisation of their organisation (79%)”; and to “increasing the global reputation of their organisation” (73%). Case study findings confirmed that international cooperation under the MSCA resulted in the strengthening and development of cooperation links between organisations from Europe and non-European regions, development of research cooperation networks encompassing these regions – something that would not have happened without the involvement of third country organisations in MSCA project consortia. The organisations sending their staff and participating in common consortia developed links that did not exist before, which gave an impetus for future collaboration in other H2020/MSCA projects, as well as in projects beyond the scope of H2020. Similarly, improved international visibility at global (and not only regional level) of both third country and European organisations participating in MSCA was another result often mentioned by stakeholders.

Available evidence also indicates that international cooperation also contributes to the better integration of third country organisations into the European Research Area by improving the research capacities of third country organisations, particularly those from ENP non-associated and developing country groups. According to the survey data, third country organisations reported significant **impacts of international cooperation in MSCA on research skills, knowledge and research capacities in their institution**: 61% of organisations agreed that their RISE/IAPP/IRSES project contributed to a very large/large extent to working with individual researchers and/or other research teams from different scientific disciplines, with another 46% reporting very large/large contribution of MSCA in terms of providing access to new tools, research facilities or equipment. Moreover, **more than half of third country organisations (51%) confirmed that MSCA contributed to a very large/large extent to their**

managerial capacities in terms of improving capacity to bid for other research funds (Figure 55).

Figure 55: To what extent has/will participation in RISE/IAPP/IRSES contributed/contribute to strengthening the following aspects of research capacity of your organisation? (answers from third country-based organisations participating in MSCA under RISE/IAPP/IRSES actions).



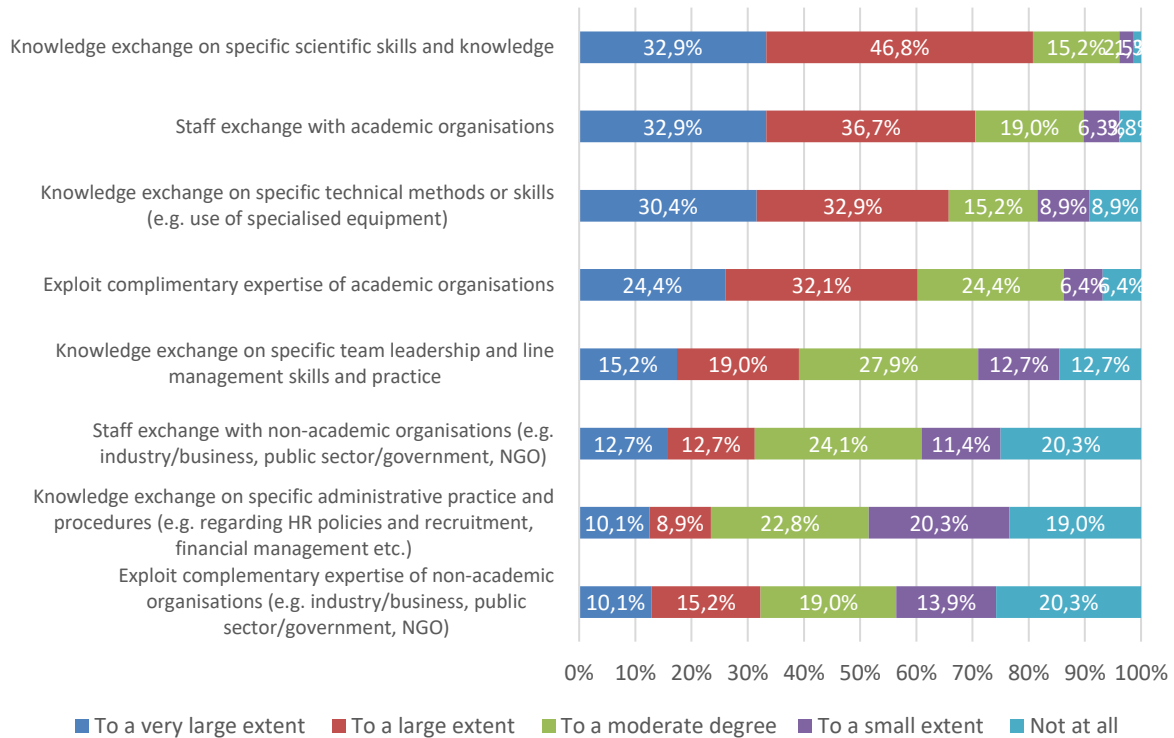
Source: ICF survey.

The survey results on specific knowledge/expertise for third country organisations resulting from international cooperation of the MSCA confirmed the above evidence: the most significant were impacts in the area of specific scientific skills and knowledge (80% reporting that MSCA contributed to a very large/large extent in this area), followed by knowledge exchange on specific technical methods or skills (e.g. the use of specialised equipment) (63%) and exploiting complimentary expertise of academic organisations (56%). Similarly, the evidence of the impacts of MSCA on project and HR management skills and expertise within third country organisations was confirmed – 34% of them agreed that knowledge exchange on specific team leadership and management skills and practices were improved as a result of MSCA (Figure 58). Qualitative data confirmed that one of the key organisational impacts involved developing competences and research capacities in both third country and European organisations by sharing knowledge and opening up infrastructure, data and research tools that would not be accessible without the international dimension in MSCA. On the one hand, third country research organisations (particularly from countries covered by the European Neighbourhood Policy and developing countries) strengthened their research capacities by being able to send their staff to train with the new and expensive research infrastructure in European institutions. On the other hand, European organisations strengthen their capacities in specific research fields (such as treatment of tropical diseases, climate change, migration and population studies etc.) by accessing research data and competences in third country organisations that are not present in Europe and thereby contributing to the policy priority of jointly tackling global challenges.

Finally, case study evidence also indicates that another key impact, particularly for institutions from developing third countries was improvement of their financial situation: MSCA provided the funds for staff training and mobility, which would not be available

otherwise. In this way international cooperation in MSCA contributes to the sustainable development of developing countries – one of the key European research policy priorities.

Figure 56: To what extent has/will participation in RISE/IAPP/IRSES contributed/contribute to strengthening the following aspects of knowledge exchange of your organisation? (answers from third country-based organisations participating in MSCA under RISE/IAPP/IRSES actions).



Source: ICF survey.

3.3.3. MSCA international cooperation impacts on researchers

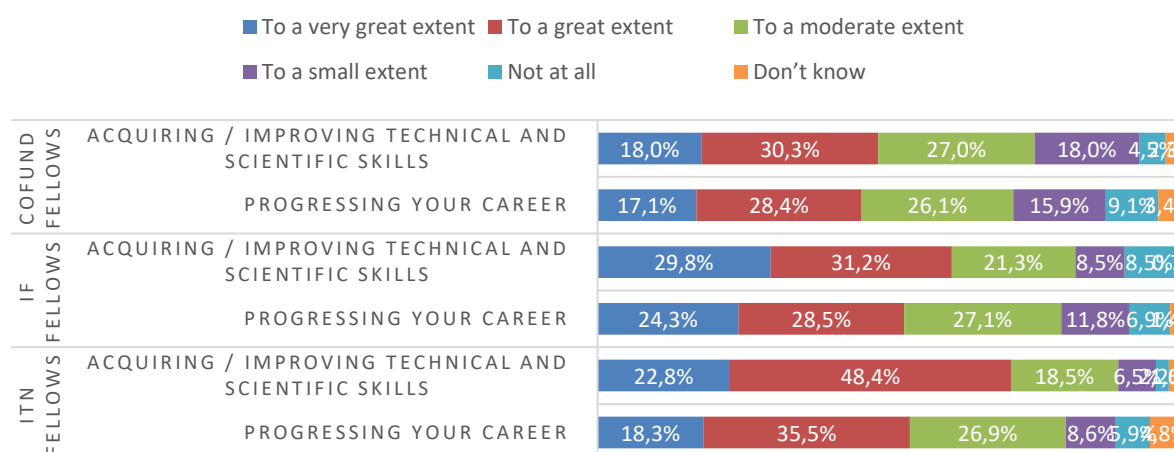
Study evidence shows that the key most important impact of international cooperation in MSCA at individual level was related to learning new professional research skills, gaining competences and knowledge that would not be accessible without the international mobility of third country researchers to Europe and vice versa. Researchers from third countries (particularly developing countries, ENP non-associated and some of the BRIC countries) particularly benefited from the mobility offered by MSCA due to the possibility to use and train using newest research infrastructure and tools that were not accessible in their home countries. Similarly, MSCA helped them to develop project management, foreign language and other horizontal skills – an opportunity that was not always present at national level. Similarly, the evidence shows that European researchers equally benefited from the international dimension in MSCA, particularly in situations where they could access data samples and conduct field research, which would not be possible in Europe.

The quantitative evidence indicates that **for the third country researchers hosted in European organisations during their MSCA project the key impact was the development of professional skills and competences, as well as the knowledge across different research fields** acquired during the fellowship. According to the results of the individual researchers’ survey conducted for FP7 ex post and H2020 interim evaluation of the MSCA, 71% of third country researchers hosted in European organisations during their ITN project confirmed that their mobility helped them in

acquiring/improving technical and scientific skills. This figure was 61% for third country individual fellows (IF) and 48% for researchers funded under COFUND.

The same survey found that generally, third country researchers reported **significant impacts of the MSCA in terms of progressing their career**, especially ITN fellows and individual fellows (54% of surveyed researchers reporting impacts to a very great extent or to a great extent in both groups) and researchers funded under COFUND (46%) (Figure 57). Bearing in mind the large share of researchers from developing countries in some of these actions (particularly ITN and COFUND), the MSCA thereby provided career development opportunities for researchers who would be unlikely to get them at national level in their own countries. Evidence from interviews and case studies also confirmed that one of the key advantages of the MSCA at individual level, particularly for researchers from developing, ENP and some of the BRIC countries with fewer career opportunities, is the opportunity to progress in their career, which would be much more difficult at national level.

Figure 57: Overall, to what extent did these partnerships help you in... (Answers from third country researchers who were hosted in EU/Associated country-based organisations during their MSCA fellowships).



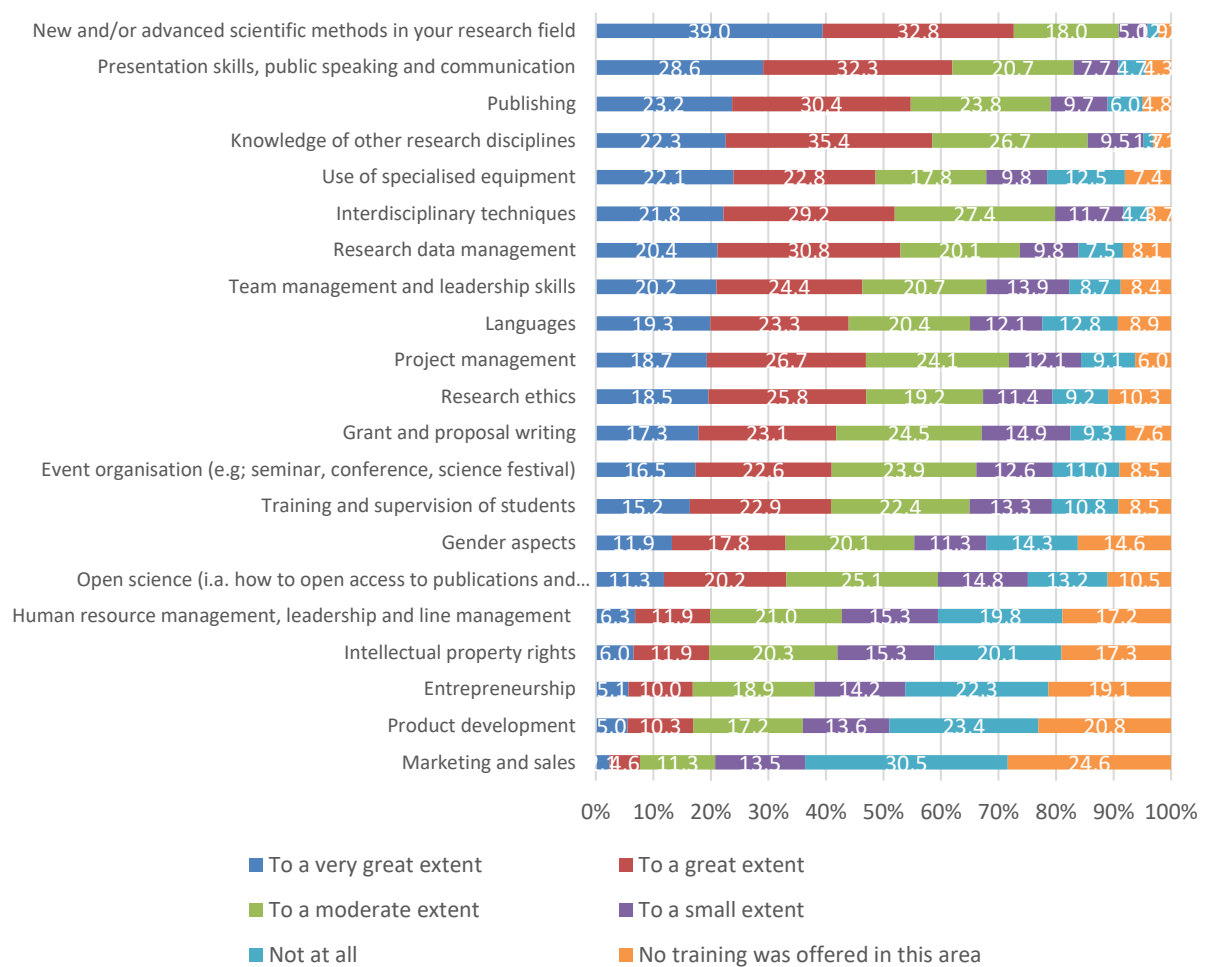
Source: ICF survey.

In terms of the impacts on specific sets of skills, the absolute majority of third country researchers hosted in European (EU/Associated country) organisations during their project indicated that they learned "new and/or advanced scientific methods in their research field" (around 72% of third country researchers indicating this happened to a very great extent or to a great extent); "knowledge of other research disciplines" (59%); "use of specialised equipment" (45%); and "interdisciplinary techniques (51%)". In addition, **third country researchers reported significant impacts on some of the horizontal/transferable skills**, particularly presentation skills, public speaking and communication (61% indicating this happened to a very great extent or to a great extent); publishing (54%); team management and leadership skills (45%); languages (43%); project management (45%); research ethics (44%) and grant and proposal writing (40%) (Figure 58).

Case study evidence largely confirmed the above quantitative information: one of the key impacts of participation in the MSCA on third country researchers was learning new research skills, increase of research competences and qualifications. The example of a number of projects shows that mobility experience in Europe provides third country researchers with new perspectives on research methods and approaches used by

European colleagues and broadens their understanding of relevant research fields. More specifically, **very often the learning effect and development of professional skills among third country researchers stemmed from the ability to have access and learn using the newest research facilities and infrastructures** that are available in Europe and absent in third countries. Case study evidence likewise shows that the MSCA also contributed to the development of horizontal skills among third country researchers, especially project management skills: this learning effect largely stemmed from the experience of writing research proposals, managing the fellowship funds, writing financial reports and planning the budget expenses.

Figure 58: Please indicate to what extent you have acquired skills in the areas below during your MSCA fellowship (answers from third country researchers who were hosted in an EU/Associated country-based organisation during their ITN/IF/IRSES/RISE/IAPP/COFUND fellowship).

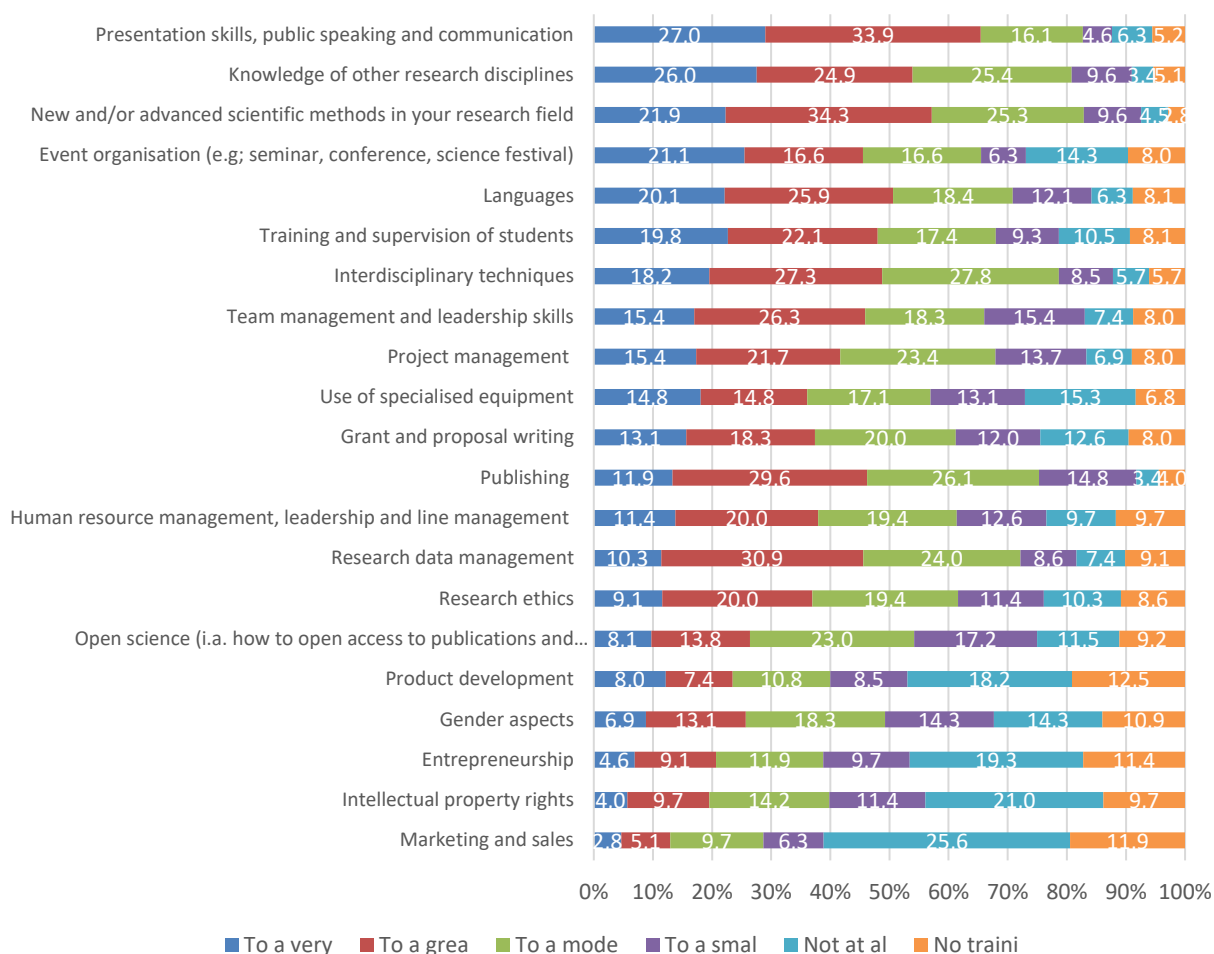


Source: ICF survey.

Although to a somewhat lesser extent than in the case of third country researchers hosted in Europe, European researchers who were hosted in third country-based organisations during their MSCA fellowship also reported significant impacts on research knowledge, professional skills and competences: around 56% of European researchers hosted in third countries during their IAPP/IRSES/RISE secondment indicated that they acquired new and/or advanced scientific methods in their research field to a very great or to a great extent, followed by knowledge of other research disciplines (51%), interdisciplinary techniques (46%)

and use of specialised equipment (30%). Similarly, the European researchers hosted in third countries reported significant impacts on their horizontal/transferable skills, including “presentation skills, public speaking and communication” (61% indicating learning effect happened to a very great extent or to a great extent), languages (46%), team management and leadership skills (42%) and event organisation (38%) (Figure 59).

Figure 59: Please indicate to what extent you have acquired skills in the areas below during your IAPP/IRSES/RISE secondment (answers from European researchers who were hosted in a third country based organisation during their IRSES/RISE/IAPP/ fellowship).



Source: ICF survey.

Information from case studies also confirmed significant learning effects for European researchers who were hosted in third countries during their MSCA project. Researchers from Europe going on mobility to third countries significantly improved their skills in certain areas and broadened their knowledge, **especially in cases where researchers gained access to data samples and could conduct field research, which would not be possible in Europe.** For example, in certain projects that focused on the treatment of certain tropical diseases European researchers acquired clinical data samples from local research institutions in third countries and were able to conduct field research, which significantly increased their expertise, knowledge and skills in relevant research fields.

Similarly, **MSCA offered European researchers the opportunity to progress their careers in the best research institutions outside Europe.** As the analysis of MSCA participation patterns showed, European researchers going for a long-term mobility period in third countries (IFs) almost exclusively went to high-income countries, where they could get the best career development opportunities and benefits (such as remuneration, social security etc.) as researchers. This evidence shows that the MSCA provided a platform to European researchers to boost their careers and to improve their work conditions compared to what is available to them in their home countries.

3.3.4. Outputs of international cooperation in the MSCA

The analysis of the monitoring data shows that **in both FP7 and H2020, researchers from high-income countries produced most of the peer-reviewed scientific publications**, whereas researchers from other countries seemed to contribute noticeably less in this regard, with researchers from developing countries producing the fewest publications.

Table 15. Scientific publications per group of country (FP7 MCA & H2020 MSCA)

Peer-Reviewed Scientific Publications				
	High income	BRICS/emerging	ENP non-associated	Developing
FP7	10 135	280	145	92
H2020	2 271	18	21	16

Source: Horizon Dashboard from the Single Electronic Data Interchange Area (SEDIA), retrieved from <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard> on 12 April 2019.

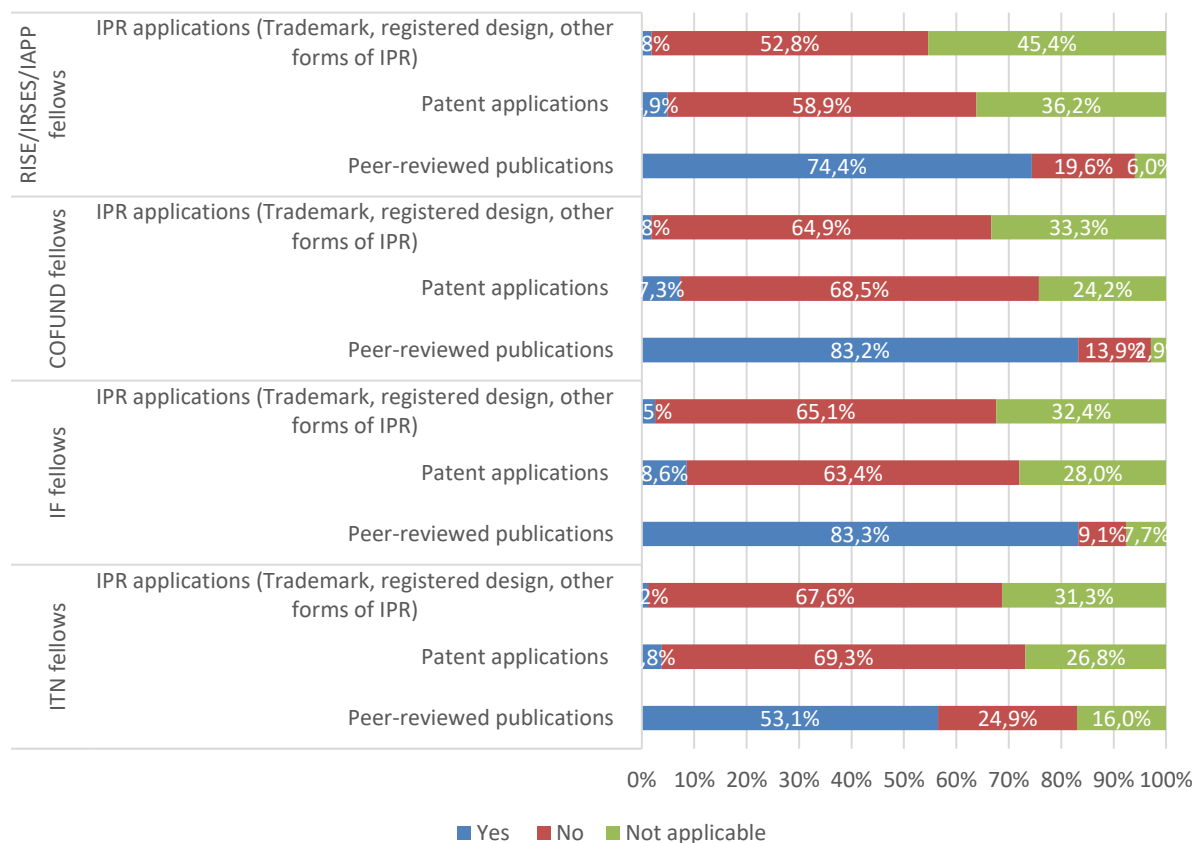
Qualitative evidence from interviews and case studies provided more evidence on the advantage of international cooperation in the MSCA in terms of the quality of publications: the involvement of non-European partners allowed publications to be produced that could not be developed at European level because of the data, partners and competences required. Some of the best and highest-rated publications ever produced in the field resulted from MSCA projects due to third country involvement, **particularly in the fields that required the participation of non-European countries (research fields such as migration from Africa to Europe, treatment of tropical diseases etc.).**

Similarly, case studies found that **development of innovations and commercialisation of research results that would not be possible at European level** was another result of the international cooperation with third countries under the MSCA. Usually this result happened where third countries had competitive advantage in a certain field (e.g. certain fields of agriculture), which contributed to knowledge transfer to other partner countries and the development of innovations. This information confirms that international cooperation in the MSCA helps Europe to develop enabling technologies by accessing new sources of knowledge outside the continent and in this way provides the EU's private sector with business opportunities and access to new markets.

The quantitative evidence provided by the survey indicates that **peer-reviewed publications was by far the most significant research output resulting from MSCA international cooperation.** According to the survey results, around 83% of third country researchers hosted in European organisations under individual fellowships (IF) and COFUND actions produced peer-reviewed publications during their fellowship, followed by 74% of researchers under RISE/IRSES/IAPP actions and 53% under ITN. In comparison, only a very small share of third country researchers (less than 10%)

produced other types of outputs (IPR applications/patent applications) across all of the actions (Figure 60).

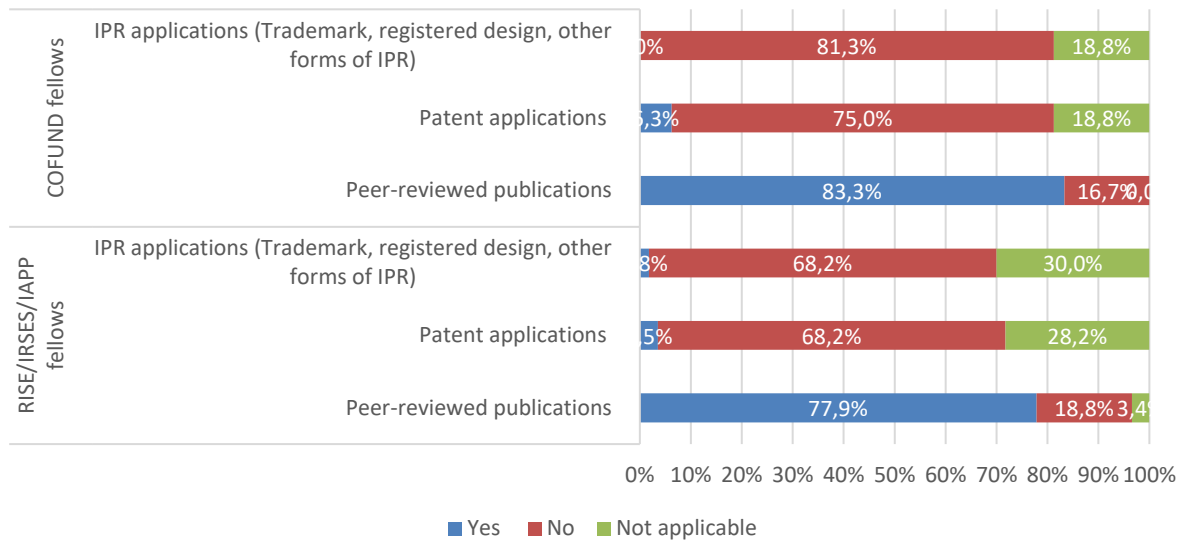
Figure 60: Did you produce the following outputs during your MSCA fellowship? (Answers from third country researchers who were hosted in EU/Associated country-based organisations during their MSCA fellowships).



Source: ICF survey.

The same patterns were found for the outputs produced by European researchers hosted in third country organisations during their MSCA project. Around 83% of European researchers hosted in third countries during their MSCA fellowships (COFUND) produced peer-reviewed publications, followed by 78% under RISE/IAPP/IRSES. As in the case of third country researchers, other type of outputs (IPR applications/Patent applications) were relatively few, with less than 10% of European researchers hosted in third country organisations reporting these types of MSCA outputs (Figure 61).

Figure 61: Did you produce the following outputs during your MSCA fellowship? (Answers from European researchers who were hosted in third country-based organisations during their MSCA fellowships).

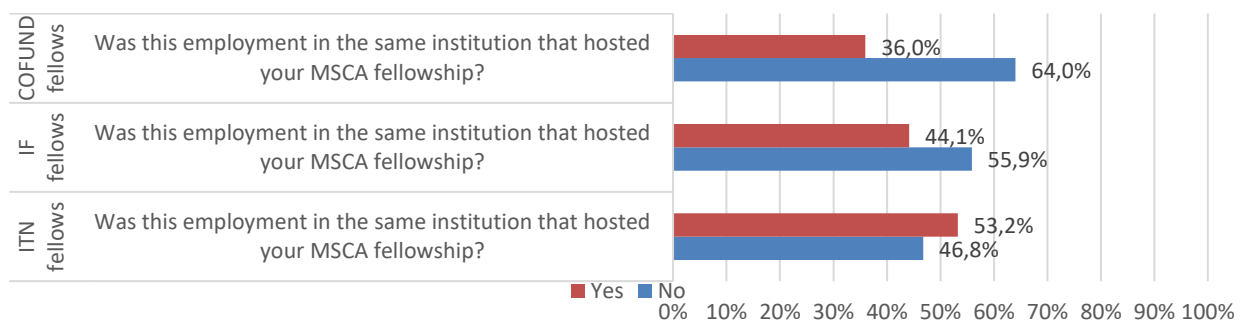


Source: ICF survey.

3.4. How far have MSCA projects with third country participation helped to support the EU in attracting and retaining leading talent across the globe?

The quantitative evidence provided by the survey of researchers and organisations conducted for the FP7 ex post and H2020 interim evaluation indicates **that international cooperation in the MSCA contributed significantly in terms of attracting and retaining leading talent, although the impact of different MSCA actions in this area varied significantly**. According to the survey results, 53% of third country MSCA fellows who were hosted in the EU/Associated countries during their fellowship under the ITN action were employed in their host institution after their MSCA fellowship, followed by 44% of individual third country fellows and 36% of fellows participating in the MSCA under COFUND (Figure 62).

Figure 62: We would now like to ask you about your first employment after the MSCA fellowship (answers from third country fellows who were hosted in the EU/Associated countries during their fellowship).

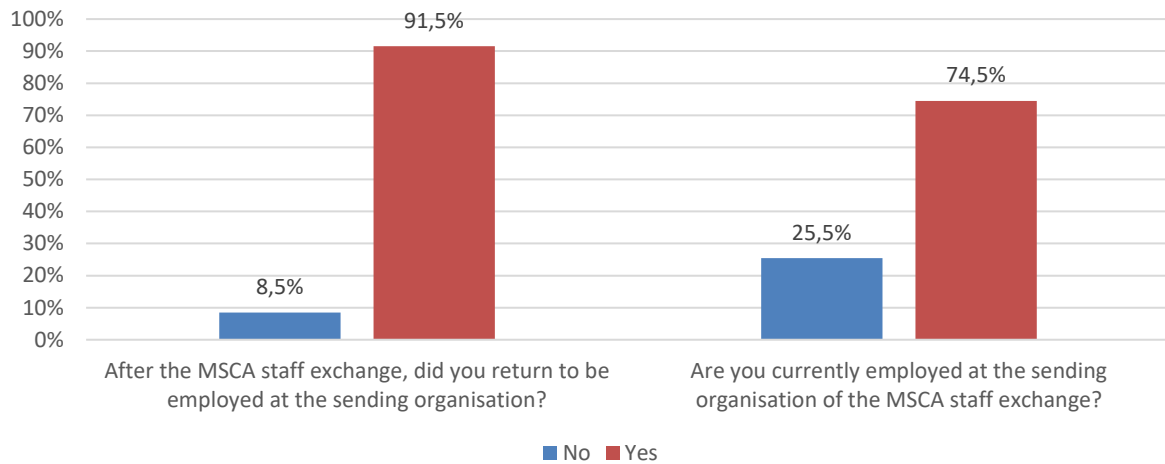


Source: ICF survey.

As expected, RISE/IRSES/IAPP did not have a strong impact in terms of attracting and retaining third country researchers to Europe. According to the survey results, the overwhelming majority (more than 91%) of third country

researchers hosted in European organisations under RISE/IRSES/IAPP actions returned to be employed at their sending organisations. Moreover, almost 75% of them were still employed at their sending institution at the time of the survey (Figure 63). This stems from the objective of RISE/IRSES to foster international exchanges of research & innovation staff, where the researchers and staff would return to work at the sending institution after their secondment.

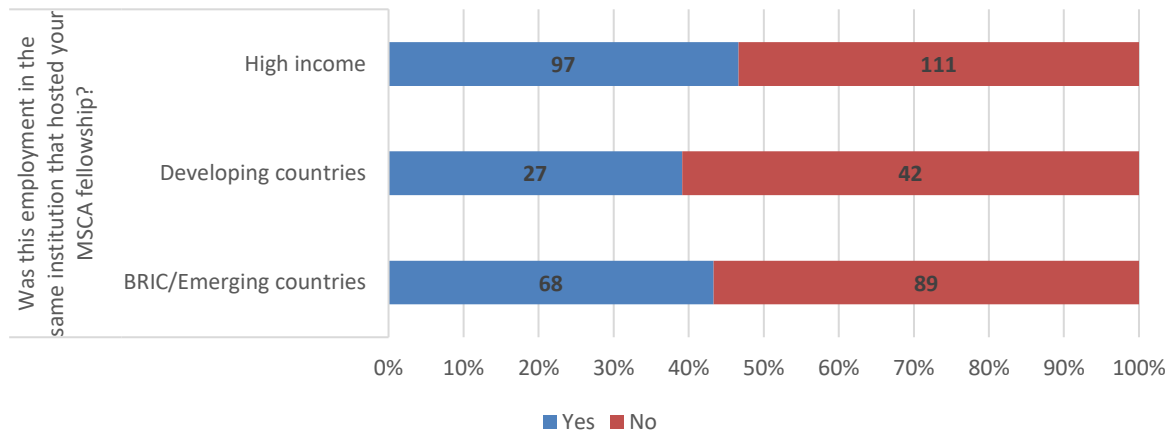
Figure 63: Employment of RISE/IRSES/IAPP fellows from third countries (residents of third countries) after their secondment in an EU/Associated country-based organisation.



Source: ICF survey.

The analysis of the MSCA impacts in terms of attracting and retaining third country researchers from different country groups showed somewhat moderate differences among the MSCA fellows from different regions. The comparison between fellows from high-income, developing and BRIC/Emerging country groups showed that the highest number of MSCA fellows who remained in their host institution in Europe after the end of the project were from high-income countries (47%), followed by third country MSCA fellows from BRIC/Emerging countries (43%). At the same time, around 39% of MSCA researchers from developing countries remained in their host institution in Europe after the project end (ENP non-associated country group was not included in the analysis because of the small number of responses from MSCA fellows from this country group).

Figure 64: We would now like to ask you about your first employment after the MSCA fellowship (answers from third country fellows from high-income, developing countries and BRIC/Emerging countries who were hosted in the EU/Associated countries during their fellowship).



Source: ICF survey.

The organisation-level survey indicated that individual fellowships, **ITN and COFUND were also more effective in helping to retain excellent European researchers**, who would have otherwise left Europe for career opportunities in other regions: almost 25% of organisations participating in IF/ITN/COFUND agreed that the MSCA programme helped their organisation to retain excellent European researchers who would otherwise have left Europe. In comparison, this share was only 12% among the organisations that participated in RISE/IAPP/IRSES actions (Figure 65).

Figure 65: Has the MSCA programme helped your organisation to retain excellent researchers who would have left Europe otherwise?



Source: ICF survey.

The qualitative findings have largely supported the above findings from the survey. A number of case studies and interviews with relevant stakeholders indicate that the **RISE action, which in many third countries is by far the most popular MSC action, generally does not lead to research talents being attracted to and retained in Europe**. The main reason for this is that the RISE action often involved already established researchers who have strong institutional loyalties and personal lives in their home countries. Consequently, they had no prior intentions or plans to move to Europe for their research careers. This stems from the objective of RISE/IRSES to foster international exchanges of research & innovation staff, where the researchers and staff

would return to work at the sending institution after their secondment. Moreover, the RISE action usually involves short-term mobility of established and experienced researchers who have established careers and personal lives in their home country. In many cases, because of internal regulations in the sending institutions or personal reasons of seconded researchers, the mobility period in RISE actions is split to even shorter periods of time lasting 1-2 weeks. Such short mobility periods are not usually sufficient to build strong professional connections and networks, or to consider and search for new professional opportunities.

In contrast, **the evidence collected during the case studies indicates that ITN and especially IF are far more suitable and effective in terms of attracting and retaining in Europe talented researchers from third countries.** The main reason for this is that these MSCA actions often involve young researchers who have fewer institutional attachments: case study evidence shows that young researchers, particularly young post-doc researchers, who have not yet established their careers in their home countries are the most likely to be attracted and retained in Europe through MSCA. As some of the projects analysed in the case studies demonstrated, MSCA individual fellowships helped talented young post-doc researchers from third countries to advance their careers by being offered research positions in prestigious European research institutions after their MSCA fellowships. The main contributing factors were the fact that the mobility period under MSCA individual fellowships helped to build strong expertise in their research fields and provided enough time to develop new contacts and project management skills, which were crucial when searching for new opportunities after the MSCA fellowship.

Literature analysis of recent studies largely support the above quantitative and qualitative evidence. For instance, a recent study on researchers' mobility in Europe found that career stage is a crucial factor in attracting foreign talents from abroad. Efforts aimed at recruiting the most promising researchers at early stages of their career rather than at later stages are likely to be more successful, whereas trying to recruit leading researchers during later career stages will be costlier by comparison, as they are less likely to move. Thus, the most effective policy choice would involve offering attractive career perspectives to early-stage researchers e.g. based on a tenure track career model¹⁵. Similar findings were provided by an earlier study on research careers, which analysed the most important factors in motivating researchers to stay in their research career and not to switch to an alternative career path. The study concluded that experienced researchers tend to value the stability and security of a research position as well as the compatibility of research work/academic career with personal life more positively than early-stage researchers. In contrast, factors such as availability of international/intersectoral mobility opportunities offered to young researchers, transparency and equal opportunities in the researcher recruitment processes, and relevance of PhD training for the needs of industry/jobs in the private sector were more important aspects of research careers for researchers at early-career stages¹⁶.

3.5. What is the added value of third country involvement in the MSCA?

There is an important distinction between the two analytical concepts: namely, benefits/impacts (presented in the section above) *versus* the added value of international cooperation in the MSCA. Benefits/impacts can be defined as any positive impacts of investment, but they might not necessarily result in added value. As explained in 2011 by the European Commission, the European added value is "the value

¹⁵ IDEA Consult, WIFO and Technopolis, MORE3 study Support data collection and analysis concerning mobility patterns and career paths of researchers, 2017.

¹⁶ PPMI, Carsa and Innova+, Research Careers in Europe, Final Study Report, 2016.

resulting from an EU intervention which is additional to the value that would have been otherwise created by Member State action alone”¹⁷. Therefore, it is perfectly possible (and, from our experience, quite common) that the EU investment can produce a certain benefit, which we might not be able to define as an added value (where there is good evidence that the benefit might have resulted from the national investment, without the EU intervention).

One of the main benefits/added value of the MSCA compared to other research mobility programmes is that it has **an extended geographical scope** and a larger variety of funded actions as compared to some other national or international level mobility programmes. It is common for mobility programmes to concentrate on creating networks and partnerships between associated institutions or countries, while the MSCA support projects, where researchers and organisations create their own networks based on their choice of criteria: the **bottom-up nature of the MSCA programme is therefore often perceived as one of the key added-values of the programme**. In the first 5 years, Horizon 2020 demonstrated a broad international outreach supporting talented researchers from 124 non-EU countries.

Another key added value of the MSCA, as suggested by interviews and previous studies, is that **research collaborations supported by the MSCA are sustainable**. For example, researchers often continue to publish with peers or supervisors that they met during the MSCA fellowship or secondment after the end of MSCA projects. Similarly, in a number of cases, organisations from Europe and third countries participating in a common MSCA project often re-apply for another MSCA/H2020 project thus sustaining the cooperative ties developed during the original project.

Another added value stemming from cooperation with third countries is the **access to relevant research infrastructures, data and local networks** that would otherwise be unavailable to either European or third country researchers and organisations. It contributes to a greater impact of research projects and allows for better outputs. For example, the MSCA project DiasporaLink created an opportunity for the European partners to access local Moroccan social networks and data necessary for the study of diaspora entrepreneurship. Similarly, Moroccan researchers were given access to the research data on the Moroccan diaspora in Europe by cooperating with European research organisations. Similarly, in the case of the MSCA TICASS project, the intended output of the project could only be implemented by the means of secondments between European and African partners because the project focused on studying the reading of images in spaces of transfer/mobility of people in urban visual environments in different cultures.

Access to high-quality research infrastructures was identified as an added value for third country researchers and research organisations (e.g. from Morocco, Kenya, Vietnam). Some third country organisations (especially from developing and ENP non-associated countries) have limited research infrastructures, while others do not have complex and expensive research infrastructures. Therefore, the MSCA benefit third country researchers by providing them access to laboratories and equipment in Europe. For example, the MSCA project AMITIE created an opportunity for Moroccan partners to access complex infrastructure used for tomography experiments, which is particularly important for conducting research in microstructural characterisations. The MSCA also helps third country researchers to learn from their European partners to use research infrastructures and equipment that are not available locally.

¹⁷ European Commission (2011), Commission Staff Working Paper “The added value of the EU budget”, SEC (2011)867 final, p.1.

Moreover, cooperation with third countries brings qualified research personnel with necessary skills to a project, thereby **pooling the human resources and skills necessary to achieve the project research goals**. Even though in some cases personnel with similar knowledge and skills could be found exclusively in Europe, it could be more difficult to find and attract the competent staff under similar conditions without third country participation in the MSCA programme. For instance, in the MSCA project AMITIE, the Moroccan partner University Mohammed V de Rabat was included because it had very solid expertise in terms of the mechanical characterisation of specific materials analysed in the project, as well as a good understanding of relationships between the mechanical properties of materials and microstructure samples.

3.6. To what degree have own resources been made available by organisations and funding bodies in third countries and how is participation in the MSCA part of national R&I policies of third countries?

Case studies and desk research revealed that there are three main sources of co-funding used by participating third country organisations:

- **Own resources of participating organisations.** Often participating organisations contribute to the project in-kind or fund their participation from own resources. Examples of such situations could involve providing access to offices, libraries and laboratories to incoming researchers, paying salaries to researchers and staff working on the MSCA projects, or funding secondments/visits of own researchers to partner organisations in Europe.
- **Resources of project beneficiaries.** Sometimes project beneficiaries may pay (e.g. through sub-contracting) for secondments/visits/field research of their partners from third countries.
- **Resources of national or international funding organisations and programmes.** A number of third countries have agreed with the EU on official co-funding mechanisms to co-finance participation of their organisations or (rarely) researchers in Horizon 2020 projects. In other cases, co-funding from the regular grants provided by third country RFOs may be available, even if there is no specific agreement with the EU.

Case study and desk research analysis revealed that the official co-funding mechanisms were signed/agreed by the EU mainly with high-income and BRIC/emerging economies. This was clearly driven by the willingness to neutralise the fact that these countries are ineligible for EU funding. Recently, the EU has agreed on co-funding mechanisms with several BRIC/emerging economies, which have lost the opportunity to be directly funded by the EU only in Horizon 2020: Brazil, China, Russia, Taiwan.

Analysis of the existing co-funding mechanisms revealed the following insights relevant for the study:

- Existing co-funding mechanisms usually focus on all Horizon 2020 projects, and normally do not include specific provisions for the MSCA (for example, in Brazil, China, Russia, Taiwan, Republic of Korea).
- Some of the co-funding mechanisms explicitly indicate very specific priority scientific areas, where they expect to provide co-funding (e.g. in Australia, China, Brazil).
- Co-funding mostly targets organisations and not researchers (with the exception of Canada).
- Only the current Canadian co-funding mechanism is directly focusing on the MSCA through providing co-funding (grants) to Canadian researchers participating in RISE.

The allocation of own resources, the factors determining it as well as specific examples of co-funding mechanisms are discussed in more detail per country group below.

3.6.1. ENP non-associated countries

ENP non-associated countries were eligible for funding under both FP7 and Horizon 2020 programmes (except for Palestinian administered areas). The ENP non-associated countries studied in-depth (Belarus and Morocco) were noticed to rarely contribute to MSCA projects with their own funds. However, some exceptions were found when the MSCA projects have aligned with national strategic interests.

For example, in the case of Morocco, the local research institutions and public authorities contributed to a few projects concerned with the development of complex national infrastructures. Such project examples include the RISE project MARSU, where the Moroccan university and public authorities covered around 30-40% of project costs; and the ATLASM5 project, where local authorities contributed in terms of financial and logistical help for the construction of the atmospheric research station infrastructure.

In addition, case studies have indicated that **some Belarusian organisations/researchers participate without remuneration**. Some Belarusian institutions and researchers are willing to participate without any financial support and use their own resources in order to establish collaboration networks that may benefit them in the future.

Regarding comparison between ENP non-associated countries and EU/associated countries analysed for the case study programme, it was observed that Turkey, as an **associated country, tends to also contribute in terms of non-monetary resources**. Turkish agencies make human resources and financial support available specifically for promoting the MSCA and supporting the preparation of MSCA applications. The Scientific and Technological Research Council of Turkey (TÜBİTAK) has launched a “TÜBİTAK Horizon 2020 Supports and Awards” scheme. Under this scheme, researchers can apply for grants to hire professional consultants that could help with preparing their applications.

3.6.2. BRIC/emerging countries

No BRIC countries are eligible for funding under Horizon 2020. Some of these countries were also ineligible for funding under the FP7 programme (Hong Kong, Macao), while others have lost their eligibility only under the Horizon 2020 programme (BRIC countries and Mexico). Although there has been a decrease in participation among countries that lost funding eligibility under Horizon 2020, these countries still remain relatively active in the MSCA. A substantial share of ITN and COFUND actions in these countries under Horizon 2020 indicate that **withdrawal of funding may encourage some institutions to find alternative funds for participation**.

The continuous participation of BRIC/emerging countries in the MSCA after the change in funding eligibility can be determined by a greater MSCA role in national R&I policies. For instance, the Chinese Ministry of Science and Technology agreed with the European Commission’s Directorate-General for Research and Innovation to set up the EU–China Co-Funding Mechanism for Horizon 2020. The co-funding mechanism aims to support universities, research institutes and enterprises on both sides in carrying out joint R&D projects. **The Chinese Ministry of Science and Technology will make available RMB 200 million (EUR 28 million) per year for China-based researchers and companies to participate in Horizon 2020 programme**. This scheme indicates that Horizon 2020, including the MSCA, is integrated among Chinese national priorities.

Likewise, in Brazil, to overcome the change in funding eligibility arrangements, the EU Delegation in Brazil and National Council of State Research Support Foundations signed a Letter of Intent in December 2014, aiming to encourage the implementation of mechanisms for co-funding Brazil's participation in Horizon 2020 projects. **As a result, Brazilian participation in Horizon 2020 collaborative projects, including MSCA projects, is currently co-funded by Research Support Foundation schemes in different states.**

On 22 May 2018, The European Commission, the Brazilian National Council for Scientific and Technological Development, the Brazilian Funding Agency for Studies and Projects and the Brazilian National Council of State Funding Agencies signed an administrative arrangement on mechanisms to support EU-Brazil cooperation activities in research and innovation. **The administrative arrangement makes it possible for co-funding of Brazilian participation in Horizon 2020 – the EU's framework programme for Research and Innovation – extending to the entire country the current co-funding that was only available in eight Brazilian states.** It also outlines the necessary operational steps for launching coordinated calls and for twinning of projects in areas of common interest. This administrative arrangement will enable more co-funding, in particular for the MSCA RISE activities.

The agreement is expected to enhance Brazilian participation in Horizon 2020 and foster cooperation between Europe and Brazil. It establishes three different mechanisms for cooperation: (1) greatly extending the national co-funding of Brazilian participation in projects under Horizon 2020, (2) promoting cooperation between researchers under coordinated calls for proposals in Brazil and the EU, and (3) twinning existing projects in the areas of common interest.

The agreement will further foster investments in the commonly agreed areas of cooperation between EU and Brazil: Marine Research, Health, Renewable Energy (advanced biofuels), Nanotechnology, Cooperation with EC's Joint Research Centre, ICT, Fusion Energy.

This agreement will continue for the remaining duration of Horizon Europe, but it does not speak about Horizon Europe.

Up to May 2018, co-funding mechanisms for Horizon 2020 projects existed in 8 Brazilian states. The first scheme was established by the Research Foundation of the State of São Paulo (FAPESP) in 2015. Following this, the National Council of Research Foundations has led a coordinated effort among the other research foundations in Brazilian states to follow the example of FAPESP.

In China, there exists a co-funding mechanism (CFM) for Horizon 2020 projects – a joint initiative launched by the Chinese Government and the EU to support joint R&I projects between European and Chinese universities, research institutions and companies in strategic areas of common interest under the framework of Horizon 2020. Through CFM, funds are provided by the Chinese Ministry of Science and Technology (MOST) for European and Chinese participants based in China and involved in Horizon 2020 projects.

Up to EUR 26 million will be made available annually by MOST on the Chinese side for the benefit of entities based in China that will participate in joint projects under Horizon 2020, while the Commission has committed to spend about EUR 100 million per year for the benefit of other entities eligible for funding in these joint projects.

Currently, CFM targets research related to the EU-China flagship initiative on food, agriculture and biotechnology. In addition, it covers nine other priority areas under Horizon 2020: new generation information network; intelligent and green manufacturing; safe, clean and efficient energy; advanced, effective, safe and convenient health technologies; marine equipment; space; new materials; large research infrastructures; and public security.

To support Russian participation in Horizon 2020 and as participants from Russia are no longer automatically funded by the EU, **the Ministry of Science and Higher Education of the Russian Federation publishes dedicated calls to offer funding support for Russian Horizon 2020 participants in accordance with its own call procedures** (Russian Federal Programme (FTP) "R&D in Priority Areas of Development of the Russian S&T Complex 2014-2020"). Russian applicants to these calls will have to provide a document acknowledging their participation in the consortium of the joint Horizon 2020 proposal, submitted under the Horizon 2020 call.

Co-funding for Russian Horizon 2020 participants may also be available via regular R&I funds available in Russia: Russian Foundation for Basic Research, Russian Science Foundation, Russian Foundation for Assistance to Small Innovative Enterprises.

In Taiwan, the Ministry of Science and Technology (MOST) and the Ministry of Economic Affairs (MOEA) are the two major funding agencies, each of which execute their own policy and have created funding programmes to support participation of Taiwanese researchers in Horizon 2020, covering all thematic areas. While MOST funding focuses on SMEs, MOST funds mainly academic researchers. The following support is available in Taiwan:

- Mobility grant is available for Taiwanese researchers to meet-up with the European colleagues to discuss the work programme or consortium agreement.
- Invitation grant is available for Taiwanese researchers to invite their European colleagues to visit Taiwan to explore the comparative strengths of the Taiwanese partners.
- Research grant is available for Taiwanese researchers that have successfully joined a Horizon 2020 project funded by the European Commission. The Research Grant for the Taiwanese partner must be utilised to support the execution of the tasks in the project.

3.6.3. Developing countries

Developing countries analysed for the case studies – Kenya and Vietnam – were eligible for EU funding in FP7 and remain eligible under Horizon 2020. Under the MSCA, organisations in both countries participated as partners and did not receive any funds from the EU. **This might indicate that organisations in these countries have weaker capacities to act as participants (beneficiaries) in the MSCA projects.** This might also be associated with a less substantial role of the MSCA in national R&I policies of these countries. We have not found any instance where Vietnamese or Kenyan research funding bodies would have funded participations of national organisations or fellows in the MSCA. Nonetheless, organisations participating in the MSCA, like in other country groups, also contribute by allocating office space, facilities and other relevant resources needed for the MSCA participants.

Regarding the control country, no substantial differences were observed between the developing countries analysed for the case study programme and Tunisia. This can partially be determined by the fact that Tunisia has only been associated with Horizon 2020 since 2016. Before this time, Tunisia was considered a developing country and its organisations could have been beneficiaries of the MSCA. In none of the projects studied during case studies did Tunisian organisations or national funding authorities contribute any funds to cover the project costs. Tunisian organisations have not contributed with own resources to the budget of any specific projects under the MSCA.

3.6.4. High-income countries

High-income countries have been non-eligible for funding under both FP7 and Horizon 2020 programmes. As discussed in the first section of the study on the structure of third country participations in the MSCA, many high-income countries, however, are very active participants. In some of the high-income countries this is, among other things, enabled by the existing co-funding schemes.

In May 2018, Mitacs, a national not-for-profit research and training organisation from Canada, and the European Commission, announced a new co-funding partnership to expand research opportunities for Canadian and European graduate students and postdoctoral fellows, who receive funding through the European Union's Horizon 2020 programme.

Through the partnership, Marie Skłodowska-Curie Actions (MSCA) and Research and Innovation Staff Exchanges (RISE) will provide funding for European graduate students and postdocs to participate in research internships in Canada, and Mitacs' international internship programme (Globalink) will provide **funding for Canadian graduate students and postdocs to participate in RISE research projects in the EU Member States.**

Students from both sides will improve their research and transferable skills in new environments, gain cultural and linguistic fluency, enhance their employability, and expand their professional networks by collaborating with industrial and academic partners. As a result of the partnership, Canada is now a formal partner of the MSCA RISE strategy under Horizon 2020, the EU 7-year programme for research and innovation.

There are two ways how participations in RISE can be co-funded by Mitacs:

- **Institutional internships – Globalink Research Award.** The amount of the award is \$6000. Projects are supervised by a Canadian home supervisor and a host supervisor at a university in one of the EU and associated countries. The host supervisor must be supported by a Research and Innovation Staff Exchange (RISE) grant. Travel duration must be between 12-24 weeks.
- **Industrial internships – Accelerate International.** The amount of the award is \$15,000. Projects are supervised by a Canadian home supervisor, a host supervisor and/or a host industry supervisor in one of the Horizon 2020 countries. The host supervisor must be supported by a Research and Innovation Staff Exchange (RISE) grant. Travel duration varies depending on the level of study.

In Canada, a separate co-funding mechanism is also available in Quebec through their provincial support programme for international cooperation.

Australia has a co-funding mechanism for Australian participants in Horizon 2020 (not focused on the MSCA in particular), which specifically co-funds collaborations in health and medical research and innovation projects. The National Health and Medical Research Council administers this instrument. This collaborative research grants scheme aims to provide assistance to Australian researchers to participate in the collaborative projects that have been selected for funding under the Horizon 2020 Health, Demographic Change and Wellbeing Societal Challenge.

In the Republic of Korea, there exist co-funding mechanisms established by the Korean government: funding from the Ministry of Science, ICT and Future Planning (MSIP) and funding by the Ministry of Trade, Industry and Energy (MOTIE). **They regularly launch public calls for proposals to co-fund Korean organisations participating in Horizon 2020** projects selected for the EU funding, covering all thematic areas.

The data collected during the case study programme does not indicate that participation in the MSCA would play a significant role among the national R&I priorities. Nonetheless, high-income countries were very active in the MSCA projects, compared to other country groups. This might be explained by the **economic factor**, as organisations based in high-income countries have sufficient resources to invest in research.

As regards the control country, the UK Department for Business, Energy, Innovation and Skills provides funding for the NCP services operated by the UK Research Office (UKRO). UKRO itself, by using the funds gathered through the subscription fee for participating universities, **organises annual training sessions for universities on how to participate in framework programmes successfully.**

3.7. Are there any synergies between the MSCA and other EU programmes that contribute to third country participation in the MSCA?

The study has looked for potential synergies between the MSCA and other EU programmes that would contribute to third country participation in the MSCA. We have looked for any potential synergies with other Horizon 2020 programmes (in particular, the European Research Council), Erasmus+ (in particular, support for capacity building in higher education, strategic partnerships and knowledge alliances in higher education, Erasmus Mundus Joint Master's Degrees), COST programme or any other relevant EU programmes.

First, we have concluded that **there does not seem to exist an active strategy to promote synergies between the EU programmes in different (although related) domains in terms of supporting cooperation with third countries.** Evidence collected during the interview programme has revealed that:

- Such synergies are not actively requested or promoted in the work programmes or calls for proposals adopted under the EU programmes in the fields of research & innovation, education or support for the economy.
- Officials involved in the daily management of the programmes (e.g. in the Commission, EACEA or other executive agencies) do consider and promote the

usefulness and possibility of such synergies, and follow the guidance of the EU international policy, which assumes the necessity of such synergies. However, there are no formal requirements or procedures according to which the officials would promote such synergies in the daily work and management of the programmes.

Second, **such synergies therefore sometimes appear naturally, without explicit specific support from the EU or national policymaking bodies.**

Third, **a common synergy between the MSCA and other EU programmes is that the opportunities in all related EU programmes are being promoted together in third countries** (i.e. same promotional events disseminate information about all related EU programmes). Below we provide several examples of such situations.

For example, the MSCA and other Horizon 2020 programmes were promoted together in Brazil. The EU Delegation in Brazil and the EU Member and Associated States organised together a series of information seminars throughout Brazil to raise awareness among Brazilian research and innovation stakeholders about the opportunities that the EU Member States and Associated Countries offer for research and innovation collaborations, including mobility schemes for Brazilian students and researchers as well as opportunities under Horizon 2020. These events are organised in the context of the so-called Tour of Brazil.

Furthermore, the MSCA are promoted in Brazil via the Horizon 2020-funded project INCOBRA – Increasing Science, Technology and Innovation International Cooperation between Brazil and the European Union. Information and factsheets on the possibilities for Brazilian organisations and researchers to participate in the MSCA are regularly featured on the INCOBRA project website.

In 2017, DG EAC co-organised the celebration of the first EU–Latin American and Caribbean Knowledge Week in San Salvador with more than 700 participants from both regions, including national authorities, representatives from universities, regional associations of universities and students. EU events to support academic cooperation included an Erasmus+ and Horizon 2020 information event and a seminar on recognition of study periods abroad for 150 participants. The seminar included panels of experts on recognition from European and Latin American associations of universities (i.e. EUA, ASCUN and CSUCA).

The event was also an opportunity to organise a cluster meeting among all the Salvadorian universities involved in capacity building projects in higher education. As coordinator of a newly selected project, the Universidad Tecnológica de El Salvador hosted this meeting with more than 30 participants. There was a fruitful exchange of practice and perspectives about their participation in Erasmus+ capacity building. The VI Senior Officials Meeting on Science of Technology provided a policy forum to present the contribution of the Marie Skłodowska-Curie Actions and Erasmus+ mobility and capacity building projects to the EU-CELAC Common Research Area.

Erasmus+ and the MSCA were at the heart of the Academic and Knowledge Summit, a congress of universities of more than 500 participants from both regions that took place in Universidad de El Salvador. The Summit concluded with a Declaration calling for further integration and academic and scientific cooperation between the EU–Latin American and the Caribbean and asking Heads of State and Government to build upon Erasmus+ and Horizon 2020 structural projects to improve academic policies.

Fourth, **another common type of synergy that we have indicated is a sustained partnership between research organisations**, which may:

- be formed for the first time while participating in a programme other than the MSCA (e.g. Erasmus+ or other Horizon 2020 programmes) and then built upon to develop a viable consortium to apply for the MSCA;
- be formed while participating in the MSCA and then built upon to apply for other programmes (mainly Horizon 2020 programmes or Erasmus+).

For example, regarding collaboration with the US, one of the Erasmus Mundus Joint Master's Degrees programmes, GEMMA (a programme in Women's and Gender Studies in Europe), has led to further collaboration between the US entities and the European consortium. The US entities have been participating in this programme as part of the extended consortium from the 6th (Florida International University and Rutgers University)¹⁸ and 11th (University of Columbia, University of New York, University of Redlands)¹⁹ editions of the programme. Following this project, the main consortium consisting of the European partners has developed the MSCA ITN project GRACE. The GRACE project aims to systematically investigate the cultural production of gender equalities within Europe. US universities that participated in GEMMA have also actively contributed to GRACE through participating in its events and the GEMMA network.²⁰ Extending the success of GEMMA, the Erasmus Mundus 'Masters of Excellence' in Women's and Gender Studies, the central objective of GRACE, is to become the programme of reference for innovative interdisciplinary doctoral training for early-career researchers.

The overview of ERASMUS+ Capacity building in higher education (CBHE) participants from a control case study country Israel showed that a number of Israeli universities have participated in both CBHE and MSCA (e.g. Weizmann Institute of Science, Bar-Ilan University, The College of Management and Academic Studies, Tel Aviv University and University of Haifa). When comparing partner organisations in CBHE and MSCA projects, we have found that there are several organisations that cooperated in both CBHE and MSCA projects. Below are some examples:

- Shenkar Engineering.Design.Art (PBC) and Iceland Academy of the Arts that cooperated on the MSCA project FISHSkin and the CBHE project Creative Leadership and Entrepreneurship – Visionary Education Roadmap;
- Interdisciplinary Center (IDC) Herzliya and University of Groningen that cooperated on the MSCA project ENTWINE and the CBHE project Teaching Excellence in Israel;
- Bezalel Academy of Arts and Design with the University of Gothenburg that cooperated on the MSCA project HERILAND and the CBHE project Developing Modernized Curricula on Immigrants Lives.

Fifth, **some of the institutions from developing and emerging countries may be enabled to participate in the MSCA or other Horizon 2020 programmes by receiving EU support for capacity building in higher education via Erasmus+.**

However, here it is very difficult to establish a causal link as to whether the capacity building activities indeed helped the institution to succeed in the MSCA. For example, a Kenyan organisation, Catholic University of Eastern Africa, has participated in both CBHE and MSCA projects. A number of Chinese universities have also participated in both CBHE and MSCA (e.g. Nanhai University, Jilin University, Hebei University of Technology, Peking University, Shanghai Jiao Tong University, etc.). While participation in the CBHE

¹⁸ <http://essenglish.org/gemma-and-grace/>

¹⁹ <http://masteres.ugr.es/gemma/>

²⁰ <http://graceproject.eu/>

may have strengthened the capacity of Kenyan and Chinese universities to participate in the MSCA, it is not possible to establish a direct causal link.

Sixth, **we have also found synergies at the individual level: for example, individuals may start PhD studies funded by the MSCA after participating in Erasmus Mundus, or their MSCA experience may help them get an ERC grant in the future**; no hard data are available on this issue. There are many specific examples, however. For example, we had an interview with a Chinese fellow, who has started his PhD research under MSCA after participating in Erasmus Mundus programme. The fellow is also involved with both the Erasmus Mundus Association Chinese Chapter and the Marie Curie Alumni Association. These organisations therefore could be used to strengthen synergies between the two programmes. For example, raising awareness of and distributing information about MSCA to Erasmus Mundus students and alumni could potentially increase their interest in the programme.

4. Conclusions

4.1. Conclusions on international cooperation in the MSCA

The share of third country organisation participations is a bit lower in Horizon 2020 MSCA compared to FP7 MCA, but there is a higher number of active third countries (mainly developing economies)

The MSCA are by far the most international part of Horizon 2020. More than half of all Horizon 2020 participations by organisations from third countries take place in MSCA projects. This corresponds to around 11% of all participations and 0.1% of EU investment in the MSCA. This is driven by participations by organisations from the USA, which constitute 40% of all third country organisation participations in the MSCA under Horizon 2020.

The share of third country participations in Horizon 2020 as it stands now (10.93%) is a bit lower, than in FP7 (12.47%). One of the main reasons for this is that few very active countries, which were previously third countries, became associated to Horizon 2020, namely Ukraine, Armenia, Georgia and Tunisia. Nevertheless, the data show that while the share of third country participations is lower in Horizon 2020 than in FP7, the number of rather active third countries (with over 10 participations) is slightly higher in Horizon 2020, although a few active countries have become associated to Horizon 2020. This is mainly because a lot of developing countries became more active in terms of organisation participations in Horizon 2020 than they were in FP7, namely: Colombia, Peru, Cuba, Malaysia, Thailand, Vietnam and Kenya, to name the most active ones.

The abolition of funding eligibility had a strong negative effect on the number of participations of organisations from the emerging economies (and therefore also RISE researchers); however, this seems to have 'redistributed' opportunities to participate in the MSCA for organisations from the developing countries

The number of annual participations by organisations from BRIC/emerging countries has decreased significantly in Horizon 2020 compared to FP7 (-51 annual participations in Horizon 2020 compared to FP7). The following 7 countries top the list of those that became less active in Horizon 2020 in terms of organisation participations, compared to FP7: Russia (-15.7 of annual participations), China (-13.1), Brazil (-10.9), India (-9.5), New Zealand (-4.7), Mexico (-4.1), Egypt (-3.3). Since this list involves almost all countries that became ineligible for funding in Horizon 2020 (BRIC + Mexico), it can be concluded that the change in funding eligibility had a strong negative effect on the participations of organisations (and thus also RISE researchers) from the emerging economies.

As a result of the abolition of funding eligibility, a number of BRIC/emerging countries have set-up co-funding mechanisms. Some of the high-income countries have also done this. Co-funding mechanisms were established also in other countries, including Mexico, China, Russia, Australia, India, Japan, South Korea, some regions of Brazil and Quebec province in Canada. The Commission also promoted this mechanism and in 2017 agreement to renew and extend the co-funding mechanism for the Chinese entities in H2020 projects in the period of 2018-2020 was reached at the 3rd EU-China Innovation Cooperation Dialogue.

On the other hand, the number of annual participations has increased significantly for developing countries (+62) and high-income countries (+62). In our view, abolition of

funding eligibility for BRIC/emerging economies has improved the opportunities for organisations from the developing countries to receive funding and therefore to participate in the MSCA. Thus, the abolition of funding eligibility for BRIC/emerging economies has effectively worked as support for organisations from the developing countries (in particular Colombia, Peru, Cuba, Malaysia, Thailand, Vietnam and Kenya, to name the most active ones). Increase in organisation participations from high-income countries is probably not related to the abolition of funding eligibility for BRIC/emerging economies but is rather an effect of a general increase in R&I collaboration among the industrialised world countries.

The increase in annual participations has been 'shared' much more equally among developing countries than among high-income countries. While organisations from many developing countries started participating more actively in Horizon 2020 compared to FP7, the increase in annual participations from high-income countries (+62) has been 'shared' by only a few countries: mainly by the US (+44), Japan (+9) and Canada (+6).

RISE remains the most popular action for third country organisations; ITNs are becoming more attractive; organisations from high-income countries were responsible for the absolute majority of participations in IFs

In Horizon 2020, third country organisations participate most actively in RISE (around 56% of all participations). This trend has not changed since FP7, where third country organisations participated most in IRSES (57.5% of all participations).

Third country organisations started participating significantly more actively in ITNs (1% of participations in FP7 compared to 16% in Horizon 2020) and somewhat less actively in IFs (39.6% in FP7 compared to 25.2% in Horizon 2020).

Both in Horizon 2020 and in FP7 organisations from BRIC/emerging, developing and ENP non-associated countries have participated first and foremost in RISE/IRSES. This means that all country groups, except for BRIC/emerging countries, have slightly increased their share of participations in RISE in Horizon 2020 relative to participations in other actions. On the other hand, organisations from high-income countries were responsible for the absolute majority of participations in IFs.

Organisations from several high-income countries are responsible for the majority of non-RISE/IRSES participations in both Horizon 2020 and FP7, namely: the USA, Canada, Australia, New Zealand, Japan and South Korea.

RISE is attractive for third country organisations as a way to create or strengthen already existing research cooperation ties with the European partners; organisations from high-income countries (especially their leading universities) see the MSCA as a way of attracting excellent researchers from Europe primarily through IF action (and increasingly through ITNs)

We found several primary drivers that motivate organisations from third countries to participate in the MSCA, and primarily in RISE/IRSES. The first one is the opportunity to improve networking or further strengthening of the already existing research cooperation ties with European partners. Closer cooperation with European universities and research centres allows better partnerships to be forged and long-term sustainability of collaborative work in research with top-level colleagues from other countries to be ensured. Finally, a number of third country organisations perceive the MSCA, and primarily RISE/IRSES, as an opportunity to contribute to their research

capacity building. Some organisations from developing and emerging economies also perceive the MSCA RISE as a source of funding to support their research undertakings.

Organisations from high-income countries (especially their leading universities) see the MSCA as a way of attracting excellent researchers from Europe primarily through IF action (and increasingly through ITNs). Internationalisation to such institutions also tends to lead to an improved overall reputation/international visibility of an institution, as well as a better level of acquaintance with the research system of the EU.

There are not many businesses from third countries participating in the MSCA

Overall, businesses constituted 8.77% of total participations from third countries (196 total participations). It must be also noted that many of the organisations qualified as businesses are actually more similar to what one would call private research institutions. Furthermore, only 11 SMEs from third countries have participated so far in Horizon 2020, constituting 0.49% of total third country participations. This means that almost all businesses from third countries participating in the MSCA were large companies heavily focused on doing research and development, mainly from the US. The following would be a representative picture of an average business from a third country participating in the MSCA: a large company heavily focused on R&D activities participating in ITN or RISE, mostly from the United States, but sometimes from other high-income or emerging economies.

Large companies that participated mainly in ITNs and RISE were motivated by an opportunity to expand their collaborative network and, especially, to acquire contacts in leading European universities and research organisations. As shown also by our previous study of business participation in the MSCA, the ultimate motivation of the large companies was the opportunity to gain access to highly skilled and talented young researchers, who may go on to become employees of a participating company. Improving third country business participation in the MSCA would therefore probably mean that more researchers from Europe would go to work in the leading research companies, mainly in high-income countries. Despite the return phase, the ICF survey results showed that many fellows go back to work in a company or a university in a third country after the return phase.

As revealed also by our previous study of business participation in the MSCA, SME participation in the programme is driven mainly by their objective to support product or service development. Furthermore, SMEs are particularly unwilling to send their employees away or to commit resources to activities, which are not directly related to their core business. Therefore, SMEs from third countries are much more interested in other types of Horizon 2020 projects and not the MSCA.

BRIC/emerging economies are less dominant than in FP7 in terms of their national researchers participating in the MSCA, while increasingly more researchers come to Europe from developing countries

Chinese researchers were by far the most active in FP7 MCA. In Horizon 2020, this category is led not by one, but by two BRIC/emerging economies: China and India. The US, Argentina and Iran are also in the top 5.

Researchers from BRIC/emerging economies were by far the most active in FP7 MCA and constituted almost half of all third country researchers participating in FP7 MCA. Other country groups shared the remaining half of outgoing researchers in very similar proportions, with ENP non-associated countries being the least active group. In Horizon 2020 MSCA, researchers from BRIC/emerging economies (39% of all MSCA third

country researchers) and developing countries (37%) participate in similar numbers. The relative decrease of researcher participations from the BRIC/emerging economies is very likely related to the abolition of funding eligibility and therefore shows fewer researchers participating in RISE. The following countries faced the largest decrease: China (239 fewer researchers are participating annually in Horizon 2020 than in FP7), Russia (-163), Brazil (-158), the US (-99.5) and Mexico (-77). The following third countries are leading the list of those that became more active in terms of national researchers participating in Horizon 2020 MSCA compared to FP7 MCA: Iran (+32.5 annual average researcher participations), Colombia (+29), Pakistan (+ 17), Ethiopia (+12), Malaysia (+12) and Vietnam (+10).

Third country researchers actively participate in all types of MSCA; the increasing popularity of ITNs, IFs and COFUND among third country researchers means that more researchers from third countries will stay in Europe after completing their fellowship

While RISE is naturally the most common type of action for third country researchers to be involved in, they are very active in other actions as well. Researchers from all groups of third countries participate increasingly actively in ITNs, while researchers from high-income and BRIC/emerging economies participate increasingly actively in IFs.

While researchers from many countries started participating more actively in IFs, researchers from the US, Canada, and Australia led the way. In Horizon 2020, IF was also much more actively discovered by researchers from China, India, Russia, and Mexico, while researchers from Japan and Korea continued participating in IFs as actively as in FP7.

Researchers from many third countries have also started participating more actively in Horizon 2020 ITNs, with researchers from India, Iran and Pakistan being relatively most active in this type of action.

Knowing that ITNs, IFs and COFUND actions have a particularly strong influence on making researchers stay in Europe, this means that brain drain from third countries (especially the ones mentioned above) to Europe is currently increasing.

Motivations of researchers from emerging and developing economies vs high-income economies have differed

Researchers coming from BRIC/emerging and developing countries were mainly motivated by (1) developing new or improving old relationships or networks, (2) accessing training to develop personal research skills and (3) working at an institution/with researchers with excellent reputation.

Researchers coming from high-income countries were mainly motivated by (1) accessing research funding, (2) enhancing international reputation as a researcher and (3) having more independence and autonomy in research.

Mobility of European researchers to third countries is mainly driven by cooperation of organisations under RISE; European researchers go on fellowships almost exclusively to high-income economies

The US and China were by far the leading destinations among third countries in terms of incoming researchers in FP7 MCA. When it comes to most popular third country groups, here BRIC/emerging and high-income countries are equally popular as top destinations.

The US is a leading third country, by large margin, in terms of incoming researchers in Horizon 2020 MSCA. China and Japan are in strong second and third places. High-income countries were a top destination for Horizon 2020 MSCA researchers among third country groups (around 50% of third country incoming researchers went to high-income economies).

European researchers went to third countries overwhelmingly via the RISE action. Almost all participations in IFs can be explained by researchers going to high-income countries and in particular to the US, Canada and Australia.

There are some notable imbalances in terms of the flow of researchers between Europe and third countries; the majority of third countries are facing an outflow of researchers to Europe

First, third countries overall had more outgoing than incoming researchers during both FP7 and Horizon 2020. Second, BRIC/emerging countries were leading the way in both framework programmes in terms of the negative flow of researchers, while developing and ENP non-associated countries followed. Only high-income countries had a significantly positive flow of researchers in both FP7 and Horizon 2020, meaning that these countries received more researchers during FP7 than the number of their researchers moving to other countries.

The following trends are also important:

- For all third countries, the negative direction started slowing down and was significantly less negative in Horizon 2020;
- This can be explained by the increasingly positive flow of researchers to high-income countries and significantly less negative flow of researchers from BRIC/emerging economies;
- The trend in flow of researchers is becoming increasingly negative for the developing countries.

The following countries were most imbalanced in terms of the negative flow of researchers (a high number of outgoing researchers and an inadequately low number of incoming researchers): India, Iran, Russia, Colombia, Pakistan, Egypt, Nigeria, Venezuela. The following countries also had a much higher number of outgoing than incoming researchers, but the flows were more balanced: China, Argentina, Mexico, Vietnam, Ethiopia, Indonesia, Malaysia, Lebanon. Some of these negative flows may be explained by tense political relations between Europe and not much may be done at the programme level to rectify the situation.

The US, Australia, Japan, New Zealand and South Africa had a strongly positive flow of researchers both in FP7 and Horizon 2020. Notably, first, Japan has significantly strengthened its positive flow of researchers. Second, for the US the positive difference between incoming and outgoing researchers is significantly larger than in FP7 (in relative terms). Third, there are more third countries with a positive flow of researchers in Horizon 2020 than in FP7.

Some strategic EU partners in R&I could have a bigger role in the programme

The European Union has concluded a number of bilateral S&T agreements with individual third countries of strategic importance. These agreements constitute a framework and a privileged forum to identify common interests, priorities, policy dialogue, and the necessary tools for S&T collaboration.

As demonstrated by the study, the following countries that have S&T agreements are relatively strong participants in the MSCA (in line with the strength of their R&I systems and size of the country) and there is no need to take specific and urgent action to have an impact on their involvement: Argentina, Australia, Brazil, Canada, Chile, China, Japan, Mexico, Morocco, New Zealand, Russia, South Africa, Tunisia, Ukraine, the US.

However, some of the countries with which the EU has signed S&T agreements could have a bigger role in the programme, namely:

- To rectify the current participation imbalances (as mentioned above): India, Egypt;
- To make full use of science and innovation potential of both partners: Korea;
- To strengthen cooperation ties: Jordan and Algeria.

Key obstacles for third country researchers and organisations to participate in the MSCA have differed by country group

An important obstacle faced in particular by researchers from the ENP non-associated (Morocco) and developing countries, but also from some of the emerging and high-income economies (for example, Japan) was job security and administrative restrictions in their home country. In some cases, the regulations of institutions in third countries do not allow the researchers to leave on prolonged periods of mobility or training without risk of losing a job. This 'prolonged period' in some countries may be even shorter than the secondment period in RISE. A related administrative issue in a similar group of countries was the difficulty in acquiring a visa.

Another visible obstacle for stronger participation of organisations mainly from the developing countries was the insufficient visibility of the MSCA. Researchers and research organisations in some of the developing countries often do not know about the programme and the opportunities it provides. Researchers and research organisations often also lack the basic knowledge of the requirements and the application procedure. Moreover, many developing countries do not have a dedicated organisation or person locally who would be able to consult them (for example, an NCP).

Reports on the implementation of the Strategy for International Cooperation and Roadmaps highlight the importance of communication strategy, which is expected to ensure global awareness of the EU's R&I strengths, priorities and activities. Coordination of the communication activities among the National Contact Points, EURAXESS offices, S&T Counsellors and EU Delegations is expected to bring about wider participation in the MSCA by third country researchers and organisations. However, the study findings have pointed out the existing shortcomings in this area such as insufficient human and financial resources, insufficient knowledge of the programme, lack of coordination and cooperation activities between different actors, insufficient utilisation of MSCA alumni and locally based organisations, insufficient investments in existing tools among others.

Additionally, researchers and organisations in some developing countries lack project management skills and are not familiar with EU funding mechanisms. It was noted during the interview programme that some researchers do not know how to write a successful proposal, especially for the EU programmes. EU funding mechanisms usually differ from national ones in terms of their requirements. Moreover, in some of the developing countries researchers have a rather low level of English language proficiency, which negatively affects their abilities to write long and sophisticated proposals.

Another important obstacle for the participation of researchers mainly from the ENP non-associated countries and developing countries was the insufficient top-up allowance in RISE. Higher living standards in many European countries, especially Western

European countries, mean that RISE funding (top-up allowance) is not always sufficient to cover all the costs related to secondments in Europe. Interview respondents indicated that they use their own resources to substitute some costs. However, mobile staff have to cover both their obligations at home and substitute some additional mobility costs from salaries that are much lower compared to their European counterparts.

Synergies between the MSCA and other relevant EU programmes and instruments in supporting international cooperation between the EU and third countries are currently more accidental than planned

We have concluded that there does not seem to exist an active strategy to promote synergies between the EU programmes in different (although related) domains in terms of supporting cooperation with third countries. Such synergies therefore sometimes appear naturally, without explicit specific support from the EU or national policymaking bodies. Perhaps the most common synergy between the MSCA and other EU programmes is that the opportunities in all related EU programmes are being promoted together in third countries (i.e. same promotional events disseminate information about all related EU programmes). Another common type of synergy that we have indicated is a sustained partnership, which may:

- be formed for the first time while participating in a programme other than the MSCA (e.g. Erasmus+ or other Horizon 2020 programmes) and then built upon to develop a viable consortium to apply for the MSCA;
- be formed while participating in the MSCA and then built upon to apply for other programmes (mainly Horizon 2020 programmes or Erasmus+).

Furthermore, some of the institutions from developing and emerging countries may be enabled to participate in the MSCA or other Horizon 2020 programmes by receiving EU support for capacity building in higher education via Erasmus+.

We have also found synergies at the individual level: for example, individuals may start PhD studies funded by the MSCA after participating in Erasmus Mundus, or their MSCA experience may help them get an ERC grant in the future. Finally, we have found synergies between third country participation in the EU international policy initiatives and their participation in the MSCA.

Third country researchers felt that participation in the MSCA had a strong impact on the development of their professional skills and competences, as well as on improved knowledge in their research field. Therefore, the impact of participating in the MSCA on third country researchers was not significantly different from the impact on the European researchers.

The study found significant impacts on research fellows from both European and non-European countries involved in international cooperation under the MSCA. For the third country researchers hosted in European organisations during their MSCA project, the key impact was the development of professional skills and competences, as well as the knowledge across different research fields acquired during the fellowship. For the researchers coming from the BRIC/emerging economies, developing countries and the ENP non-associated countries, the learning effect and development of professional skills often stemmed from the ability to have the access and learn using the newest research facilities and infrastructures that are available in Europe and absent in their countries. Although to a somewhat lesser extent, researchers from Europe going on mobility to third countries also significantly improved their skills in certain areas and broadened their knowledge, especially in cases where researchers gained access to data samples and could conduct field research, which would not be possible in Europe.

International cooperation in the MSCA has helped EU and third country organisations establish new and lasting international collaborations, strengthen the existing ones and increase their international visibility and reputation

At the level of research organisations, quantitative and qualitative evidence indicate that international cooperation in the MSCA had significant impacts on both third country and European organisations, particularly in terms of networking and strengthening existing international collaborations with research-performing organisations and increasing their international visibility and reputation. In addition, third country organisations reported significant impacts of international cooperation in the MSCA on the research/technical skills, knowledge and research capacities in their institution, as well as on their managerial capacities in terms of improving capacity to bid for other research funds.

ITN, IF and COFUND actions have strongly contributed to attracting and retaining leading research talent from third countries to Europe

International cooperation in the MSCA has contributed significantly in terms of attracting and retaining leading talent, although the impact of different MSCA actions in this area varied significantly, with ITN and IF having the highest employment effects and the RISE/IRSES/IAPP being significantly less effective in this area.

According to the survey results, 53% of third country MSCA fellows, who were hosted in the EU/Associated countries during their fellowship under the ITN action, were employed in their host institution after their MSCA fellowship, followed by 44% of individual third country fellows and 36% of fellows participating in the MSCA under COFUND. The comparison between fellows from high-income, developing and BRIC/Emerging country groups showed that the highest share of MSCA fellows who remained in their host institution in Europe after the end of the project were from high-income countries (47%), followed by third country MSCA fellows from BRIC/Emerging countries (43%) and fellows from developing countries (39%). This shows that ITN, IF and COFUND actions strongly contribute to attracting and retaining leading research talent in Europe (what could be seen by third countries as 'brain drain').

4.2. Conclusions on the role and impact of the MSCA in implementing the EU strategy for international cooperation in R&I

As part of the current Horizon 2020 and the future Horizon Europe programme, the MSCA is one of the instruments to implement the EU strategy for international cooperation in research & innovation (R&I), which was adopted in 2012, and to contribute to the EU's policy priorities: "Europe as a stronger global actor" and being "Open to the World". Based on the evidence produced by the study, this executive summary concludes on the role and impact of the MSCA in implementing the EU R&I international cooperation strategy and policy priorities.

The FP7 MCA and Horizon 2020 MSCA have clearly contributed to Horizon 2020 and EU R&I being "Open to the World". As shown by the study, the MSCA are by far the most international part of Horizon 2020. More than half (over 52%) of all participations by third country organisations in Horizon 2020 take place in the MSCA projects.

Around 11% of all participations by organisations and around 30% of all researchers participating in the MSCA come from third countries. These numbers are slightly lower than during the FP7 period: 12.5% and 32.5%, respectively. However, third country participations in Horizon 2020 may catch up with the FP7 levels by the end of the current programming period. A positive development is that the number of active third countries (with over 10 participations) is slightly higher in Horizon 2020 MSCA than it was in FP7 MCA. This has resulted from the fact that a number of developing countries, who were less active during the FP7 period, started participating much more actively in Horizon 2020 MSCA (namely Colombia, Peru, Cuba, Malaysia, Thailand, Vietnam and Kenya, to name the most active ones).

The MSCA have also contributed to the strategic objective of strengthening the EU's attractiveness in R&I. This is primarily revealed by the strong net positive inflow of researchers from third countries (especially BRIC/emerging economies and developing countries) to Europe. The study has also found a strong interest of European researchers to do fellowships in high-income third countries (in particular, the US, but also Japan, Canada).

Another strategic objective of the EU is to continue strengthening the framework conditions for international cooperation in R&I, including encouraging reciprocal access to third countries' programmes. **The EU was recently successful in negotiating co-funding agreements for Horizon 2020 in many countries, which became ineligible for funding in Horizon 2020** (BRIC/emerging economies). Co-funding agreements were signed with Brazil, China, Russia, Taiwan. Agreements were also signed with some of the high-income countries (Australia, Republic of Korea). While these agreements focus on the overall co-funding for Horizon 2020, they do not mention the MSCA in particular. In the future, the Commission could seek to specifically mention the MSCA in such agreements in order to strengthen the visibility of the programme. A good example of an agreement related to co-funding the MSCA in particular is a scheme recently agreed with Canada, which will provide grants for Canadian researchers participating in RISE.

The EU also has a strategic objective for R&I framework programmes to facilitate access to new and emerging markets, and there is a related strong interest for EU stakeholders to collaborate with businesses established in third countries or globally. The study looked at how businesses (both from the EU and from third countries) are involved in international cooperation in the MSCA. First, **we found that third-country businesses (but also those within the EU) mainly participate in the MSCA as a means to improve their competitiveness by creating collaborative networks with R&I organisations in Europe and to benefit from the most talented European researchers.** Second, the survey of fellows and seconded researchers from third countries revealed that the MSCA researchers are explicitly interested in academic careers and gaining academic experience in the top EU institutions. Third, in most cases, the EU businesses cooperated with organisations from high-income economies (58% of partnerships), while 20% of partnerships happened with organisations from BRIC/emerging countries and 17% with developing economies. This finding is in line with the objectives of the EU strategy on international cooperation in R&I, which mentions "business opportunities and access to new markets" as a priority for cooperation with industrialised and emerging economies.

The MSCA have also contributed to the EU strategic objective to tackle global societal challenges through international cooperation, in particular by working together with the most advanced research systems in high-income/industrialised countries and emerging economies. First, the study found that organisations from the US, Canada and Australia and organisations from the EU

were largely focusing on the same scientific areas and problems. On the other hand, participations by organisations in the MSCA from the BRIC/emerging economies were often driven by the specific strengths of their national research systems. For example, China's organisations participating in the MSCA are overwhelmingly performing research in engineering, Brazilian organisations are focusing much more than Europeans on environment, Russian organisations – on physics. This means that the EU organisations cooperated with the BRIC organisations in areas where the third country partners have the strongest research credentials. Second, the survey evidence revealed that access to research infrastructures, which may only be available in specific countries (European or third countries), was one of the key drivers for researchers and organisations to engage in international cooperation instead of staying at a home institution.

The EU international cooperation strategy in R&I has also foreseen that the EU framework programmes would support the implementation of other EU external policies "by coordinating closely with enlargement, neighbourhood, trade, Common Foreign and Security Policy (CFSP), humanitarian aid and development policies and making research and innovation an integral part of a comprehensive package of external action". This goal was underlined as especially important in cooperating with the EFTA countries, EU enlargement countries and countries covered by the European Neighbourhood Policy. The study has not found significant ways in which the MSCA are supporting or having synergies with other EU external policies. This is not surprising, since the MSCA is a bottom-up programme based explicitly on research excellence. However, **the European Commission may look into ways of how, and if, further links or synergies with external policies of the EU would be relevant and contribute to international cooperation between the EU and its key partners.**

Regarding strategic objectives related in particular to cooperation with the ENP countries, the aim of the EU is to integrate these countries into the European Research Area, including through their possible association with Horizon 2020. While ENP countries that recently became associated to Horizon 2020 (Ukraine, Georgia, Tunisia and Armenia) were active participants in the MSCA, many of the current ENP countries not associated to Horizon 2020 would benefit from more active participation (Algeria, Azerbaijan, Jordan, Lebanon) in order to be in line with the EU strategic objectives, while other ENP non-associated countries are already very active (Morocco, Belarus, Egypt).

As an instrument focused on people, **the MSCA also provide strong support for the overall Horizon 2020 programme in fostering science diplomacy between the EU and its key partners.** The key added value of the MSCA here is creating sustainable links between researchers, research teams and organisations in Europe and in third countries. Our study has revealed the following insights:

- RISE, which funds staff exchanges for researchers and administrative and technical staff, is a particularly important and impactful action in this regard, as it is the key MSCA instrument to foster international cooperation between the European and third country organisations. We found that participations of third country organisations in RISE were driven by:
 - Opportunities to build research networks with the European research organisations, which may also work as a 'ladder' for future funding in other Horizon 2020 programmes.
 - Opportunities to strengthen research capacities. This means that both the European partners and third country partners supported each other in sharing expertise and thus helping to improve each other's capacity. **This achievement was particularly in line with the EU strategic objective to focus on capacity building in cooperating with organisation from the developing countries.** Survey evidence

revealed that building up research capacities was one of the key drivers for researchers and organisations from the developing countries to participate in the MSCA.

- Quantitative analysis stemming from the survey of organisations participating in the MSCA has revealed that 85% of third country organisations strengthened existing or created new collaborations with the European research organisations.
- The MSCA-related issues and promotion of the MSCA in third countries were also part of discussions between the national officials of third countries and the EU Delegations, EURAXESS Worldwide officials and NCPs. This has contributed to building a common understanding between the EU officials and the national third country policy makers about the expected scope of researcher mobility, possibilities for co-funding such mobility, as well as obstacles for it to be removed.

On the negative side, interviews with third country officials revealed that **parts of the MSCA – namely ITN and IF actions – were seen as instruments contributing to brain drain**. Interviews revealed that the administrations of some third countries have explicitly discouraged participation of their national researchers in ITNs and IFs, while supporting participation of organisations in RISE. In Horizon 2020, the flow of researchers from a third country to Europe are especially significant for India, China, Iran, Russia and Colombia. Many other third countries are also facing an outflow of their researchers to Europe, although on a smaller scale. This may be a troubling issue for future relationships in the area of R&I between the EU and some of its partners.

5. Recommendations

The programme is and will remain bottom-up, but at the same time efforts should be made to better align it with the EU external policy objectives, given its strong international dimension and the growing role of science diplomacy in foreign policies and strategies. As an overarching line of action, **we therefore recommend that MSCA cooperation issues be systematically addressed during formal S&T policy dialogues held with national authorities from third countries or regional fora, and that the results of these discussions be reflected in corresponding bilateral and regional cooperation roadmaps.** All specific recommendations listed below should be implemented as part of this overarching framework.

5.1. Cross-cutting recommendations

Recommendation 1: Work to set up co-funding agreements in BRIC/emerging and high-income countries, where these agreements are not yet available. Make sure that the available co-funding agreements are well-suited to support organisations and researchers participating specifically in the MSCA.

As part of the study, we refer to the following countries as BRIC/emerging economies: Brazil, Russia, India, China, Hong Kong, Macao, Taiwan, Mexico; and the following countries as high-income economies: Andorra, Australia, Canada, Japan, Republic of Korea, Liechtenstein, New Zealand, Singapore, The United States, Monaco, Qatar, Saudi Arabia and United Arab Emirates, as well as the overseas territories.

The 2018 progress report on the implementation of the strategy for international cooperation in R&I stated that “the Commission should remain proactive in ensuring good framework conditions for international cooperation, notably including extended co-funding mechanisms.” This objective is of key importance in relation to BRIC/emerging economies and high-income countries. The abolition of funding eligibility had a strong negative effect on participations of organisations from the emerging economies (and therefore also RISE researchers). The number of annual participations by organisations from BRIC/emerging countries has decreased significantly in Horizon 2020 compared to FP7 (-51 annual participations in Horizon 2020 compared to FP7). The following 7 countries top the list of those that became less active in Horizon 2020 in terms of organisation participations, compared to FP7: Russia (-15.7 of annual participations), China (-13.1), Brazil (-10.9), India (-9.5), New Zealand (-4.7), Mexico (-4.1), Egypt (-3.3). High-income economies are also not eligible for funding, which may prevent their top organisations from participating in the MSCA, in absence of co-funding opportunities.

As shown by our study in section 3.6 (detailed descriptions of the existing co-funding mechanisms in third countries), the European Commission has established co-funding mechanisms in Brazil, China, Russia, Taiwan, Canada, Australia and the Republic of Korea. All these mechanisms (except for Canada) consider Horizon 2020 in general, without mentioning the MSCA in particular. Some of these instruments mention a number of specific scientific areas, where co-funding would be prioritised. The mechanisms available in Brazil, Taiwan, Canada and the Republic of Korea are generally open to all scientific areas, while agreements with China, Russia and Australia explicitly prioritise some selected areas. We also found that some very limited and ad hoc co-funding opportunities exist in India and Mexico (e.g. co-funding only projects from selected calls in specific scientific areas).

In order to mitigate the decrease in participations created by the abolition of funding eligibility in the BRIC countries, and having in mind that BRIC/emerging economies and high-income economies are strategically important partners of the EU, we recommend:

- To negotiate the setting-up of co-funding mechanisms in India, Mexico, the United States, Japan, New Zealand, Singapore, and possibly other emerging and high-income economies.
- To seek expansion of the co-funding mechanisms available in China, Russia, Australia, and the Republic of Korea, so that they cover all scientific areas and all programmes of Horizon 2020. Coverage of all scientific areas and all programmes should also be ensured in the new co-funding mechanisms, so that the MSCA does not miss out on this opportunity.
- To make sure that researchers from Hong Kong and Macao can either freely access co-funding mechanisms agreed with China or are able to negotiate their own co-funding mechanisms with the EU.
- If possible, to seek direct mentioning of the MSCA (RISE, in particular) in the legal texts of co-funding agreements. An even further step would be to make sure that a certain amount of funding is allocated directly for the MSCA.

Regarding the last point, MSCA officials could draw on the good practices of co-funding RISE researchers in Canada and South Africa. The Department for Science and Technology in South Africa has an instrument for Horizon 2020 RISE Co-investment Funding (previously FP7 IRSES Co-investment Funding), which provides financial support to South African participants of up to ZAR 30 000 (~EUR 1 875) per person per month (a maximum of 12 months), given that expenditure is fully substantiated by the applicants. Another good practice with a specific target to co-fund salaries of RISE researchers is implemented in Canada, where the co-funding instrument provides grants for Canadian researchers going to Europe through the RISE action.

Recommendation 2: Take steps to increase total individual funding received by researchers and staff members going from lower-income countries to the EU and Associated Countries via RISE secondments.

When going on secondment in RISE, researchers continue to receive their salary from the sending institution. In addition to this, they receive a monthly top-up allowance of EUR 2 100. The rationale of this top-up allowance is mainly to cover the mobility/travel and accommodation costs. The top-up allowance must be paid in full for the individual use of a seconded researcher.

For each researcher/month, institutions participating in RISE projects also receive EUR 1 800 to cover research, training and networking costs, as well as EUR 700 to cover management and indirect costs per researcher month. These institutional unit costs may be used to further complement the top-up allowances and salaries received by the seconded researchers.

To compare RISE with other actions, it should be noted that a number of separate allowances – living allowance, mobility allowance, family allowance – exist to cover individual costs of researchers participating in individual fellowships and Innovative Training Networks.

During case studies and interviews, we have indicated that total individual funding (usually consisting of home salary and a top-up allowance) was often insufficient to cover real costs incurred by the seconded researchers from developing and ENP non-

associated countries going to Europe, and in particular to Western and Northern European countries, where prices of goods and services are the highest. This was subsequently seen as an obstacle by institutions from developing and ENP non-associated countries preventing them from applying for RISE projects; they understood that their seconded researchers and staff would incur financial losses as a result of going to Europe.

In addition to ENP non-associated and developing countries, this recommendation is also valid for India, which is categorised as a BRIC/emerging economy. Researcher salaries in India are very low compared to those received in high-income European countries; furthermore, the MSCA would benefit from more balanced researcher flows with India, which may be achieved first and foremost by increasing participation of Indian institutions in RISE.

During case studies and interviews, we have indicated the following specific problems related to insufficient individual funding received by seconded researchers from ENP non-associated and developing countries:

- A seconded researcher's home salary and a EUR 2 100 monthly RISE top-up allowance is expected to cover the travel costs, accommodation costs, living costs, family costs, but also the researcher's financial responsibilities at home (e.g. paying a mortgage, supporting the family, paying childcare and education costs). The overall funding received during the secondment period was seen by researchers and institutional representatives in ENP non-associated and developing countries as insufficient to cover all financial responsibilities.
- This issue was amplified for researchers coming from countries that are further away from Europe, like Vietnam and Kenya, and therefore prices of tickets are higher and take up a significant share of the top-up allowance.
- Sending institutions were rarely willing to top-up the salaries of seconded researchers by using institutional unit costs for research, training and networking (EUR 1 800) and management and indirect expenses (EUR 700). This comes from the fact that RISE is often seen as more of a research project than a mobility project, and therefore institutional funding is understood as necessary to cover various research and management costs.
- Knowing this situation, institutions from the ENP non-associated and developing countries are less willing to apply to RISE, since they feel that the inability to cover real costs of mobility may cause discontent among their researchers.

The reader should note, however, that the data gathering was implemented in certain selected countries and did not cover all developing and ENP non-associated countries. These findings come from the case studies on Kenya, Vietnam, Morocco and Belarus, as well as interviews with experts in other developing or emerging countries (Thailand, Pakistan, Argentina, South Africa, Colombia, Malaysia, India).

We suggest several options for how this issue could be tackled:

- If a RISE researcher is coming from an ENP non-associated or a developing country, consider increasing his/her top-up allowance by a certain coefficient or even developing a specific unit cost for such situation. This coefficient/unit cost could be defined on the basis of evidence to be collected by an ongoing study to review the MSCA unit costs.
- The Commission could also encourage organisations from the ENP non-associated and developing countries to use their institutional unit costs to increase the living and mobility allowances of the staff seconded to Europe.
- Finally, through bilateral dialogues, the European Commission could encourage the research funding organisations in developing and ENP non-associated countries to provide co-funding for RISE, in particular to top-up salaries of

seconded researchers and staff. For example, the Department for Science and Technology in South Africa has an instrument for Horizon 2020 RISE Co-investment Funding (previously FP7 IRSES Co-investment Funding), which provides financial support to South African participants of up to ZAR 30 000 (~EUR 1 875) per person/month (a maximum of 12 months), given that expenditure is fully substantiated by the applicants. Another good practice with a specific target to co-fund salaries of RISE researchers is implemented in Canada, where the co-funding instrument provides grants for Canadian researchers going to Europe through the RISE action. These good practices could be flagged for the national authorities of developing and ENP non-associated countries.

Recommendation 3: Establish interaction, liaison and, possibly, joint promotion campaigns between the MSCA programme and international university associations, regional research and education networks. The aim of such action would be to promote the MSCA and inform the local academic communities about the opportunities provided by the programme, the application processes and other relevant information related to the programme.

A large number of third country organisations participating in the MSCA are higher education institutions or public research organisations. Furthermore, the survey of researchers implemented as part of the MSCA interim evaluation has clearly shown that the MSCA researchers prioritise mobility to academic organisations rather than to any other type of organisations.

To further increase awareness of the MSCA and its attractiveness among academic communities and administrations around the world, we suggest that the European Commission should take steps to establish interaction, liaison and, potentially, joint promotion campaigns between the MSCA programme and international/regional associations of universities and research & education networks. This idea was suggested and strongly supported during the validation seminar organised as part of this study.

As for international university associations, we suggest targeting members of the International Association of Universities (with consideration to engage them through this umbrella organisation):

- L'Agence universitaire de la Francophonie (AUF), Canada;
- Association of African Universities, (AAU), Ghana;
- Association of Arab Universities (AARU), Jordan;
- Associação das Universidades de Língua Portuguesa (AULP), Portugal;
- Inter-American Organization for Higher Education (IOHE), Canada;
- NAFSA: Association of International Educators, USA;
- Réseau Africain Francophone de la Formation Supérieure et de l'Enseignement Technique (RAFSET), Togo;
- The Association of Commonwealth Universities (ACU), UK;
- Union de Universidades de América Latina (UDUAL), Mexico;
- Universities Caribbean, Jamaica.

Furthermore, the European Commission could consider engaging with the national university associations of the strategic partner countries:

- Universités Canada;
- Asociación Colombiana de Universidades (ASCUN);

- Association of Indian Universities;
- Association of Private Universities of Japan;
- Japan Association of National Universities;
- National Association of Universities and Higher Education Institutions (ANUIES), Mexico;
- Committee of Vice-Chancellors of Nigerian Universities;
- Universities South Africa;
- American Council on Education (ACE).

Also, consider the following research and education networks connecting research communities in Europe and third countries:

- Trans-Eurasia Information Network (TEIN);
- AfricaConnect;
- EUMEDCONNECT;
- Alliance for Logistics Innovation through Collaboration in Europe (ALICE).

The European Commission could consider the following lines of action related to this recommendation:

- The following two types of cooperation opportunities could be considered:
 - (1) **Dissemination of information.** It could be agreed with the networks that they would disseminate promotional information and information about the calls for proposals among their members. Such information would be provided to them either directly by the Commission or via EURAXESS Worldwide offices.
 - (2) **Promotional activities.** Representatives of the international/regional networks could be invited to join the promotional events organised by EURAXESS Worldwide, MCAA, NCPs and other actors promoting the MSCA in their countries. Further steps could be to organise joint events.
- The European Commission could also join various activities implemented by the International Association of Universities (IAU; <https://www.iau-aiu.net/>), which connect many of the above-mentioned university networks. The following joint activities could be considered:
 - Joining relevant peer-to-peer, knowledge sharing, and capacity building events organised by the IAU, where the Commission or EURAXESS Worldwide representatives would have direct access to member universities.
 - Launching joint analytical assignments analysing mobility of researchers in the world. One of the working packages of the IAU is expertise & trends analysis, as well as advisory services.
 - Joining networking events (and in particular the International Conference) organised by the IAU or organising joint events.
 - Ask the IAU to disseminate information about the MSCA calls in their newsletter.

Recommendation 4: Work to increase the size of EURAXESS Worldwide in terms of human resources and further strengthen its capacities to promote the MSCA.

While EURAXESS Worldwide is an extremely successful instrument supporting researchers working outside of Europe who wish to connect or stay connected with Europe, our interview programme and the validation seminar revealed a growing agreement among the stakeholders that it has to be strengthened if Horizon 2020 and Horizon Europe want to be more 'open to the world'.

As put by one of the participants in the validation seminar, “EURAXESS Worldwide officials are already working beyond their capabilities to achieve tremendous results taking into account that they only have 12 persons to cover the worldwide network.” Indeed, EURAXESS Worldwide is already the strongest link promoting the MSCA in third countries.

We are aware that EURAXESS Worldwide is not working only on the MSCA and increasing its size is not something that the DG EAC unit working on the MSCA could decide alone. Also, we are aware that the financial and human resources are always limited, and every EU organisation has to live with what is possible. However, having in mind that a top priority for the EU R&I policy (and framework programmes in particular) is to be “open to the world”, **we would suggest doubling the size of EURAXESS Worldwide in terms of human resources before the start of Horizon Europe**. DG EAC MSCA unit could pilot this recommendation among other Commission services working on mobility of researchers and on Horizon 2020/future Horizon Europe.

As one of the first steps, **the Commission could establish EURAXESS Africa**. As African countries grow stronger in their R&I potential, the EU needs to work on establishing solid links with the best-performing R&I systems in Africa no later (better earlier) than other partners and competitors – the US, China.

To further strengthen capacities of EURAXESS Worldwide:

- **Training on third country R&I systems, and in particular R&I funding systems, could be organised for EURAXESS Worldwide officials.** Potentially, this could be done by selected experts in the relevant third countries or by DG RTD desk officers for third countries. This would respond to a gap indicated by the study that, as effective as EURAXESS Worldwide officers are, they sometimes lack knowledge about the national third country R&I systems and (co-)funding instruments available.
- A certain amount of the working time (FTE) of a EURAXESS Worldwide officer could be formally allocated for **promoting the MSCA programme specifically**.
- In this way, **EURAXESS Worldwide could inspire stronger and more institutionalised networking of all instruments working on promotion of the MSCA**, including MCAA, NCPs (Net4Mobility+), EU Delegations. Interviews with stakeholders and discussions during the validation seminar have indicated that there is a need for a common coordinated platform linking all actors promoting the MSCA and strategically steering their efforts. De facto, EURAXESS is already the main organisation inviting other actors to join their promotional activities and coordinating the MSCA promotion efforts. We understand that EURAXESS Worldwide may not be in place to coordinate such network (if it would become more centralised), as it does not have a formal authority over the EU Delegations or the NCP network. However, EURAXESS Worldwide is the right organisations to inspire the development of such network.

Recommendation 5: Marie Curie Alumni Association (MCAA) could consider future actions to further promote and raise awareness of the MSCA in third countries, based on existing good practices, including (1) establishing a Working Group in MCAA specifically dedicated to outreach and communication to the academic community of third countries and (2) supporting the establishment of MCAA chapters in those non-European countries, where they still do not exist.

Marie Curie Alumni Association (MCAA) is an extremely important stakeholder in promoting the MSCA programme in third countries. It already has many active local chapters in a number of third countries and regions. The role of the MCAA is especially strong in encouraging other researchers to apply for MSCA fellowships: sharing of real-life experiences of successful third country MSCA applicants with other third country researchers by showing real-life success stories can convince them that they can also be successful in applying for MSCA funding. The information sessions and meetings with actual third country MSCA beneficiaries also help to address the language barrier, which may be an obstacle for disseminating information on the MSCA in some of the third countries.

For this purpose, the MCAA could be further utilised in several specific ways:

- **Establishing a working group in MCAA specifically dedicated to outreach and communication to the academic community of third countries** about the opportunities provided by the MSCA. The main mission of this working group would be to organise information sessions and events, where the MSCA alumni (including third country MSCA alumni) meet members of the research community from a specific third country, tell them their personal story and provide information on different aspects of the MSCA, e.g. the application process and selection criteria, guidelines on how to write a good proposal, how to contact relevant partners in Europe, different research infrastructure available in European institutions, career development opportunities etc. The working group would also be responsible for the preparation and dissemination of innovative, high-quality, consistent communication resources (newsletters, magazines, articles, multimedia etc.), both online and in print, addressing the research communities of specific non-European countries.
- **Supporting the establishment of MCAA chapters in those non-European countries, where they still do not exist.** As in the case of the already existing chapters, the new MCAA chapters would aim to encourage networking of the MSCA alumni in a specific country, as well as communication and good practice exchange between the alumni and the local research community. The validation seminar has revealed that MCAA is already working on establishing MCAA chapters in Japan, Korea and Australia.

The following are some of the good practices of MCAA activities, which could be mainstreamed in other third countries (for more detail on each practice, please refer to Annex 2):

- Promoting interaction with external and national funding agencies and relevant stakeholders, as done by the MCAA Brazil Chapter, in particular working with: EURAXESS, CNPq, CAPES, DAAD, CONFAP, Fapesp/SP, Academia Brasileira de Ciências, Brazilian Humboldt Kolleg, MSCA, Serrapilheira).
- A newsletter by the Brazil Chapter to report on their activities, disseminate research links, and to encourage interaction with external partners.

- Raising awareness of the MCAA and the MCAA Brazil Chapter by recruiting new members: at universities (Federal and State), research institutes (Embrapa, Fiocruz, Instituto Adolfo Lutz, Instituto Biológico etc.) and businesses.
- EURAXESS China in cooperation with MCAA China Chapter organised the first EURAXESS Grants in Practice event in 2018. The first event in the Grants in Practice series focused on Marie Skłodowska-Curie individual fellowships. The goal of the event was to spotlight the details of what the Marie Skłodowska-Curie individual fellowships are.
- Lunch meetups for Marie Curie Fellows in China. This event facilitated networking activities among Marie Skłodowska-Curie fellows in China. It was a first step in creating an informal environment and helped build connections among researchers.
- MCAA China Chapter is regularly recruiting its members to participate in EURAXESS-organised events to share their experiences with potential participants.
- MCAA members are mentoring potential future MSCA researchers from the US by participating in the Joint European Mentoring Initiative (JEMI).

Recommendation 6: Set up an inter-service working group at the European Commission to better coordinate how EU mobility and R&I programmes could create synergies with each other, and with the EU external policy instruments, to most effectively contribute to strengthening EU cooperation in R&I with third countries.

The EU strategy on international cooperation in R&I stated that “International cooperation activities in research and innovation will be developed in close coordination with the Union’s external policy instruments. This will also include mainstreaming research and innovation across other policies with a strong international dimension, such as trade, CFSP, environment and energy, and exploiting synergies with international cooperation in higher education proposed under Erasmus.”

The strategy has also foreseen that “the Union’s external policies will aid in building up research capacity in the enlargement, neighbourhood and developing countries. Research and innovation funding will focus on excellence, thereby contributing to finding innovative solutions for the challenges these countries face.”

Our analysis revealed that there does not seem to exist an active strategy to promote synergies between the EU programmes in different (although related) domains in terms of supporting cooperation with third countries in R&I. Such synergies therefore sometimes appear naturally, without explicit specific support from the EU or national policymaking bodies, since the Commission officials are of course broadly pursuing the objectives of the EU strategy and policy on international cooperation.

In short, during interviews and desk research we have indicated that the EU R&I and higher education mobility programmes (in particular, the MSCA, ERC, Erasmus+ and COST) do not explicitly work together on the basis of a common plan to create synergies in reaching the EU strategic objectives on international cooperation in R&I and higher education. While they of course are broadly working in line with the EU policies, such as EU policy on international cooperation in R&I, there is no specific plan how to do this and what each programme should (and should not) focus on in particular.

We suggest setting up an inter-service working group at the European Commission to coordinate actions (which preferably could be put on paper as a working plan) on how

the EU mobility and R&I programmes could create synergies and have a common strategy in strengthening the EU cooperation with third countries in R&I and in higher education. The working group should include persons involved in drafting Work Programmes for the MSCA, other Horizon 2020 programmes (in particular, ERC), COST and parts of Erasmus+, in particular Capacity Building in Higher Education, Jean Monet actions, Erasmus Mundus Joint Master's Degrees and international credit mobility.

The potential white paper/plan resulting from the work of such an inter-service group should also address the question of how funding instruments available at other directorates (e.g. DG NEAR, DG DEVCO) could create synergies with the EU mobility programmes in R&I and higher education in order to strengthen international cooperation in R&I in line with the EU strategy and policy.

5.2. Recommendations related specifically to high-income/industrialised countries

Recommendation 7: Promote more significant overall involvement in the programme of organisations from South Korea, who holds an agreement for scientific and technological cooperation with the EU. Encourage South Korean individual researchers to apply for MSCA funding by raising their awareness of the opportunities provided by the programme.

As demonstrated by the study, the majority of high-income countries that have S&T agreements are generally strong participants in the MSCA. A significant exception in this country group is South Korea, which, compared to other high-income countries, is generally not participating actively in the MSCA. Organisations from Korea had only 35 participations in FP7 and H2020 MSCA combined. The study evidence shows that the lack of knowledge about the MSCA and its opportunities (especially in regions outside Seoul), together with the limited know-how about the application process, are some of the key obstacles for South Korea's participation in the programme. Study evidence also shows that South Korea's EURAXESS needs more human resources to organise additional events such as information days, proposal writing seminars and promotion campaigns. In addition, in the case of South Korea's participation in the MSCA there is a lack of diversity in terms of scientific disciplines: almost half of the South Korean grantees specialise in engineering. The following measures should be applied to encourage wider participation of South Korean organisations and researchers in the MSCA:

- Engage EU centres in South Korea, especially those outside Seoul (Yeungnam University EU Centre; Pusan National University EU centre) to organise common MSCA promotion campaigns and info days together with South Korean EURAXESS and NCPs.
- Based on the examples of the ERC, aim to establish international agreements between the European Commission and research funding agencies in South Korea (National Research Foundation of Korea/National Academy of Sciences Research Foundation) that would support researchers from South Korea to temporarily join MSCA teams in Europe.
- Encourage EURAXESS Korea to support the establishment of Marie Curie Alumni Association (MCAA) Chapter for South Korea, to participate in MCAA South Korea chapter Annual Meetings and to develop joint work plans to increase participation of South Korean researchers and organisations in the MSCA.

- Provide additional financial support to EURAXESS South Korea, in order to expand its human resource base and capacities to organise information/networking events.
- In comparison to other third countries, South Korea has a wide network of NCPs – there are 14 NCPs – almost one for every topic/area, including the MSCA. Engage South Korea’s wide network of NCPs in organising MSCA promotion campaigns and info days (together with the local EURAXESS), particularly in the research institutions outside Seoul.
- Engage the Korean Council for University Education to cooperate more actively with the local EURAXESS and South Korean Network of NCPs in organising MSCA promotion campaigns, info days, seminars and fairs, particularly in the regions outside Seoul.
- Strengthen networking and twinning events involving European and South Korean research organisations by renewing and providing support to common projects, such as the former Initiative to Intensify and Strengthen the Regional S&T Cooperation between Korea and the ERA (KorA-Net), Stimulating and facilitating the participation of European researchers in Korean R&D programmes (KORRIDOR) and Korea-EU Science and Technology Cooperation Advancement Programme (KESTCAP).

Recommendation 8: Aim to increase the number of Japanese researchers going to European institutions under the MSCA by seeking to improve job security of internationally mobile Japanese fellows and better promoting MSCA opportunities among the Japanese researchers’ community.

Based on the study findings, one of the key measures to increase the participation of Japanese researchers in the MSCA (particularly the RISE action) is to ensure job security for Japanese MSCA fellows going on secondments by addressing administrative restrictions existing in Japanese research institutions (e.g. risk of losing their job position in the institution if their mobility period is longer than 2 weeks). This could be done by informing Japanese policymakers and the management of universities/research institutions of the problem and encouraging them to solve it, mainly through the following policy dialogue instruments and platforms:

- the Delegation of the European Union to Japan, with its specific administrative unit – the Science, Innovation, Digital and other EU Policies Section;
- and the EU-Japan Science Policy Forum.

To improve the visibility and awareness of MSCA opportunities among Japanese researchers and encourage more Japanese research fellows to apply and participate in the MSCA, the following measures are proposed:

- Based on the example of international agreements in the ERC, aim to establish an agreement between the European Commission and the Japan Society for the Promotion of Science (JSPS)/Japan Science and Technology Agency (JST) according to which Japanese researchers funded under JSPS/JST programmes would be able to visit running MSCA projects for short periods of time.
- Engage the Japan Society for the Promotion of Science (JSPS) and the Japan Science and Technology Agency (JST) to cooperate with the local NCPs and Euraxess Japan to organise common networking events, seminars, info days and other MSCA promotion activities targeting Japanese researchers funded under the programmes of JSPS/JST.
- Renew and provide support for common Japan-EU S&T cooperation projects, such as JEUPISTE (Japan-EU Partnership in Innovation, Science and Technology), CONCERT-Japan (Connecting and Coordinating European Research and Technology

Development with Japan), Europe Network for Neutrino and Intensity Frontier (JENNIFER) and European Higher Education Fair in Japan. In addition, use these projects to promote the MSCA for Japanese researchers and research institutions, mainly through information days, brokerage and matchmaking events and MSCA promotion campaigns.

- Encourage the establishment of a Marie Curie Alumni Association (MCAA) Chapter for Japan.
- Aim to cooperate with the existing EU centres in Japanese universities/research institutions (EU Institute in Japan at Kobe University; Kyushu University, EU Studies Institute in Tokyo, Hitotsubashi University and EU Institute in Japan, Waseda University), in order to organise common MSCA promotion events with Euraxess Japan and NCPs, targeting students and researchers in these universities.

Recommendation 9: Increase the number of American and Australian researchers going to European institutions under the MSCA by addressing mobility-related administrative obstacles and better promoting MSCA opportunities among the American and Australian researchers' community.

The EU Delegations to the USA and Australia and other existing cooperation tools (the bi-annual Australia-EU Joint Science and Technology Cooperation Committee (JSTCC), the Joint Consultative Group of the US, the EU-US Space Dialogue, the Transatlantic Ocean Research Alliance, the US-EU Energy Council) should be used as policy dialogue instruments to facilitate the granting of visa/work permits to US/Australian researchers and the transfer of health insurance of mobile researchers from USA/Australia.

To improve the visibility and awareness of MSCA opportunities among the American and Australian researchers and to encourage them to apply and participate in the MSCA, the following measures are proposed:

- Aim to establish a specific division of US NCP focusing on the MSCA within the pilot National Contact Point for Horizon 2020 programme. Study findings indicate that currently the pilot National Contact Point for Horizon 2020 programme, located at the National Council of University Research Administrators (NCURA) is only limited to administrative and financial questions regarding regular Horizon 2020 agreements and is not dedicated to specific actions, like the MSCA. Therefore, the research data suggest that the pilot NCP lacks effectiveness in respect to promoting and disseminating information about the MSCA.
- Use the specific division of US NCP focusing on the MSCA, JEMI – pilot a Joint European Mentoring Initiative and Euraxess North America for disseminating information and providing career guidance and advice for potential MSCA applicants in the US, including information on career prospects and benefits stemming from MSCA, research careers in Europe, information on living costs and social security for internationally mobile researchers in Europe. Study evidence shows that American researchers are mainly concerned about their future/career prospects after the MSCA fellowships: they are often eager to have a career plan and want to know about health insurance for international researchers moving to Europe. The European Commission should concentrate on providing this information on long-term career prospects and living conditions in Europe to American researchers, in addition to administrative/financial questions currently provided.
- Develop links between JEMI – pilot Joint European mentoring initiative and EURAXESS North America/North American NCP/pilot National Contact Point for the Horizon 2020 programme. JEMI addresses important obstacles that individual US and EU fellows face when relocating to the US or Europe. Fellows

are allocated a volunteer mentor who had a similar experience as a mentee (e.g. an MSCA alumni). However, currently, JEMI is still at its pilot stage and is not associated with EURAXESS.

- Based on the examples of the ERC, aim to establish international agreements between the European Commission and research funding agencies in the US and Australia (National Science Foundation in USA, Australian Research Council) that would support researchers from the US and Australia to temporarily join MSCA teams in Europe.
- Encourage EURAXESS Australia & New Zealand to support the establishment of a Marie Curie Alumni Association (MCAA) Chapter for Australia, participate in MCAA Australia chapter Annual Meetings and develop joint work plans to increase participation of Australian researchers and organisations in the MSCA.
- Renew and provide additional support for common US-EU and Australia-EU S&T cooperation projects, such as the Meeting of European Scientific Diasporas in North America, the BILAT USA 4.0 project and the former AUS-ACCESS4EU project aimed at increasing science and technology cooperation between the EU and Australia. Use these projects to inform researchers in Australia and the USA about the added value, opportunities and application process of the MSCA.

5.3. Recommendations related specifically to BRIC/emerging countries

Recommendation 10: To reduce the imbalances of researcher flows with BRIC/emerging economies, consider re-establishing a return phase for third country fellows participating in the European Fellowships.

As mentioned throughout the study, some of the BRIC/emerging economies that are strategic partners of the EU suffer from large negative imbalances of researcher flows vis-à-vis Europe. This means that a high number of researchers (mainly, long-term ITN and IF fellows) go from these countries to Europe, while a much smaller number of researchers (mainly, short-term RISE researchers and staff) come to these countries. Among BRIC/emerging economies, India is suffering from a particularly severe imbalance in researcher flows, while China and Russia also have very pronounced imbalances. As revealed by the interviews with stakeholders, this is starting to be seen as a 'brain drain' by India, China and Russia, and therefore may become an issue for political disagreements between the EU and its strategic BRIC partners.

The study team believes that increasing participations of organisations from these countries in RISE is the key action to be taken to tackle imbalances in the short-to-medium term. Since IF fellows are very selective and are usually attracted by the best research institutions/conditions in the world, it will be very difficult for India, Russia and China to take steps, which would naturally attract more individual fellows to carry out research in their countries in the short-to-medium term. For this to happen, they will need to improve general conditions to perform R&I in their countries, which will only become a reality in the longer term.

One of the actions that could be taken directly by the MSCA programme officials and which would increase the flows of fellows to India, Russia and China, is to re-establish a return phase for third country fellows participating in the European Fellowships. ENP non-associated countries and developing countries would also benefit from such provision. However, if possible, we would not suggest having such an option for high-income countries, since some of them already enjoy strongly positive researcher inflows (mainly fellows) from Europe. Perhaps a certain objective criterion in terms of GDP per

capita could be developed by setting a threshold for countries, the fellows from which can or cannot have a return phase.

We have also considered suggesting an option to allow the ITN partner organisations from third countries to hire fellows. However, this would probably cause an even stronger outflow of European researchers to high-income countries.

Recommendation 11: To reduce severe imbalances of researcher flows between Europe and India, put more effort into promoting networking between European and Indian organisations. This action should lead to a higher number of RISE consortia between European and Indian organisations.

For the majority of third countries (except for some of the high-income countries), the number of their national researchers going to Europe is higher than the number of European researchers coming to these third countries. For India, these imbalances are particularly pronounced. Consultations with stakeholders revealed that this is seen by policymakers and other stakeholders as a 'brain drain' situation. This may subsequently harm the international cooperation and science diplomacy efforts between the EU and India. The European Union has also concluded a bilateral S&T agreement with India, meaning that it is a country of strategic importance for the EU in the area of international cooperation in R&I.

The key idea of this recommendation would be to take action and to encourage organisations from India to set-up RISE consortia together with European organisations, as RISE is the most likely MSCA instrument to achieve a better balance of researcher flows in the short-to-medium term. This could be done by:

- Organising common fairs/matchmaking events for higher education institutions and research-performing organisations from India and Europe;
- Focusing the EU outreach and promotion activities on reaching organisations in India and encouraging them to participate in RISE together with the European organisations;
- Incentivising EU higher education institutions and research-performing organisations to enter into consortia with organisations from India;
- Addressing these imbalances during the formal dialogues with the national authorities of India and inviting the policymakers from India to encourage their HEIs and research organisations to participate.

Why does this recommendation focus in particular on networking between organisations and specifically on the RISE action? The immediate impact of promoting the involvement of third country organisations in ITN or IF (or linking European fellows to third country organisations) would be lower, as there are far fewer individual fellows than RISE researchers, and individual fellows tend to be very selective when choosing a place for their fellowship or a PhD. Structural issues/framework conditions in different countries must be addressed so that they could receive more ITN and IF fellows, but this is only possible in the much longer term.

5.4. Recommendation related specifically to ENP non-associated countries

Recommendation 12: In bilateral meetings and policy dialogues with officials from ENP non-associated countries (in particular, Morocco, Belarus), raise the issue of job security and administrative restrictions preventing researcher mobility.

The main obstacle observed in this country group was related to job security and administrative restrictions, preventing researchers from leaving the country for longer periods of time. In some cases, the regulations of institutions in the ENP non-associated countries do not allow researchers to leave on prolonged periods of mobility or training. For example, interviewees in Belarus have explained that in cases where a researcher leaves a country for a longer period, he or she can lose their position in their home institution. In Morocco, the difficulty is related to the requirements of the MSCA RISE actions, which demand that a secondment of research staff must be at least 30 days long. According to the interview evidence, in many cases, Moroccan researchers cannot leave their home institutions for such period of time due to the administrative requirements in Moroccan organisations. The interview respondents indicated that it would be more convenient, if secondments could be divided among different personnel or if the minimum period for one researcher could be reduced. We suggest that the European Commission raise this issue in bilateral meetings with officials from ENP non-associated countries and ask them to loosen administrative restrictions preventing researcher mobility.

5.5. Recommendation related specifically to developing countries

Recommendation 13: Strengthen EU R&I presence in the developing countries. Consider assigning new S&T counsellors to the developing countries with the highest R&I potential and setting up a EURAXESS office for Africa.

In many developing countries (e.g. Kenya, Ethiopia, ASEAN countries, Pakistan) EU Delegations do not have a dedicated S&T Counsellor. The European Commission could consider delegating S&T Counsellors to countries that have substantial R&I capacities and are increasingly participating in the EU programmes such as Kenya, Ethiopia, and one of the ASEAN countries (Vietnam or Malaysia) with a possibility to cover the whole region. In cases, when this is not feasible or desirable, the EC should ensure support to EU Delegations by:

- establishing better communication channels between the EU Delegations and the EC staff responsible for S&T in specific countries and regions;
- preparing and distributing material ready to use by the EU Delegations (e.g. video clips, slide presentations, leaflets, overviews of country's R&I systems, written testimonials of MSCA alumni); and
- possibly organising training and awareness courses for EU Delegation staff voluntarily promoting Horizon 2020 or more specifically the MSCA.

Coordinated action between the EU institutions is necessary in order to achieve its R&I goals and ensure better visibility of its funding programmes, including the MSCA. In most African countries and Pakistan, EU Delegations are the only actors that have a

potential to promote the MSCA because there are no dedicated MSCA NCPs and no EURAXESS presence.

Africa is currently the largest region, which is not covered by the EURAXESS network. Most African countries do not have any organisation or persons locally that would promote the MSCA. In Africa, there are currently only 7 countries that have the MSCA NCPs. Therefore, we suggest setting-up a EURAXESS Africa. The need to have a EURAXESS office in Africa was already suggested in the Roadmap for EU–South Africa S&T cooperation.

Annex 1: Case study reports

Annex 2: A list of good practice cases

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