



# **Study on Fostering Industrial Talents in Research at European Level**

Executive Summary

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*Research and  
Innovation*

# Study on Fostering Industrial Talents in Research at European Level

## *Executive Summary*

Written by:

Mark Whittle



## Table of Contents

1	Introduction .....	2
1.1	Study objectives .....	2
1.2	Definition of intersectoral mobility .....	2
1.3	Study scope .....	2
1.4	Methodology.....	2
2	Key findings .....	4
2.1	Key findings – baseline assessment.....	4
2.2	Overall conclusions – baseline assessment .....	7
2.3	Key findings – gap analysis .....	7
2.4	Feasibility study and options definition / analysis .....	8
2.5	Recommendations at EU level for The European Commission.....	9
2.6	Recommendations for managers of individual intersectoral mobility schemes .....	10

**Please note that a list of acronyms can be found in the Final Report.**

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**This Executive Summary outlines the findings from a *Study on Fostering Industrial Talents in Research at European Level* coordinated by EPRD, together with the Centre for Strategy & Evaluation Services, inova+ and PPMI Group.**

## **1 Introduction**

### *1.1 Study objectives*

The overall study objective is to examine the feasibility of additional EU-level initiatives to increase the participation of academic and industrial researchers in intersectoral mobility ("ISM") in Europe. The specific objectives are to:

- Produce an inventory of existing literature on ISM in Europe and selected third countries;
- Identify up to 10 examples of formal national ISM schemes per country, and examples of mobility between sectors taking place through informal means;
- Identify and analyse the barriers and drivers of the uptake of ISM, including the availability of, and access to support structures, guidance and training and funding mechanisms for researchers;
- Ascertain the level of ISM among researchers in the EU-28 Member States, EFTA/ EEA and candidate countries, and between the EU and third countries;
- Identify five good practice examples of ISM schemes and critically evaluate these, highlighting the strengths and weaknesses and examining the scope for replicability<sup>1</sup>;
- Develop recommendations as to what form possible further EU-level interventions to increase the intersectoral mobility of researchers – if deemed necessary – might take.

### *1.2 Definition of intersectoral mobility*

ISM refers to all possible bridges between universities, industry, and the public and third sectors. In a narrower sense, ISM is defined as the physical mobility of researchers between one sector (academia) and another<sup>2</sup>. Researcher mobility may also involve partial mobility (for instance, spending one day per week in an enterprise and four days carrying out PhD research at university) or take place virtually (e.g. co-location, carrying out a collaborative research project within industry, but remaining on-site within academia).

### *1.3 Study scope*

The study's **thematic scope** covers the mobility of researchers between **academia** (e.g. universities, other types of higher education institutions and publicly-funded research institutes) **industry** (e.g. SMEs and large firms) the **public sector** (e.g. national government, local authorities, and public institutions) and the **third sector** (NGOs, community organisations, including arts and cultural). The **geographic scope** covers the EU-28, EEA and EFTA countries, the Associated Countries ("AC") participating in Horizon 2020 and international comparator countries such as the **USA, Japan, Canada, South Korea, Australia, Singapore** and the **BRICs (Brazil, Russia, India, and China)**.

### *1.4 Methodology*

The methodology required a detailed baseline assessment to map national examples of formal and informal mobility schemes taking place, and a review of existing EU programmatic and funding support for ISM. This led to the development of a gap analysis and responses to the research

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<sup>1</sup> It was agreed with DG RTD that since no individual ISM scheme has all the characteristics of an ideal scheme, the case studies would adopt a cross-comparative approach by type of mobility. This still focuses in on individual dedicated ISM schemes.

<sup>2</sup> Definition adapted from Vandeveld, K.: "Intersectoral Mobility. ERAC Mutual Learning Workshop on Human Resources and Mobility", 2014. [https://cdn1.euraxess.org/sites/default/files/policy\\_library/report-intersectoral-mobility.pdf](https://cdn1.euraxess.org/sites/default/files/policy_library/report-intersectoral-mobility.pdf)

questions. A feasibility of the scope for further EU intervention to strengthen participation in ISM was then undertaken.

The data collection approach consisted of desk and field research, namely: 1) a comprehensive review of previous literature e.g. studies and evaluations relating to ISM 2) an extensive interview programme with >100 stakeholders participating in ISM or involved in scheme design, covering circa 50 countries and 3) three online surveys with i) higher education institutions and research institutes ii) industry and private sector research institutions and iii) individual researchers. The survey response overall was 105<sup>3</sup>. Nevertheless, sufficient qualitative data was gathered through the interview programme to address the key research questions.

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<sup>3</sup> Other than survey fatigue, one of the reasons for a low response was that the survey was targeted mainly at those that have participated in a formal ISM scheme, which limited the target cohort.

## 2 Key findings

### 2.1 Key findings – baseline assessment

The purpose of the baseline assessment was to identify what types of national ISM schemes already exist, and to analyse their key characteristics, size and scale. In total, more than 270 different schemes were identified across the EU-28, associated countries and internationally. Two types of schemes were identified, firstly, dedicated ISM schemes where intersectoral mobility is a central feature and secondly, schemes which allow scope for cross-sectoral mobility but this is not the primary focus. Subsequently, having completed the national scheme mapping, to inform the gap analysis, an assessment of existing provision of EU schemes<sup>4</sup> to facilitate researcher mobility (including ISM) was undertaken. The drivers, challenges and obstacles to participation in ISM were also analysed. On the demand side, the study examined the motivations of researchers in taking part in formal and informal ISM and for different stakeholders participating in and involved in the setting-up, management and implementation of ISM schemes.

#### 2.1.1. The demand-side of intersectoral mobility

There is a lack of previous studies to assess the level of demand among industry for PhD and post-doctoral level researchers and a corresponding lack of data. However, based on qualitative assessment, the research found that:

- In countries with a longer-established tradition of industry-academic cooperation, there is evidence of **strong demand for PhD and post-doctoral researchers among industry**, especially for researchers in STEM subjects.
- In the public and third sectors, there is **stronger demand for researchers in non-STEM subjects, social sciences, arts and humanities**.
- There is particular **demand for PhD and doctoral level researchers in specialist skills shortages areas**, such as in the ICT domain, in specific sub-sectors such as programming and cryptography.
- There is a **higher level of awareness among larger firms than SMEs about the benefits of engaging with PhD and post-doctoral researchers through ISM to recruit the best industrial researchers to drive future growth**. Some large firms sponsor ISM schemes and others actively participate in industrial PhD and fellowship schemes.
- **Many SMEs remain unaware about the potential benefits of recruiting PhD and / or post-doctoral researchers**. Although attitudes are changing, a significant percentage of smaller companies view PhDs as being too 'academic', and the research skills acquired as being too theoretical to be applied in industry.
- In some industries, however, **demand for post-doctoral researchers to carry out industrial research projects is relatively limited**. There is rather a need for industry to recruit bright Masters and PhD graduates with transferable skills that help to strengthen their employability to work on company-specific challenges.
- There is, in some countries, a **lack of interest among researchers in developing a career outside of the academic setting**. However, given the increasing supply of doctoral and post-doctoral researchers, there is increased pressure on researchers in academia to open their horizons to a non-academic career.

#### 2.1.2. Supply side - prevalence of ISM schemes by sector and geographic coverage

- **There is low awareness and understanding about the term "intersectoral mobility" among many stakeholders.**
- **There are major variations in the number of formal ISM schemes across the EU-28 operating at national level.**

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<sup>4</sup> This covered the Marie Skłodowska-Curie Innovative Training Networks (MSCA ITN), the SME Associate Pilot, and the European Institute of Innovation & Technology (EIT)'s Knowledge and Innovation Communities (KICs), which offer Masters and Doctoral courses and the European Structural & Investment Funds (ESIF).

- **The EU is the only financing source for schemes which combine intersectoral and international mobility. Most national schemes are small-scale and only operate domestically.**
- **There are proportionately more ISM schemes targeted at industry than at the public sector and third sector.**

#### 2.1.3. *Funding of ISM*

- **The majority of EU Member States do not have a dedicated national funding system to support formal ISM schemes. There are however a number of significant-scale publicly-financed national funding schemes to support ISM.**
- **A number of different national public and private funding sources have financed the setting up and operation of ISM schemes operating in individual EU and associated countries.**
- **In many EU-13 countries, but also some EU-15 countries (e.g. Germany), the main funding source to promote ISM is through dedicated EU-funded schemes, namely the MSCA's ITN which provides European Industrial Doctorates and European Joint Doctorates, the MSCA COFUND, the EIT KICs and the SME Associate Pilot.**

#### 2.1.4. *Scheme design, management and implementation*

- There were found to be a variety of different approaches to scheme design, such as one-two year Fellowships and three-four year full industrial PhD schemes, as well as internships and placements involving much shorter periods of mobility.
- It is difficult to generalise about scheme design since there are a wide heterogeneity of schemes (reference should be made to the case studies, which show alternative approaches).
- The most effective approach to scheme design and implementation was found to prioritise flexibility over a prescriptive approach.
- Regarding scheme management, good practice suggests the need for a minimum of one dedicated scheme manager with a strong understanding of both industry and academia (or other sectoral) needs, able to monitor scheme implementation and to provide practical, hands-on support to researchers and institutional and company participants.

#### 2.1.5. *Monitoring and evaluation*

- The best schemes undertake periodic reviews and / or evaluations of scheme implementation to assess how effectively schemes are operating (see case studies and section on evaluation practices).
- However, a general problem identified is the lack of systematic evaluation and monitoring and the absence of sufficient attention to indicators from the outset of scheme implementation. This is partly due to the small size and fragmented nature of many schemes.
- Longitudinal assessment of the impacts of participation on researchers and on institutional/ organisational participants would help to strengthen the evidence base attesting to the benefits of ISM.

#### 2.1.6. *Good practices in intersectoral mobility*

A large number of good practices were identified and these are highlighted in detail in the five case studies (see standalone case study report). Examples of good practices are:

- The majority of schemes rely on a combination of **formal and informal skills and training**. Among the benefits for researchers and HEIs of such training were:



strengthening transferable skills for employability, and making it easier to make the transition from academia to the non-academic sector.

- Regarding **supervision arrangements**, well-managed schemes ensure that doctoral researchers have both an academic and industry supervisor responsible for monitoring their mobility experience.
- The **co-funding of schemes between the public and private sectors** is an effective practice, since schemes where the private sector has made a contribution towards the costs of recruiting PhD researchers were viewed especially positively in terms of their benefits for researchers and industry participants. Co-funding also tends to ensure buy-in from all parties involved.
- **Evaluation and monitoring** should be built into scheme design from the outset.

## 2.2 Overall conclusions – baseline assessment

Overall, there are **low levels of awareness about the concept of intersectoral mobility**, because the term is not widely used. More should be done to raise awareness among researchers and stakeholders that could potentially benefit from participating in ISM.

Whilst across the countries within scope, there were found to be a high number of schemes dedicated to intersectoral mobility operating at national level, this masks **considerable variation in the provision of formal schemes across the EU-28 and H2020-associated countries**. Accordingly, due to the lack of national investment in such schemes, some countries (especially those eligible for widening participation) are currently over-dependent on EU funding to facilitate researcher mobility. Since EU schemes include a mandatory requirement to take part in international mobility, strengthening participation in ISM through EU schemes as they are currently designed may exacerbate the risk of brain drain in many EU-13, and at least some associated countries.

**There are many tangible and intangible benefits of taking part in formal and informal ISM.** ISM schemes studied have led to many different benefits within the knowledge triangle ecosystem for researchers, industry and academia, and for the public sector and third sector. The nature and magnitude of benefits varies depending on the stakeholder type:

- **Researchers** - taking part in ISM gain valuable experience through mobility periods, and acquired transferable skills to improve their employability;
- **Industry and SMEs** – access to high-quality top research talents for industrial research purposes, opportunity to strengthen collaborative relationships with universities and research institutes.
- **Public sector** – access to high-quality researchers to solve problems and challenges relating to public service delivery and public policy
- **Third sector** - access to high-quality researchers to solve problems and challenges relating to national and international NGOs, CVOs etc.

There are a wide variety of **different types of outcomes from ISM**, some of which are measurable. However, many indicators were found to be predominantly outputs rather than results of impacts. Nevertheless, there are some interesting examples of outcomes, such as IPR generated, new revenue streams from licensing arrangements, and positive outcomes for researchers such as enhanced employability prospects and higher salaries.

A further finding was that there would be strong value in having a more holistic EU-level approach to promoting increased participation in ISM to strengthen the coherence of existing EU researcher mobility initiatives, some of which promote such mobility. These different initiatives would benefit from being branded under a common umbrella to heighten awareness about ISM.

## 2.3 Key findings – gap analysis

The purpose of the gap analysis was to ascertain how far there are gaps in the availability of formal ISM schemes by country, and type of mobility by sector. The findings were that:

- **Access to national ISM schemes by researchers is not uniform, since there is geographic unevenness in the number of dedicated national ISM schemes.** There are very few dedicated ISM schemes in EU-13 countries, where industry-academic cooperation is generally less well developed.
- There was found to be an **absence of appropriate framework conditions** in many EU countries (especially countries eligible for H2020 'widening participation' support). Among the framework conditions necessary for intersectoral to flourish are: a long and well-established culture of intersectoral collaboration, mechanisms to facilitate joint industry-academic cooperation, the availability of R&I tax incentives to recruit doctoral/ post-doctoral researchers.
- Whilst in some countries, ISM schemes between industry and academia are relatively well-developed, there has been **insufficient policy importance attention given to researcher mobility between academia and other sectors.**

- There is a lack of **inter-scheme connectivity** since many schemes are very small in scale and therefore the opportunities for scheme managers to engage in partnership working, information and data exchange about outcomes and the exchange of experiences and good practices is presently being lost. One possibility to overcome this problem could be to provide EU funding to enable scheme managers to cooperate more closely in future.
- There is insufficient attention being given to **preparatory training for researchers** before they undertake intersectoral mobility experiences. Such training could help open their horizons to undertaking a mobility period in another sector and equip them with skills to strengthen their transferable skills. There could also be a need for industry training and to provide general information for participants in schemes from other sectors as to how to best make use of a visiting researcher, how best to use their time and expertise etc.

Overall, the findings from the gap analysis suggest that whilst there are many examples of national formal ISM schemes in some countries, and evidence of good practices in scheme design, management and operation, there is insufficient access for researchers in all countries to take part in ISM through existing national schemes. Very few countries are making national resources available to support ISM, raising question marks as to the sustainability of existing schemes, and making it more difficult to increase overall levels of participation in ISM across the EU. This suggests that there is a rationale for further EU intervention. Possible options in this regard are considered under 2.4 – feasibility study.

#### *2.4 Feasibility study and options definition / analysis*

The feasibility study considered a number of questions relating to possible further EU intervention in future to strengthen participation in ISM. An options analysis was developed based on the findings from the baseline assessment and gap analysis. The options defined were:

**Option 0 – No change.**

**Option 1 – Mainstreaming intersectoral mobility as a horizontal theme.**

**Option 2 – Set up a new EU funding umbrella programme dedicated to promoting intersectoral mobility.**

**Option 2.1 – Sub-action: Industrial Fellowships for Excellent Researchers.**

**Option 2.2 – Sub-action: Intersectoral mobility placements and internships.**

**Option 2.3 – Sub-action: Intersectoral mobility between academia and the public sector and third sectors.**

**Option 2.4 – Sub-action: Intersectoral mobility to increase opportunities for researchers in non-STEM subject disciplines to undertake mobility experiences**

**Option 2.5 – Set up a dedicated EU and national level support structure**

**Option 2.6 – Streamline the MSCA by folding in the cross-sectoral aspects into a new umbrella EU scheme dedicated to intersectoral mobility along with the SME Associate Scheme.**

**Option 3 – Sub-action to provide preparatory training and professional career development, skills and training support to intersectorally mobile researchers**

**Option 4 – Expand the SME Associate Pilot Scheme**

The findings were that no change is not a realistic option, since ISM currently has low visibility within EU programmes. The possibility of mainstreaming ISM more prominently in future programmes is a viable possibility, but under this option consideration would need to be given as to how to address identified gaps (perhaps through the introduction of new sub-actions post-2020). The series of options identified under Option 2 relating to possible new funding measures to complement existing initiatives are potentially viable and since they are not mutually exclusive could be implemented in parallel. Option 2.6 in particular would involve restructuring existing initiatives that support ISM and combining these post-2020 with the proposed new funding sub-actions outlined in Options 2.1, 2.2, 2.3 and 2.4 respectively.

The research identified sufficient grounds to justify a new sub-action to provide preparatory training and professional career development, skills and training support to doctoral researchers. Although something similar exists already through the MSCA ITN, access to training provision is confined to those awarded European doctoral awards under the MSCA and is not open to all researchers. Option 4 – expanding the current focus of the SME Associate Pilot Scheme beyond industry alone to other sectors and making it more flexible so that the emphasis in the mobility period is not on international mobility alone was also found to be viable, although the scheme should not be expanded yet until the evidence base becomes clearer as to its effectiveness (an evaluation of the pilot only commenced in January 2018).

The future role of the European Commission (EC), Euraxess, Member State authorities and individual scheme managers in strengthening the European intersectoral mobility eco-system was considered. The findings were that the EC should play an active role in heightening policy attention to ISM among national authorities, and a strong coordination role in launching and overseeing the implementation of a holistic new EU initiative on intersectoral mobility. This could combine existing researcher mobility initiatives and new funding and non-funding measures to strengthen participation in ISM. The research also found that both the European Commission and Member State authorities should be taking more active steps to ensure that the framework conditions in which ISM can flourish are made more propitious. Therefore, even if a series of new funding measures were to go ahead post-2020, steps need to be taken in the current period to mainstream ISM and to promote the strengthening of the framework conditions in which ISM can flourish at national level. The absence of sufficient access to national support structures merits consideration of expanding the role of Euraxess to provide support for setting up and operating ISM schemes under the overall coordination of the European Commission (Option 2.5).

## *2.5 Recommendations at EU level for The European Commission*

**Recommendation 1:** The European Commission should take the lead in strengthening the communication and dissemination of the tangible and intangible benefits of intersectoral mobility, for the economy and society as a whole, and for all stakeholders concerned.

**Recommendation 2:** A holistic and integrated approach to fostering greater participation in intersectoral mobility should be adopted at EU level, thus making the practice and benefits of ISM as widely known as those of international mobility.

- **Recommendation 2.1:** Strengthen coherence in European ISM-related funding schemes.
- **Recommendation 2.2:** Set appropriate framework conditions to increase formal and informal ISM schemes, making use of ERA roadmaps.
- **Recommendation 2.3:** Coordinate indicator-driven monitoring and long-term impact assessment.
- **Recommendation 2.4:** Data on the careers of doctorate holders should be collected more regularly at EU and national levels.
- **Recommendation 2.5:** Promote the exchange of experiences, knowledge and good practices between ISM schemes; support partnership working, networking and the sharing of benchmarking monitoring data.

**Recommendation 3:** Intersectoral mobility should be mainstreamed in FP9 as a “horizontal” priority, as well as implemented “vertically” through specific funding calls.

- **Recommendation 3.1:** A new EU funding umbrella programme dedicated to promoting intersectoral mobility should be set up post-2020, drawing on funding from FP9.
- **Recommendation 3.2:** Consideration should be given to the possibility of streamlining the ISM component within existing EU researcher mobility programmes post-2020 (e.g. the MSCA’s ITN and the SME Associate Scheme) into the same umbrella programme, so as to complement the establishment of new funding sub-actions and other complementary proposed measures (e.g. relating to support structures, which would include stronger EU-level coordination and improved partnership working between national authorities and between ISM scheme managers).
- **Recommendation 3.3:** A new EU co-funding scheme should also be set up encouraging the development of new small-scale regional, national and international ISM schemes, and supporting the scaling-up of existing ones.

- **Recommendation 3.4:** A new EU funding or co-funding scheme preparing for ISM should address the need for professional development training for researcher to broaden their career horizons to working in other sectors, as well as skills development during their ISM period (with a focus on skills to strengthen employability, digital skills, entrepreneurship and IPR).
- **Recommendation 3.5:** Additional financial allocations (or a reduction of co-financing requirements) to countries prioritised under the “widening participation” agenda in Horizon 2020 or in its follower FP9.
- **Recommendation 3.6:** Support non-industrial ISM and a higher take-up of ISM in non-STEM
- **Recommendation 3.7:** As an alternative to setting up a new EU funding programme with specific sub-actions, the scope of existing ISM schemes (e.g. MSCA, the SME Associate Pilot Scheme) could be expanded in order to address identified gaps in funding provision.

**Recommendation 4:** The European Commission should support the development of good practice guidance documents relating to intersectoral mobility. Examples of good practices that could be developed either into a single guidance document or into several shorter guides are:

- **Recommendation 4.1:** A Practical Guide to Intersectoral Mobility
- **Recommendation 4.2:** A Guide on IPR Issues relating to Intersectoral Mobility

**Recommendation 5:** Inspired by the European initiatives described under 2.2.2, national authorities should develop a national (industrial) research strategy that explicitly supports ISM as a mechanism for fostering industrial talents, and for strengthening industrial competitiveness over the longer term. ISM policies should be embedded in a ‘higher-level skills needs’ strategy and involve not only the industry sector but also the public and third sectors.

**Recommendation 6:** The Member States should ensure that they put in place the necessary framework conditions conducive to supporting ISM identified through this study.

- **Recommendation 6.1:** The Member States should put in place the necessary funding, incentives (including relocation support for families and tax incentives) as well as institutional arrangements to support the development and implementation of ISM schemes at national level.
- **Recommendation 6.2:** The career appraisal systems in individual HEIs should explicitly recognise the value of taking part in intersectoral mobility from a professional career development perspective.
- **Recommendation 6.3:** National governments and public sector organisations should lead by example and hire more PhD graduates themselves and encourage other sectors to recruit and retain more doctoral and post-doctoral researchers.
- **Recommendation 6.4:** The general and specific benefits of intersectoral mobility for different types of stakeholders should be familiar to all.
- **Recommendation 6.5:** Key stakeholders (policy makers, industry stakeholders, universities, companies) should be involved in designing new ISM schemes, in a dialogue on how ISM can best meet identified needs.

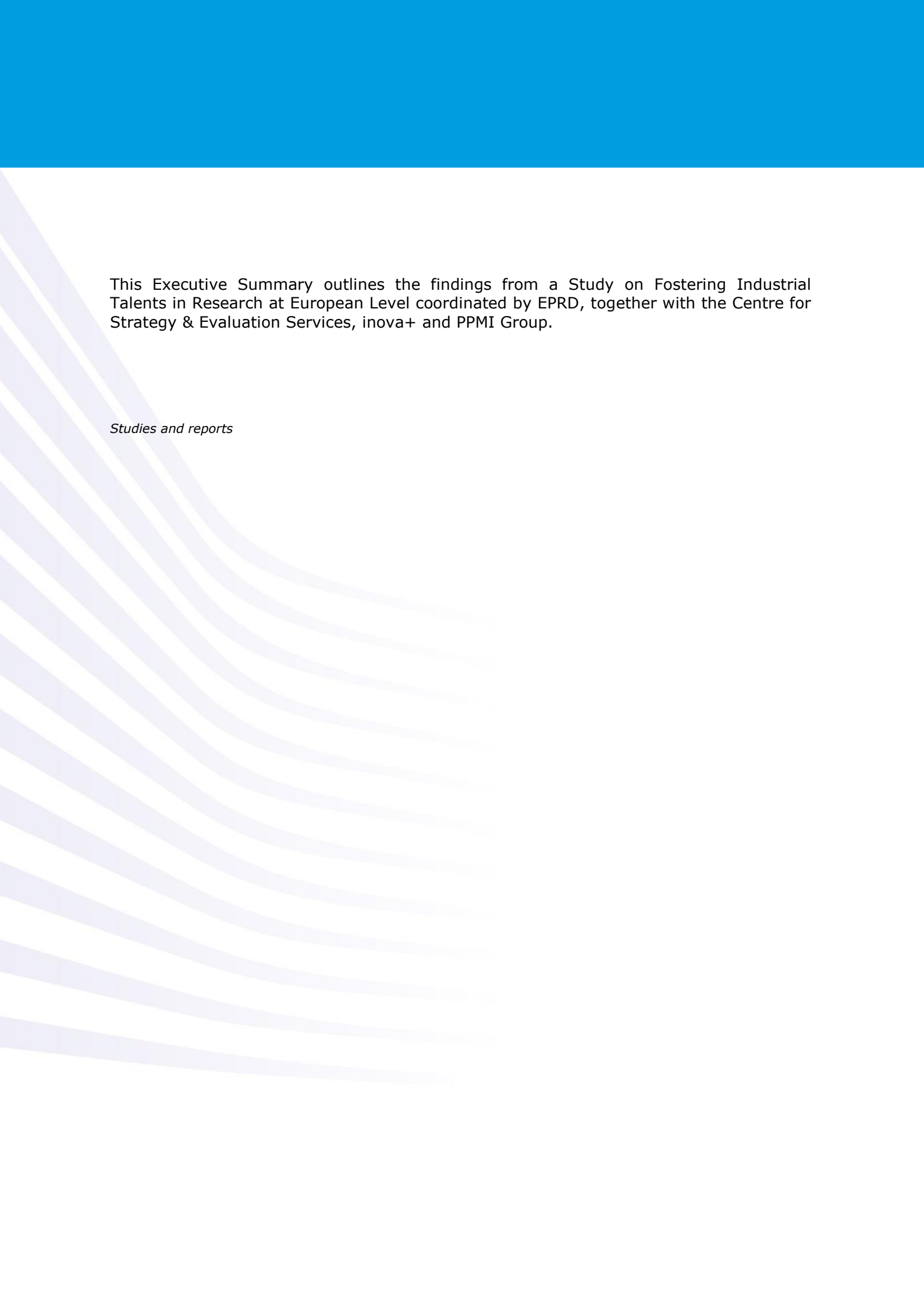
**Recommendation 7:** A stronger culture of monitoring and evaluation of intersectoral mobility schemes operating in each Member State should be promoted and/or included in their country Semester Report / annual RIO report. Lessons learned through different ISM schemes should be integrated into evaluation exercises, with attention for output data as well as qualitative outcomes.

## 2.6 Recommendations for managers of individual intersectoral mobility schemes

**Recommendation 8:** Remove any limitations in existing regulations currently impeding ISM and develop the appropriate framework conditions for successful ISM schemes.

- **Recommendation 8.1:** In designing ISM schemes between academia and industry, scheme managers should ensure that ISM schemes are sufficiently flexible to adapt to the changing circumstances on the ground during scheme implementation.

- **Recommendation 8.2:** A particular effort should be made to ensure that 'less obvious' non-academic partners are equally keen to participate as large R&D-intensive industrial companies. SMEs (and ideally also start-ups), the public sector and the service sector should be equally able to take part in ISM schemes.
- **Recommendation 8.3:** When designing ISM schemes, the employment and working conditions of academic (and industry) staff should not be unduly affected by undertaking a mobility period.
- **Recommendation 8.4:** ISM scheme managers should ensure that adequate resources are put into scheme management and administration, evaluation and monitoring.



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