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The UK's Intersectoral Mobility Landscape: Trends and Economic Impacts

Muthu De Silva, Birkbeck, University of London
Chris Dimos, University of Bath



Authors' affiliations and contact details*:

Muthu De Silva ^{PhD}, Professor, Faculty of Business and Law, Birkbeck, University of London, Email- m.desilva@bbk.ac.uk

Chris Dimos ^{PhD}, Assistant Professor, Centre for Governance, Regulation and Industrial Strategy (CGR&IS), School of Management, University of Bath, Email- C.Dimos@bath.ac.uk

*The authors contributed to this report in equal measure.

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Foreword



Rosalind Gill
Head of Policy and Engagement
NCUB

The ready movement of researchers across and between sectors of our economy is both a key driver of innovation and an indicator of the vibrancy of the R&D system. In this knowledge, policy makers and funders, universities, businesses, and researcher developers across the innovation landscape are working to create an open and pro-mobility landscape.

In 2023, the National Centre for Universities and Business (NCUB) led a Taskforce to review the extent to which researchers have access to opportunities across sector boundaries, and explore the potential for the improved exchange of skills and knowledge. The work yielded an understanding of the benefits and barriers to cross-sector moves and assessed the support available within public policy and organisations. It found a wealth of successful approaches, but also that action is needed to unlock the full potential of the workforce. At a time when innovation is crucial to achieving national ambitions, supporting our workforce in enabling it to deliver has never been more important.

Building on the 2023 evidence, this report continues to demonstrate the potential benefits and opportunities that would be afforded to researchers, employers and sectors, and the wider economy by the realisation of a better connected and mobile workforce. It assesses how the discourse within public policy has changed in recent years to highlight progress, and aids our understanding of both why and how pro-mobility systems should be developed in the future. The report also provides a framework suited to assess the benefits of mobility for individuals, businesses, and the economy as a whole.

Commissioned by the NCUB, this report supports continued advocacy and support for mobility, as we launch a one-year on milestone report.

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Background

[The Pathways to Success Report](#) was published in September 2023 by the National Centre for Universities and Business (NCUB). Its recommendations are aimed at ensuring that connections and collaboration among the UK's universities, research institutions, industry, government agencies, and other stakeholders are enhanced by empowering researchers to develop careers across these interfaces, which is a key factor in creating a more dynamic and interconnected system.

One year after the publication of the Pathways to Success Report, Prof Muthu De Silva, Birkbeck, University of London, and Dr Chris Dimos, University of Bath, have been commissioned to conceptually assess the potential economic benefits of the enactment of the NCUB's visions and associated recommendations. The two authors have conducted a desk-based study to outline the significance of mobility between universities, industry, and government agencies, the prominence of mobility in the current policy and funding landscape, pathways to economic impacts of mobility, and methods and associated limitations in measuring the economic impacts of mobility.

Executive Summary

The mobility of researchers across roles in universities, industry, and government agencies throughout their careers is key to maintaining and boosting the UK's position as a world-class research and innovation nation and to improving the quality and quantity of the impacts made by research. Mobility between university, industry, and government agencies could be considered to range from individuals permanently transitioning between sectors to those holding simultaneous affiliations across multiple sectors. The latter instance involves various mechanisms, including placements and research- and teaching-based collaborations. To make boundaries porous and take a holistic approach to mobility, it is thus important to consider the interrelationships between a wide array of different activities supporting mobility.

This report conceptually analyses the potential economic benefits of the enactment of the NCUB's recommendations, together with how the policy and funding landscape in the UK has changed owing to the integration of mobility.

NCUB Vision I: Integrated system – the UK’s funding in support of mobility

[The People and Culture Strategy](#), launched in 2021 by the UK Research and Innovation (UKRI), is a key policy publication that has mobility as its key focus. It is focused on transforming the research and innovation sector by creating a more inclusive, supportive, and dynamic environment with a particular emphasis on researcher mobility.

Before the publication of the strategy, government-led funding initiatives had an element of mobility largely centred on enhancing the transfer of knowledge between academia and industry, and any references to researcher mobility across policy documents were limited. As such, the focus was more on benefiting ‘closer to market’ research (e.g., applied research, often at higher Technology Readiness Levels¹) and industry, and the emphasis on any mobility benefits for researchers and the higher education sector was rather limited. Mobility was perceived as the outcome of government initiatives.

Yet, after the publication of The People and Culture Strategy, the tone shifted to creating an open, fair, and inclusive research culture. Therefore, mobility is now considered an integrated element of the research culture and a means for generating a myriad of benefits, rather than an end in itself. This tone shift has resulted in mobility being perceived as a catalyst for cultural change, with initiatives increasingly emphasising its role in fostering interdisciplinary collaboration and promoting a more cohesive and dynamic research environment. This cultural shift strongly aligns with the NCUB’s vision of an integrated system that supports intersectoral mobility.

The NCUB Visions II and III: Innovative Organisations and Individual Pathways

There is a wide array of mobility mechanisms and associated economic impacts. We discuss four pathways geared toward the generation of economic impacts through mobility across universities, industry, and government agencies, together with how organisations and government agencies could support such pathways.

- **Mutual student and staff movement across university, industry, and government agencies** – Temporary and indefinite student and staff movement across the spheres of universities, industry, and government agencies has been observed. Permanent moves, which involve recruitment processes, account for approximately 38% of university starters coming from, and 44% of university leavers joining, the private or public sector.

¹ Technology readiness levels (TRLs) are a method for estimating the maturity of technologies with 1 presenting basic research and 9 indicating the readiness of the technology for the market.

Yet, it has to be noted that permanent moves do not paint a full picture of intersectoral mobility and that the denominator of this figure—which accounts for the total number of recruitees and leavers—represents only a fraction of the picture. Conversely, temporary moves may involve placements, fellowships, and apprenticeships.

Moves enable both the private and public sectors to gain from the advanced knowledge and skills possessed by academics and students, while universities benefit from the commercial and socio-economic insights stemming from government agencies and industry. Such exchanges enhance the appeal of university degree programmes by boosting graduate employability. Additionally, the knowledge, networks, and resources gained as a result of these moves foster further collaboration opportunities and help universities align their research and teaching with private and public sector needs

- **Joint-research as a bridge between universities, industry and government agencies**
– Regardless of the nature of the moves—permanent, temporary, or linked to research-based contracts—individuals are all increasingly likely to engage in collaborative research, from applying for grants to delivering research outcomes and impacts.

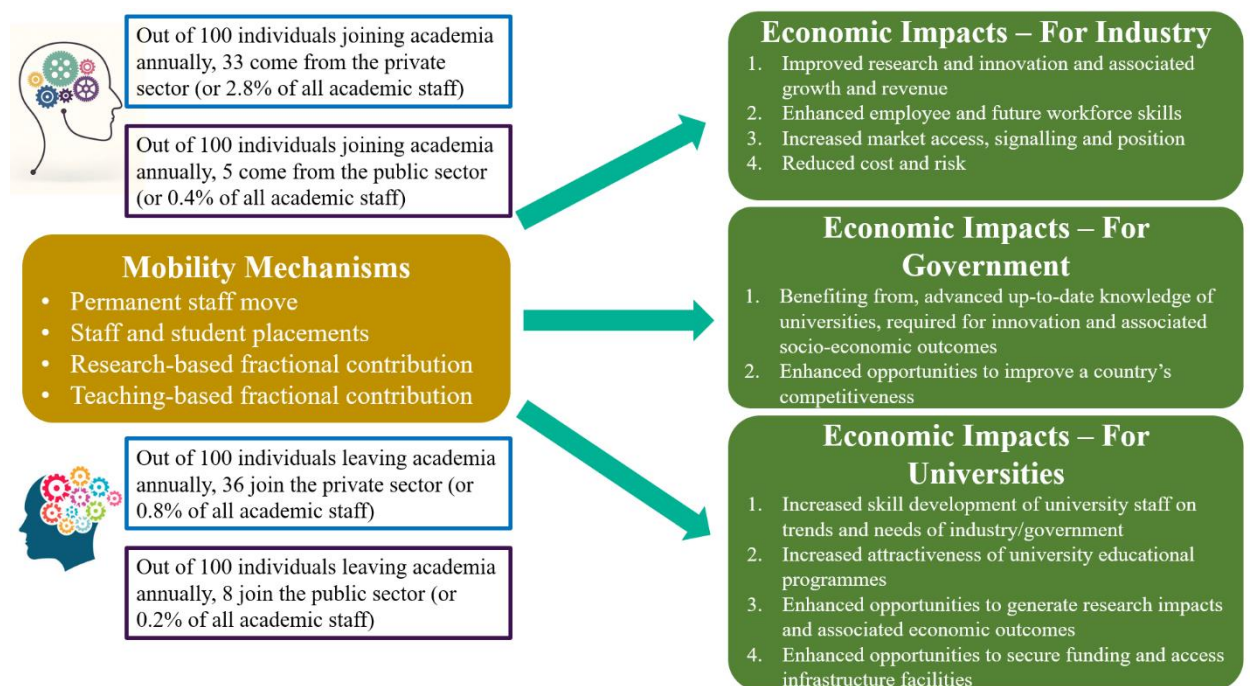
Besides reducing costs and enhancing market advantages, joint research activities drive economic impacts by fostering innovation in products, processes, business models, and services. Government collaborations with universities and industry are crucial to addressing any socio-economic challenges and improving national competitive advantages. Universities benefit economically from joint research through increased grant success, access to industry-scale R&D facilities, and enhanced educational offerings that are in line with industry and government needs, thereby improving student employment prospects.

- **Joint-research centres as bridges between universities, industry, and government agencies**
– Joint research centres offer long-term porous movement that sometimes also involves the co-location of individuals from different institutions. They are mainly established to share research infrastructure, facilitate interactions, and to enable individuals to develop long-term interactions and engage in research of mutual value.

Joint infrastructure enables the long-term, cutting-edge research and innovation that individual organizations could not achieve on their own, particularly in regard to addressing complex problems. Companies benefit from engaging in high-risk, early-stage research, which enhances their capabilities and market reputation, while universities gain access to industrial facilities and commercial opportunities, thus boosting their teaching programmes and their students' employability. By acting as funders or collaborators, governments leverage these partnerships to address complex socio-economic challenges.

- **Collaborating for skills development and training, making the boundaries between universities and industry porous** – As teaching is the main income generation activity of universities, their collaboration with industry for the training and skill development of the latter's current and future personnel is of significant value. The joint development and delivery of educational offerings make it possible to train the future workforce in ways suited to address any skill gaps and enhances opportunities for movement across institutions.

Training collaborations help industry develop advanced knowledge and skills, address any skill gaps, and build a stronger future workforce. These interactions also enhance university teaching by taking industry needs into account, improving graduate employability, and making educational offerings more attractive.



Funding availability, collaborator commitment, conducive processes, incentives, skill development opportunities, intermediaries, and benefit awareness improve the translation of these activities into economic impacts.

An economic measure of mobility

The development of a measure suited to quantify economic benefits would be useful to objectively articulate a wide array of those resulting from university, industry and government interactions. We thus propose a high-level and multi-layered framework that, conditional upon data availability, enables the identification of the economic impacts of researcher mobility by considering the benefits accrued by organisations and individuals associated with mobility-based interactions. Further, we also address critical and challenging questions pertaining to the quantification of economic benefits and the understanding of the optimal level of mobility.

Universities, businesses, and government agencies all play specific roles in the ecosystem. The aim of mobility is to benefit from the heterogeneity and key differential strengths of these organisations, rather than standardising them. Should mobility induce these organisations to deviate from their core competencies, it would make them less likely to generate optimal economic value. While the available qualitative evidence suggests the possibility of deriving a myriad of opportunities from mobility, each individual organisation is responsible for deciding its own optimal level of mobility and how to support this achievement, which will result in an integrated system suited to reach an optimal level of mobility and reap its associated economic benefits.

1. Defining Intersectoral Mobility

It has been argued that the movement of researchers among universities, industry, and government agencies throughout their careers is key to maintaining and boosting the UK's position as a world-class research and innovation nation and to improving the quality and quantity of the impacts generated by research. In its broad sense, researcher mobility refers to the movement—which may occur either over indefinite or fixed-periods—of researchers across institutions, locations, and/or disciplines ([NCUB 2023](#)).

In this report, we focus on the movement of individuals across three distinct types of institutions (i.e., institutional mobility):

- Universities: including both universities proper and other higher education institutions²;
- Government: including both central and local government agencies, but also other policy-focussed public institutions such as the centres in the 'What Works Network' or UKRI Councils; and
- Industry: including private businesses and non-governmental organisations operating in any industry.

Mobility among university, industry, and government agencies could be considered to occur along a spectrum that ranges from individuals permanently changing their affiliations to remaining simultaneously affiliated with either. The latter instance may involve various arrangements, including placements, research, and teaching-based collaborations ([Nurse Review 2023](#); Bekkers and Freitas 2008)—which include joint research, training, and knowledge exchange activities. While these various activities may generate different types of impact, what they have in common is the delivery of outcomes of mutual value through individuals from universities, industry, and government agencies spending time together. In order to ensure that mobility plays a stronger role in making the UK's research and innovation landscape competitive, it is vital to consider a wide array of these interrelated activities that make the boundaries of universities, industry and government agencies porous ([R&D People and Culture and Strategy 2023](#)).

² Under the Further and Higher Education Act 1992, a HE institution is defined as “a higher education corporation; an institution designated as eligible to receive support from funds administered by the Higher Education Funding Council for England (HEFCE), aside from further education colleges”.

Therefore, in this report, we expand our definition of researcher mobility by building on the definition of mobility found in the NCUB’s Pathways to Success Report (Exhibit 1, P 10). We do so in order to not only include formal movements of researchers across academia, government, and industry but also any ‘informal’—albeit ‘intense’—engagement of researchers across entities (universities/government/industry) other than their institutions of origin. We thus identified four different types of interrelated mobility mechanisms (Figure 1).

Figure 1: Spectrum of interrelated mobility types

	Permanent staff moves	Staff and student placements	Research-based fractional contributions	Teaching-based fractional contributions
Nature of movement	Indefinite moves among industry, university, and government agencies	Fixed periods spent in host organisations	Engaging in collaborative research, joint research centres, and/or spinouts, among others.	Engaging in executive education, training, and/or educational programme development
Affiliation	Affiliation to host organisations	Affiliated to host organisations for specified periods and then transfers back to the home organisations	While remaining affiliated to home organisations, spending percentages of FTE on research-based interactions with others	While remaining affiliated to home organisations, spending percentages of FTE on teaching-based interactions with others
Nature of engagement	While being based at host organisations, acting as boundary spanners due to previous affiliations	Closely interacting with host organisations and acting as boundary spanners	Closely interacting with project teams	Closely interacting with teaching teams

It should be noted that these different types of activities are overlapping and synergistic. For example, a placement may involve collaborative research and training while also leading to research or teaching-based fractional interaction (Figure 1). Those who have permanently moved from industry to university might be more likely to make teaching and research-based fractional contributions (Bekkers and Freitas 2008). In turn, teaching-based fractional contributions may lead to permanent staff moves or to placements. All these forms of

mobility mechanisms facilitate the development of skills, knowledge resources, and networks useful to make the boundaries porous, and of the shared organisational, cognitive, and cultural spaces required to scale-up the benefits stemming from the mobility interaction (Fernández-Esquinas et al. 2016). To make boundaries porous and to define a holistic approach to mobility, it is thus important to consider the interrelationships occurring among a wide array of different activities ([UKRI Strategy 2021- 2027, 2023](#)). Therefore, when discussing the economic contributions made by university-industry mobility, it is advisable to consider the various types of mobility and their interrelationships (Abreu and Grinevich 2013; Gulbrandsen and Thune 2017).

2. The Significance of Intersectoral Mobility

The government’s response to Sir Paul Nurse’s Review of the Research, Development and Innovation (RDI) Organisational Landscape clearly outlines the significance of encouraging ‘end- to end’ research³ to the end of generating sustainable RDI. In particular, the government’s response highlights the need to understand the benefits of RDI activities for commercial outcomes and the economy besides their academic and social value. As such, the government response promotes *“a culture change promoting openness, mutual respect, closer interaction, collaboration, and permeability of ideas, technologies and people has to occur in both business and academia.... government should take particular responsibility for driving RDI that provides societal benefit as well as economic growth”* (Nurse [Review Recommendation and Government Actions](#) 2023).

The evidence shows that cross-sector mobility fosters connections, stimulates creativity, and facilitates knowledge exchange, ultimately promoting research and the adoption of innovation ([UKRI 2024](#)). Researcher mobility has been found to foster impactful careers, benefit universities and businesses by leveraging skilled research communities, and ensure the UK thrives in the next industrial revolution through interconnected cross-sector research (Abreu and Grinevich 2013). Mobility has positive effects on research quality (Petersen 2018), spillover effects (Jonkers and Tijssen 2008), R&D and innovation and scientific output quality and quantity (Baruffaldi et al. 2020), opportunities to collaborate with highly

³ End-to-end research refers to the full life cycle of a research project, including applying for funding, conducting the research, generating impacts, engaging in commercialisation, etc.

productive new coauthors, the exploration of new topics (Baruffaldi et al. 2020), and teaching offerings that integrate industry trends and needs (De Silva 2016).

The factors discussed in the literature in relation to the generation of impact through mobility include university/industry proximity (e.g., geographical, institutional, or cognitive) (Appelt et al. 2015; Rossi et al. 2024), any resources dedicated to mobility and R&D (Appelt et al. 2015), the relational skills of universities and business partners (De Silva and Rossi 2018), the encouragement provided by a country's policy landscape (De Silva et al 2023) the provision of appropriate research equipment and infrastructure (Ivancheva and Gourova 2011), the commitment of senior leadership, and the presence of intermediaries and boundary spanners (Rosli et al 2018).

3. The NCUB Visions and Recommendations

The NCUB's recommendations are aimed at government agencies, funders, universities, businesses, and individual researchers. As such, they encourage them to seize any opportunities to construct a more interconnected research and innovation system suited to facilitate the research careers needed to address global challenges in the decades ahead. By taking action in relation to these six recommendations, we can establish a genuinely **integrated system**, foster **innovative organizations**, and empower **individual trajectories**.

The report outlines six recommendations in three categories:

Integrated system. A research and innovation system that is internationally renowned for the opportunities it offers researchers to build exciting careers across sectors.

1. A design policy that embeds mobility – The Government should build on the proposals set out in the 2021 R&D People and Culture Strategy to make the enhancement of intersectoral mobility a key design principle of the UK research and innovation system.
2. Scale national support for mobility – Public research funders should ensure that all researchers—regardless of discipline, sector, career stage, funding source, or background—have opportunities to access public support for intersectoral mobility.

Innovative organisations. Institutional environments that recognise and reward skills, knowledge, and networks on the basis of their value, and actively facilitate mobility.

3. Facilitate mobility – Universities and businesses should create clearer, more formalised mechanisms suited to facilitate the seamless movement of researchers across sectors.

4. Reward mobility – Universities and businesses should clearly recognise and reward any skills and experiences gained across different sectors.

Individual pathways. Career pathways across sectors that are directed by the ambitions and interests of individuals and informed by the full breadth of the available opportunities.

5. Promote career pathways across sectors – Universities and businesses should help researchers understand and be prepared for the full range of exciting career pathways provided by the UK’s research and innovation system.

6. Pursue progression through mobility – All researchers should actively pursue career paths suited to provide them with the breadth of skills and experiences they need to meet their ambitions; and all research managers and supervisors should encourage and advocate for their teams to do the same.

4. NCUB Vision I: Integrated system – The UK’s funding support for mobility

The People and Culture Strategy, launched in 2021 by UK Research and Innovation (UKRI), is focussed on transforming the research and innovation sector by creating a more inclusive, supportive, and dynamic environment with a particular focus on researcher mobility. Given the importance of the work, we analysed the shift in tone and emphasis on mobility across government-led initiatives and policy documents that followed the publication of the People and Culture Strategy. Our analysis revealed such a shift in regard to priorities, framing, and intended outcomes.

4.1. Government Funding Initiatives for Mobility: Before and After the Launch of the People and Culture Strategy

In Tables 1 and 2, we capture the extent to which government-led funding initiatives favour researcher mobility. We selected for analysis those government funding and policy initiatives directly or indirectly aimed at supporting mobility, as per our definition. Table 1 focusses on temporary student or staff placements, and Table 2 on joint collaborations. To understand the extent to which mobility and/or its benefits are explicitly referenced, we searched for the term ‘mobility’ and related ones—such as ‘knowledge transfer’, ‘knowledge exchange’, and ‘network’—in the initiatives’ descriptions. Where a section is dedicated to discussing mobility and/or its benefits, we perceived this as an indication that the initiative prioritises mobility. Where the mechanisms for mobility are explicitly set out (e.g., secondment, research collaboration, etc.) we made a record of them in the Tables. Finally, we also captured whether the initiatives explicitly provide references to researcher career development, reach (national or international), funding amount, and mobility direction.

Pre-Strategy Focus

Before the publication of the strategy, any element of mobility contained in government-led funding initiatives was largely centred on enhancing the transfer of knowledge between academia and industry. Programmes like the Knowledge Exchange Fellowships (funded by the NERC), the Prosperity Partnerships, and the Knowledge Transfer Partnerships were focussed on enabling researchers to engage with industry partners to drive innovation and commercial outcomes. As such, their focus was more on benefiting ‘closer to market’ research that would benefit industry, and any emphasis on the benefits that mobility could bring to researchers and the higher education sector was rather limited.

Initiatives such as the Innovation Scholars Secondments and the EPSRC Open Plus Fellowships were primarily seen as mechanisms whereby individual researchers could gain diverse experiences and develop interdisciplinary skills. In such a career development framework, mobility was framed as a pathway to career growth, emphasising the benefits of varied experiences for researcher development. As such, mobility was supported with the expectation that it would automatically generate the expected benefits. Mobility was perceived as the outcome of these initiatives.

To some degree, we found that these schemes had a strong focus on specific disciplines, with interdisciplinary initiatives being relatively less common.

Post-Strategy Focus

The People and Culture Strategy introduced a stronger emphasis on inclusivity, equality, and diversity in mobility initiatives. The tone shifted from solely focussing on mobility competitiveness and research excellence to creating an open, fair, and inclusive research culture. Therefore, mobility is now considered to be an integrated element of the research culture and a means for generating a myriad of benefits, rather than an end in itself.

This change has been reflected in subsequent mobility initiatives, which emphasise not just the movement of talent but also the need to address any barriers to participation across different demographic groups. Also, mobility is now closely associated with specific deliverables such as research, addressing business challenges, or local issues. Mobility is now also viewed as a means to induce cultural change, with initiatives increasingly highlighting the role played by mobility in fostering interdisciplinary collaboration while promoting a more integrated and dynamic research environment. There has also been an increase in interdisciplinary initiatives—as opposed to tightly disciplinary-focussed ones—focussed on specific challenges.

Initiative	Before / After the P&C Strategy	Mention of 'Mobility' or related terms	Priority on 'Mobility'	Extra funding for researcher mobility	Direction of mobility	Duration of mobility	Emphasis on career development	Reach - International / National	Mechanisms for supporting mobility	Funding (net contribution)	Funder (representation of sectoral focus)
Knowledge Exchange Fellowships (NERC)	Before	No	No	No	n.a.	n.a.	No	National	No	Varying	NERC
Future Leaders Fellowships	Before	Yes	No	Yes	All	Unknown	Yes	National	Building networks and collaboration	£300,000 to over £2m	UKRI wide
The Academy of Medical Sciences Future Leaders in Innovation, Enterprise and Research (FLIER) programme	Before	Yes	Yes	Yes	All	2 years (15 days per year)	Yes	National	Research Collaboration	Open	Academy of medical Sciences
Innovation Scholars secondments	Before	Yes	No	Yes	ROs to industry	6-36 months	Yes	National	Secondment	£200,000	AHRC
Innovation Fellowships Scheme	Before	Yes	Yes	No	HEIs to industry / government	Between 6-12 months	No	National	Secondment	£96,000	British Academy - Humanities and Social Sciences
EPSRC open plus fellowship	Before	Yes	No	No	All	Up to 60 months	Yes	National	Secondment	Unknown (more than £400k)	EPSRC
Turing Artificial Intelligence Fellowships	Before	Yes	Yes	No	HEIs to Institute (public)	Up to 5 years	Yes	International	Collaboration	Up to £5m	UKRI wide- AI specific
The Royal Academy of Engineering Industrial Fellowships	Before	No	No	No	HEIs to industry and vice-versa	Up to 2 years	No	National	Collaboration	Up to £100k	The Royal Academy of Engineering

Initiative	Before / After P&C Strategy	Mention of 'Mobility' or related terms	Priority on 'Mobility'	Extra funding for researcher mobility	Direction of mobility	Duration of mobility	Emphasis on career development	Reach - International / National	Mechanisms for supporting mobility	Funding (net contribution)	
The Royal Society Entrepreneur in Residence Scheme	Before	No	No	Yes	HEIs to industry	2 years	Yes	International	Knowledge Exchange	Up to £50k	Science and Engineering
UKRI's statement of expectations of postgraduate training	After	Yes	Yes	Yes	HEIs to industry	Unknown	Yes	International	Unclear	n.a.	UKRI wide
Internship, fellowships, apprenticeships, member of the expert advisory board of Government Office for Science	After	Yes	Yes	No	HEIs to Government	Varying	No	National	Secondment / advisory committee	Varying	Science, Engineering and UKRI wide
Flexible Talent Mobility Accounts (FTMA)	After	Yes	Yes	No	All	Up to 6 months	Yes	International	Placements and exchanges	£330,000	BBSRC
UKRI Policy Fellowships	After	Yes	Yes	Yes	HEIs to Government / What Works Centres	18 months	No	National	Secondment	£136,000	UKRI wide
Parliamentary Thematic Research Leads	After	Yes	Yes	No	HEIs to Parliament	24 months	No	National	Secondment	£200,000	Interdisciplinary

*Colours denote specific focus areas (A) grey – the period of publication; (B) green – specific dimensions of mobility; (C) yellow- associated with individual researchers; (D) orange – reach of the initiative and (E) blue – characteristics associated with the scheme

Table 2. Researcher Mobility Initiatives: Joint Collaboration

Initiative	Before / After P&C Strategy	Mention of “Mobility” or related terms	Priority on “Mobility”	Extra funding for researcher mobility	Direction of mobility	Duration of mobility	Emphasis on career development	Reach - International / National	Mechanisms for supporting mobility	Funding (net contribution)	Funder (representation of sectoral focus)
Impact Acceleration Accounts	Before	No	No	No	HEIs to industry / government	n.a.	No	National	Engagement / Knowledge exchange	Up to £3.3m	AHRC, BBSRC, EPSRC, MRC, and STFC
Prosperity Partnerships	Before	No	No	No	All	n.a.	No	National	Unknown	Varying	EPSRC
Knowledge Transfer Partnerships	Before	Yes	Yes	Yes	HEI to industry	12 to 36 months	Yes – career development of the graduate	National	Research collaboration	A typical KTP project delivers a package of support valued at around £80,000 to £100,000 per year.	UKRI wide
Analysis for Innovators	Before	No	No	No	HEIs to industry	Up to 6 months	No	National	Research collaboration	£100,000	Innovate UK/UKRI wide
Local Policy Innovation Partnerships	After	No	No	No	Any direction between devolved government, local businesses and local authorities	4 years	No	National	Unclear within the Partnership	Up to £50,000	UKRI Wide

**Colours denote specific focus areas (A) grey – the period of publication; (B) green – specific dimensions of mobility; (C) yellow- associated with individual researchers; (D) orange – reach of the initiative and (E) blue – characteristics associated with the scheme*

4.2. Government Policy Documents: Before and After the launch of the People and Culture Strategy

In Table 3, we capture the extent to which policy reports on topics pertaining to the UK's R&D landscape and strategy take into account researcher mobility. As we had in regard to the initiatives, we also searched for the term 'mobility' and related terms—such as 'knowledge transfer', 'knowledge exchange', and 'network'—in the policy reports to understand the extent to which they explicitly referred to mobility and/or its benefits. Where we found a discussion on mobility and/or its benefits, we perceived it as an indication of the policy report prioritising mobility. This is often the case for reports published after the People and Culture Strategy, which they acknowledge. In addition, we also capture whether the policy reports explicitly discussed the career development of researchers engaged in mobility as well as the potential benefits brought by mobility to the UK economy.

Pre-Strategy Focus

Before the publication of the People and Culture Strategy, there were references to researcher mobility across policy documents and government-led initiatives. Policy documents published before the launch of the Strategy made only limited references to mobility and, when they did, it was within the context of global competitiveness and research excellence.

For example, the 'Our plan for growth: science and innovation' was focussed on more traditional narratives for research and innovation, which revolve around their importance in achieving long-term growth through increases in productivity, investment issues in R&D arising from market failures, and ways of assessing the performance of the knowledge system. No references were made to researcher mobility, researcher careers, or any EDI issues.

A similar picture was painted by two more reports—the 'Research and Development Pipeline' and the 'Innovate UK action plan for business innovation 2021 to 2025'. The former, although it did discuss the UK R&D workforce and the skill demand in the R&D sector, did not consider researcher mobility or researcher careers. The latter, although it did touch on EDI topics, did not discuss researcher mobility.

Post-Strategy Focus

Following the publication of the People and Culture Strategy, policy documents have increasingly adopted a tone in line with it, placing a greater emphasis on inclusivity, sustainability, and societal impact. An excellent instance of this is the UK Research and Innovation's (UKRI) strategy for 2022 to 2027. One of the six objectives of the UKRI is the development of 'World-class people and careers'. In regard to this objective, the UKRI emphasises its commitment to "*incentivise diverse, flexible careers, so that people can pursue great ideas without barriers, moving easily between disciplines, sectors, business and academia*" (UKRI, 2022:15)

In addition, the UKRI commits itself to incorporating EDI principles into the design of funding calls, peer review processes, and the selection of advisory panels. The aim here is not only to provide everyone with opportunities, but also to reap the benefits from a diverse range of perspectives and experiences.

This highlights a shift towards a more inclusive research and innovation landscape, with an emphasis on facilitating researcher mobility not only between industry and academia but also across disciplines. The Strategy outlines how this can be realised by providing incentives and support for researcher mobility and knowledge exchange activities. Another example comes from the 'Global mobility of research and innovation personnel: evidence report'. Besides discussing the benefits of mobility for the UK economy, the report emphasises the benefits for researchers' careers, including research autonomy and striking a balance between teaching and research. In addition, the report makes references to EDI policies in mobility aimed towards increasing the 'family-friendliness' of academia. The report also stresses the importance of increasing international mobility by attracting overseas talent.

Table 3. Policy Reports on R&D (Before / After the People and Culture Strategy)

Report	Before / After P&C Strategy	Priority on 'Mobility'	Emphasis on careers	Emphasis on UK economy benefits	Extroversion (National / International)	Acknowledging the P&C Strategy
UK Research and Development Roadmap	Before	Yes	Yes	No	Both	n.a.
Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy	Before	No	No	No	Both	n.a.
25 Year Environment Plan	Before	No	Yes	No	National	n.a.
OUR PLAN FOR GROWTH: SCIENCE AND INNOVATION	Before	No	No	No	Both	n.a.
WHY SHOULD THE TAXPAYER FUND SCIENCE & RESEARCH?	Before	No	No	No	Both	n.a.
Research and Development Pipeline	Before	No	No	No	National	n.a.
REF 2021	Before	No	No	No	International	n.a.
Industrial Strategy: building a Britain fit for the future	Before	No*	No	No	International	n.a.
UKRI corporate plan 2020/21	Before	No	No	No	International	n.a.
UK R&D Roadmap	Before	Yes	Yes	Yes	International	n.a.
UK Innovation Strategy: leading the future by creating it	On same year	No	No	No	International	Yes
National space strategy	On same year	No	No	No	Both	No
Innovate UK action plan for business innovation 2021 to 2025	On same year	No	No	No	Both	No
UKRI strategy 2022 to 2027: transforming tomorrow together	After	Yes	Yes	No	International	Yes
Research, development and innovation (RDI) organisational landscape: an independent review	After	No	No	No	National	Yes
Global mobility of research and innovation personnel: evidence report	After	Yes	Yes	Yes	International	Yes
REF 2028: initial decisions and issues for further consultation	After	No	No	No	National	No
Harrington Review	After	No	No	No	International	No
UK Research and Innovation corporate plan 2023 to 2024 update	After	Yes	Yes	Yes	International	Yes
Reforms to People, culture and environment indicators in REF 2029	After	No	No	No	National	No
Skills England	After	No	No	No	National	No

*Priority on social mobility but not on researcher mobility.

5. NCUB Visions II and III: Innovative Organisations and Individual Pathways

To understand the extent to which researchers move between academia and industry/government (public sector), we used data drawn from the Higher Education Statistics Agency (HESA). Table 4 shows the inflows and outflows affecting the UK’s HE academic staff population over the 2022/23 academic year (the most recent available data). The table refers only to the “permanent” movements (i.e. The first of the four types of mobility presented in Figure 1, p.11 of this report) within the UK (i.e., it excludes international mobility).

Out of all the newcomers to UK HE institutions (i.e., those recruited to academia) over the 2022/23 academic year, approximately 4.4% came from the public sector and 31.5% from the private sector. While this striking disparity can largely be explained by the sheer size differential between the UK’s public and private sectors, it does highlight the importance of industry as a source of academic staff. It is worth noting that these statistics exhibit no overly pronounced discrepancy across different types of academic roles; namely, roles involving teaching only, research only, and both teaching and research. These statistics offer clear evidence of how UK universities welcome the influx of private and public sector staff to enrich their teaching and research.

The pattern of leaving academics also showcases a similar trend. For the 2022/23 academic year, more than one-third of those who exited academia did so to move to the private sector, and approximately 8.1% to public sector roles. Of all academic role types, academics engaged in ‘teaching only’ roles were the least likely to migrate to either the public sector or industry.

Table 4. Academic staff newcomers and leavers (2022/23)

	Teaching only	Research only	Both teaching and research	Neither teaching nor research	Total
Newcomers – Inflow to the UK HE academic staff population					
All Newcomers	13,160	5,660	3,475	235	22,530
From the Public sector	575	170	235	20	995
(%)	(4.4%)	(3.0%)	(6.8%)	(8.5%)	(4.4%)
From the Private sector	4,475	1,450	1,045	115	7,090
(%)	(34.0%)	(25.6%)	(30.1%)	(48.9%)	(31.5%)
Leavers – Outflow from the UK HE academic staff population					
All Leavers	2,810	2,870	1,075	55	6,810
To the Public sector	145	270	125	10	550
(%)	(5.2%)	(9.4%)	(11.6%)	(18.2%)	(8.1%)
To the Private sector	855	1,150	465	35	2,510
(%)	(30.4%)	(40.1%)	(43.3%)	(63.6%)	(36.9%)

Source: adapted from [HESA](#)

Figure 2 presents the observed movements of academic staff from and to the UK’s private and public sectors over a period of nine years (i.e., the academic years 2014/15 to 2022/23). For newcomers, a generally stable trend can be seen over our focal nine years, with both the private and public sectors consistently supplying relatively steady proportions of academic staff. On average, approximately 33% and 5% of individuals joining academia come from the private and public sectors, respectively.

On the other hand, some fluctuations in the proportions of academia leavers can be observed over our focal year period. Migration to the private sector started at a high of 37.8% of total leavers. They then stabilised around 35% for the following years, before plummeting to about 32% during the COVID-19 lockdown years (2019/20 and 2020/21), and then increasing again to about 37% after the pandemic. The outflow to the public sector exhibited greater stability over our focal years. The only exceptions can be observed in the academic year preceding the pandemic (2018/19), when 10% of leaving academics moved to the public sector, and in the first year of the COVID-19 pandemic (2019/20), when movement almost halved (5.8%) compared to the previous year. On average, approximately 8% of “leaving” academics moved to the public sector and 36% of “leaving” academics moved to private sector over the nine years under observation.

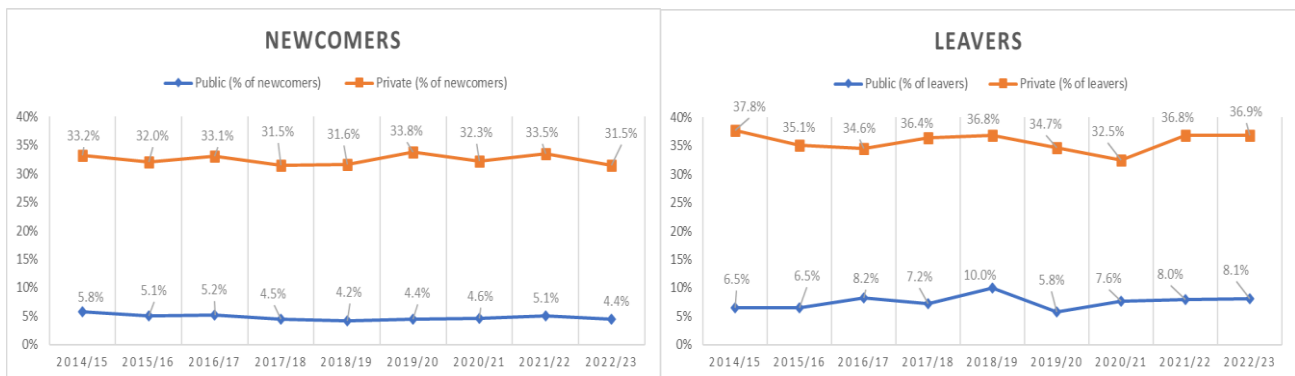


Figure 2. Academic staff moving to the private and public sectors (as a % of newcomers / leavers) (academic years 2014/15 to 2022/23) (Source: adapted from [HESA](#))

These statistics are useful to understand the temporal inflow and outflow patterns of academic staff with regard to the private and public sectors. However, they are relative to the overall number of staff members entering or leaving the academic sector. To capture mobility from another perspective, we followed NCUB (2023) and considered the inflows/outflows in relation to the total academic workforce. Also, it should be noted that these data only take into account the “permanent” moves of staff, which only refer to the first of the four different types

of intersectoral mobility discussed in our report (Figure 1, p. 11). Therefore, this also fails to comprehensively capture the extent of intersectoral mobility in the UK.

We also drew the data for this further analysis from the HESA. Figure 3 presents the corresponding movements of staff to and from the academic sector as a percentage of total academic staff.⁴ Besides movements between the public sector / private sector and academia, we also present the total inflow (i.e., all newcomers) and total outflow (i.e., all leavers) as percentages of total academic staff. Intersectoral mobility constitutes a significant part of inflows and outflows throughout the years. The sharp increase of inflows from the private sector that can be observed for the 2021/22 academic year probably reflects the more ‘secure’ working conditions offered by academia vis-à-vis industry in the aftermath of the COVID-19 pandemic. This increase is accompanied by a decrease in outflows to the private sector at the peak of the pandemic (the 2020/21 academic year), which then increased again in the post-pandemic years. Academic staff moves from and to the public sector can be seen to have followed more predictable patterns across our focal nine years, exhibiting a temporary outflow increase for the 2018/19 academic year. On average, over the observed period, 2.8% (0.4%) of all academic staff came from the private (public) sector and 0.8% (0.2%) left for the private (public) sector. This is in the context of the total newcomers to, and leavers from, academia as a percentage of total academic staff, on average over the observed period, being 8.8% and 2.3%, respectively.

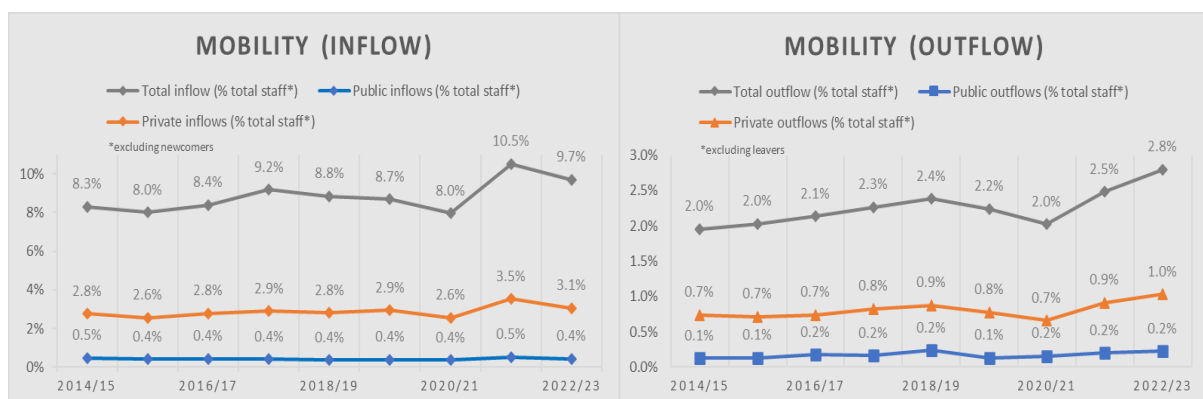


Figure 3. Inflows and outflows of academic staff: total, private sector and public sector (as a percentage of the academic staff population) (academic years 2014/15 to 2022/23) (Source: adapted from [HESA](#))

⁴ The total academic staff figures do not include staff on atypical contracts.

Figure 4 presents the total inflow and outflow of academic staff as a percentage of the academic workforce (i.e., the sum of the respective inflows and outflows). Such mobility between academia and the public sector can be seen to have been relatively steady over the nine years, with an average of 0.6%. A similar pattern can be seen to apply to the total mobility between academia and the private sector, but only for the first seven years, when mobility fluctuated between 3.2% and 3.7%. Mobility became significantly more pronounced in the aftermath of the COVID-19 pandemic, exceeding 4.0% of the total academic workforce. Over our focal nine years, about 3.7% of all academic staff, on average, moved from or to the private sector. This means that, in total (i.e., adding private and public mobility), about 4.3% of staff, on average, moved to and from academia. This is in the context of the total inflows and outflows as a percentage of total academic staff, on average over the observed period, being 11.6%.

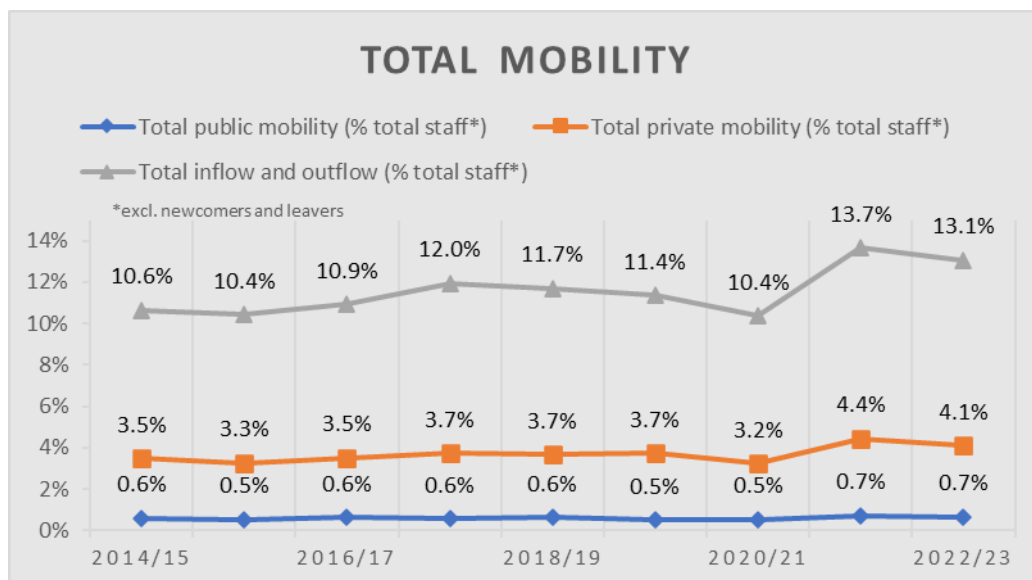


Figure 4. Mobility of academic staff: total, private sector and public sector (as a percentage of the academic staff population) (academic years 2014/15 to 2022/23) (Source: adapted from [HESA](#))

The income of UK universities comes predominantly from tuition fees and educational contracts (see Figure 5). In 2022-2023, 52% of their total income was derived from tuition fees ([HESA 2023](#)). Research grants and contracts, which include grants received from research councils, charities, public sector bodies, industry, and international funding, account only for 14% of the total income generated by universities. While the literature clearly

highlights the positive impacts of mobility on skill development, it is important that we improve the link between mobility and teaching and research delivery. We could do so by making clear plans to capitalise on mobility for the teaching and research activities of universities and their associated income generation activities.

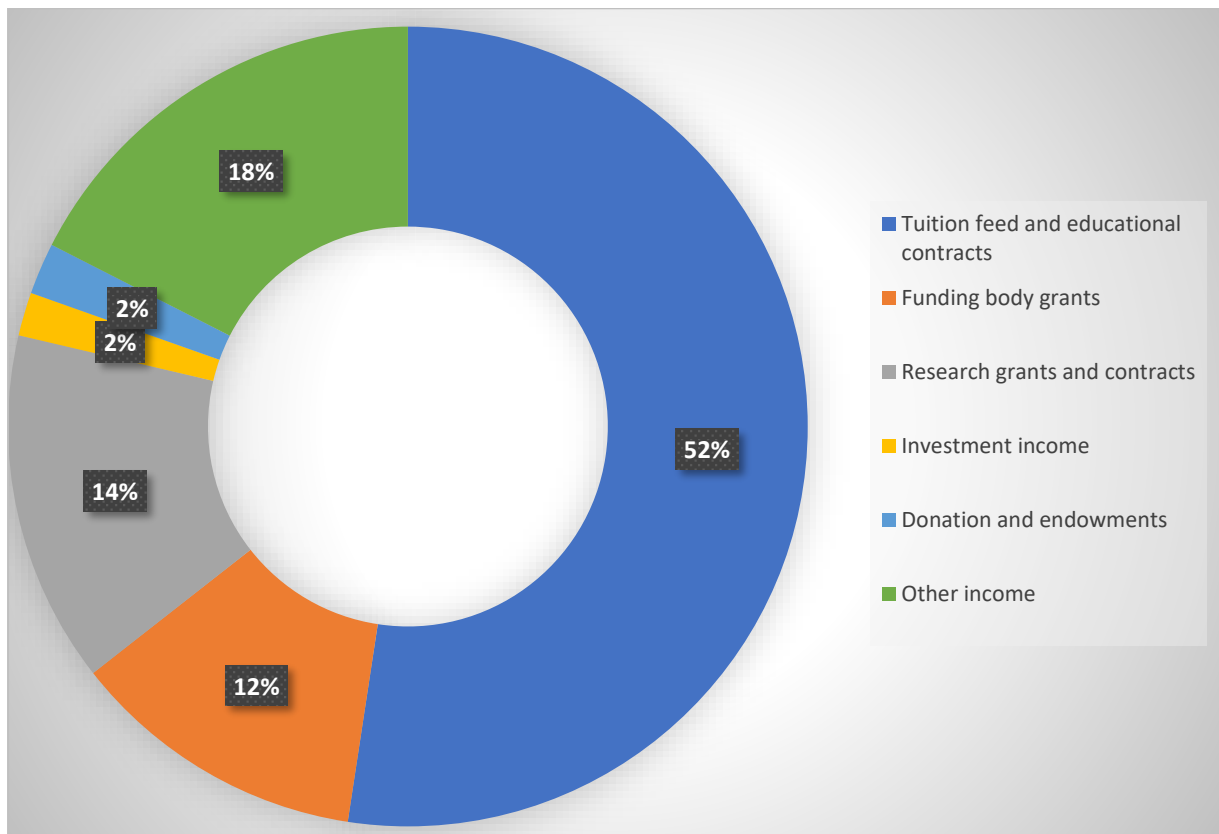


Figure 5: Sources of Income for the UK Higher Education Sector in 2022/23

In relation to establishing tight links between mobility and the core activities of universities, the evidence suggests the existence of multiple different mobility mechanisms between academia and industry. In this section of the report, we have discussed how each of the different mechanisms generates economic impacts. In doing so, we have also discussed the factors that influence how the activities that fall under each of the mechanisms generate economic impacts.

The mechanisms that ensure the mobility between university, industry and government agencies are:

- Mutual student and staff exchanges
- Joint-research initiatives
- The establishment of joint-centres and spinouts

- Collaborations for skill development and training

The generation of economic impacts through mobility mechanisms is positively influenced by the moderation effects of many government initiatives that support mobility, the myriad of support schemes, initiatives, processes, and incentives offered by universities and businesses, and individual-level motivation and commitment.

5.1. Mutual student and staff movement across university, industry, and government agencies

Activities. Temporary and indefinite student and staff moves across the spheres of universities, industry, and government have been observed. Permanent moves, which involve recruitment processes, account for about 32% of university newcomers, while 36% of those who leave academia join the private and public sectors. This trend, which has been broadly visible over the last decade ([HESA 2023](#)), has been supported by the introduction, by universities, of dedicated recruitment pathways for those with extensive industry experience to join university staff as Professors in Practice (Norton 2013) and of new Teaching and Scholarship staff pathways. These pathways are likely to offer more opportunities for those who move from the private and public sectors to integrate into the universities. Collaboration among academics with different past experiences has been seen to have an economic impact through enhanced collaboration with industry, improved knowledge transfer geared towards student employability, and regional economic development (Conlon et al. 2021; Rossi et al. 2022) (Figure 6).

A wide array of other opportunities for temporary student and staff placements aimed at contributing to the generation of economic impacts has increasingly become visible (Figure 6). This includes universities, industry, and government collaborating to offer placements, fellowships, apprenticeships, and DBAs (i.e., company-based PhDs). During the course of these placements, staff and students can avail themselves of opportunities to engage in collaborative research projects, formally and informally exchange knowledge, address any specific challenges faced by the private and public sectors, and improve their own networks with the hosting organisations. As a result, they have not only a direct impact on resolving any immediate business/public sector issues (Fernández-Esquinas et al. 2016), but also more longer-term impacts in relation to gaining a mutual understanding of the host and home

organisations, leading to the further exploration of opportunities for collaboration and their associated economic impact generation even after the temporary move (Lucas et al. 2009; Bekkers and Freitas 2008). It has been argued that, in particular, ‘teaching only’ academics should take part in more of these placements because they enjoy relatively few opportunities to deal with the private and public sectors compared to their counterparts engaged in research (Patrick et al. 2008; Phillips 2014; Bekkers and Freitas 2008; Whelan 2017).

Economic Impacts. These placements have the potential to enable industry and the public sector to benefit from the advanced up-to-date knowledge and skills possessed by academics and students, and to provide universities with opportunities to benefit from the commercial and socio-economic knowledge held by the private and public sectors, respectively (De Silva and Wright 2018). Opportunities for mutual exchanges of students and staff increase the attractiveness of university degree programmes because they are perceived to enhance graduate employability (Business Industry and Higher Education Collaboration Council 2007). Finally, any knowledge, networks, and resources acquired during temporary placements are likely to enable both the home and host organisations to explore additional opportunities for collaboration and to make it easier for universities to take industry and public sector needs into account when designing their research and teaching programmes (Patrick, Peach and Pocknee 2008; Jackson 2010; Fernández-Esquinas et al. 2016).

Moderators. The likelihood of staff and student movements across universities, businesses, and government agencies to generate the stated benefits is evidenced to be increased by the increased availability of government initiatives and funding (see the ‘Government funding initiatives for mobility’ section of this report for more details), any support mechanisms and incentives offered by both the home and host organisations to facilitate and benefit from the interactions, the commitment of senior leadership to integrate placement activities for their core operational and strategic deliveries, and the motivation of individuals to benefit from these interactions (Boyer 1990; Rosli et al. 2018). As an example, the Australian nursing accreditation process (Australian Nursing and Midwifery Accreditation Council, 2012) now requires academics to spend a specified period in the industry, which further encourages benefiting from mobility (Patrick, Peach and Pocknee 2008). Therefore, it should be noted that, for mobility programmes to generate economic value and in addition to offering opportunities for mobility, it is important for the home and host organisations to have clearly laid out processes and incentives (Patrick, Peach and Pocknee 2008).

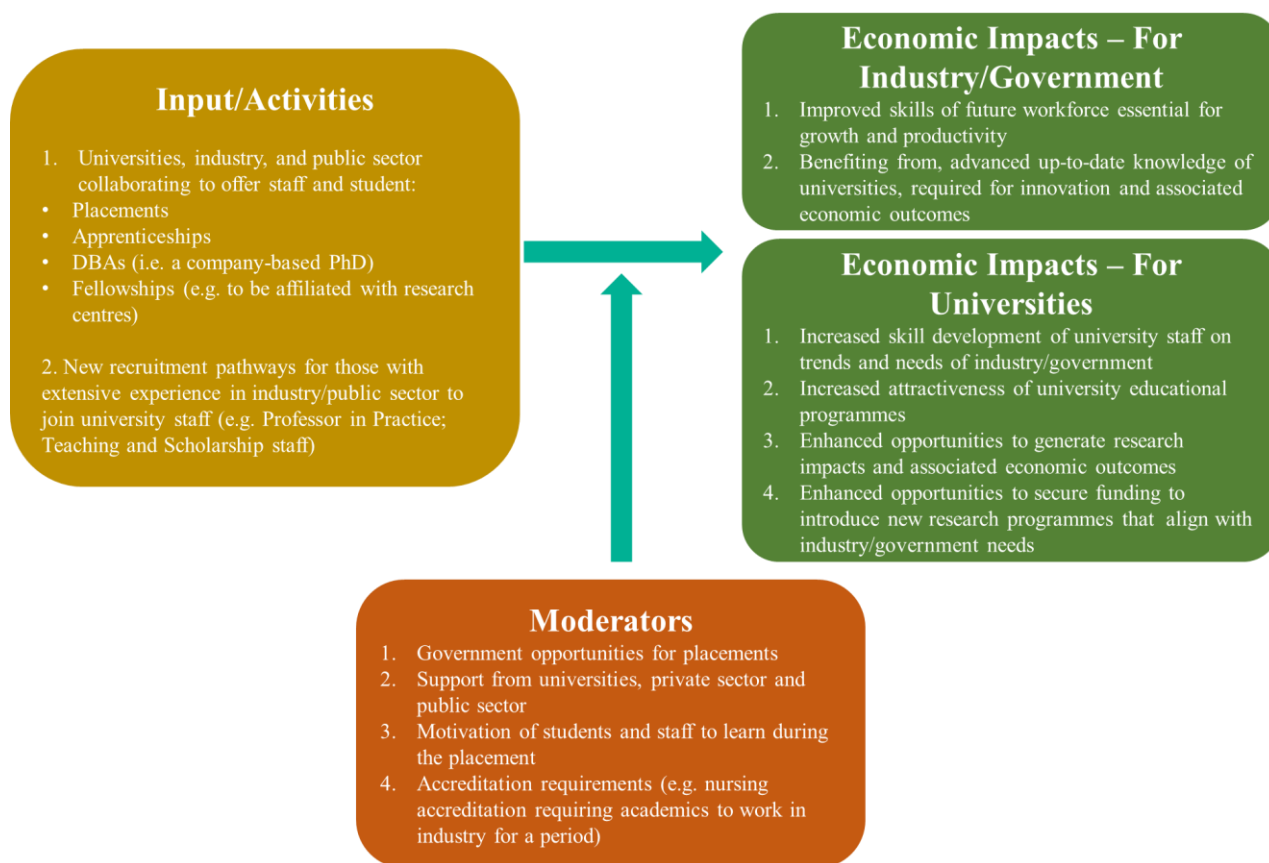


Figure 6: Mutual student and staff movement across university, industry and government

5.2. Joint-research as a bridge between universities, industry and government

Activities. Individuals from universities and the private and public sector are likely to engage in collaborative research regardless of whether they are engaged in permanent or temporary moves or in research-based contracts (De Silva and Rossi 2018). Individuals from universities, industry, and government agencies increasingly collaborate in research projects, from applying for grants to delivering research outcomes and impacts. The funders often require them to collaborate to generate synergies by pooling their respective strengths. In some instances, the government and industry directly fund specific universities to engage in joint research or consultancy with their institutions to address specific challenges (D'Este and Patel 2007; Perkmann and Walsh 2007) (Figure 7).

Economic Impacts. These joint research activities have been found to generate economic impacts on the industry by way of enabling innovation in the form of new products, processes, business models, and services, as well as reducing costs and improving market advantages (Bonaccorsi and Daraio 2007). For the government, collaborating with universities (and industry) is important to address socio-economic challenges, which cannot be addressed by a single party. More importantly, the government and associated funders invest in connecting universities, industry, and other relevant stakeholders to collaboratively improve the country's competitive advantages. A UK government initiative involves the establishment of so-called catapult centres, which are aimed at improving the UK's competitive advantages in key sectors such as cell and gene therapy, compound semiconductor and digital applications, and high-value manufacturing (Fernández-Esquinas et al. 2016).

Universities also accrue a myriad of economic benefits from joint research, including increased success in their grant applications for research and laboratories, and opportunities to access industrial-scale R&D facilities and generate income from commercialisation and REF impacts (Rossi et al. 2024). By engaging in joint research, academics are likely to improve their educational offering by aligning it with industry and government needs, thus offering opportunities for students to engage in joint research, which enhances student employment prospects (Whelan 2017; Patrick et al. 2008; Phillips 2014; Bekkers and Freitas 2008).

Moderators. The availability of UKRI and other grants—which encourage joint collaborations and business investment in collaborative research with universities—seems to enhance the likelihood of joint research generating the stated economic benefits. Additionally, universities have introduced many measures aimed at supporting, incentivising and encouraging academics to apply for and engage in joint research. These include considering engagement and impact generation as promotion criteria, appointing knowledge exchange and impact professionals, and imparting the academic training required for successful engagement. Some universities also offer internal grants for academics to engage with industry to develop joint grant applications. Some universities offer awards such as impact, public engagement, and knowledge exchange awards. A key role is also played by intermediaries, who bring together academics and businesses in joint research activities and enable them to successfully deliver projects. These intermediaries come in many forms,

including living labs, research and technology organisations, and catapult centres (Fernández-Esquinas et al. 2016; De Silva et al. 2018).

Proximity among universities and businesses, be it geographical or institutional, appears to positively impact the generation of economic impacts from joint research. However, their concurrent presence seems to have negative implications due to excessive closeness reducing novelty (Rossi et al. 2014). Therefore, in regard to mobility, it is important for universities, businesses, and government agencies to preserve their distinctions and unique characteristics, as they have specific roles to play, and their heterogeneity is what enables them to benefit from the interaction.

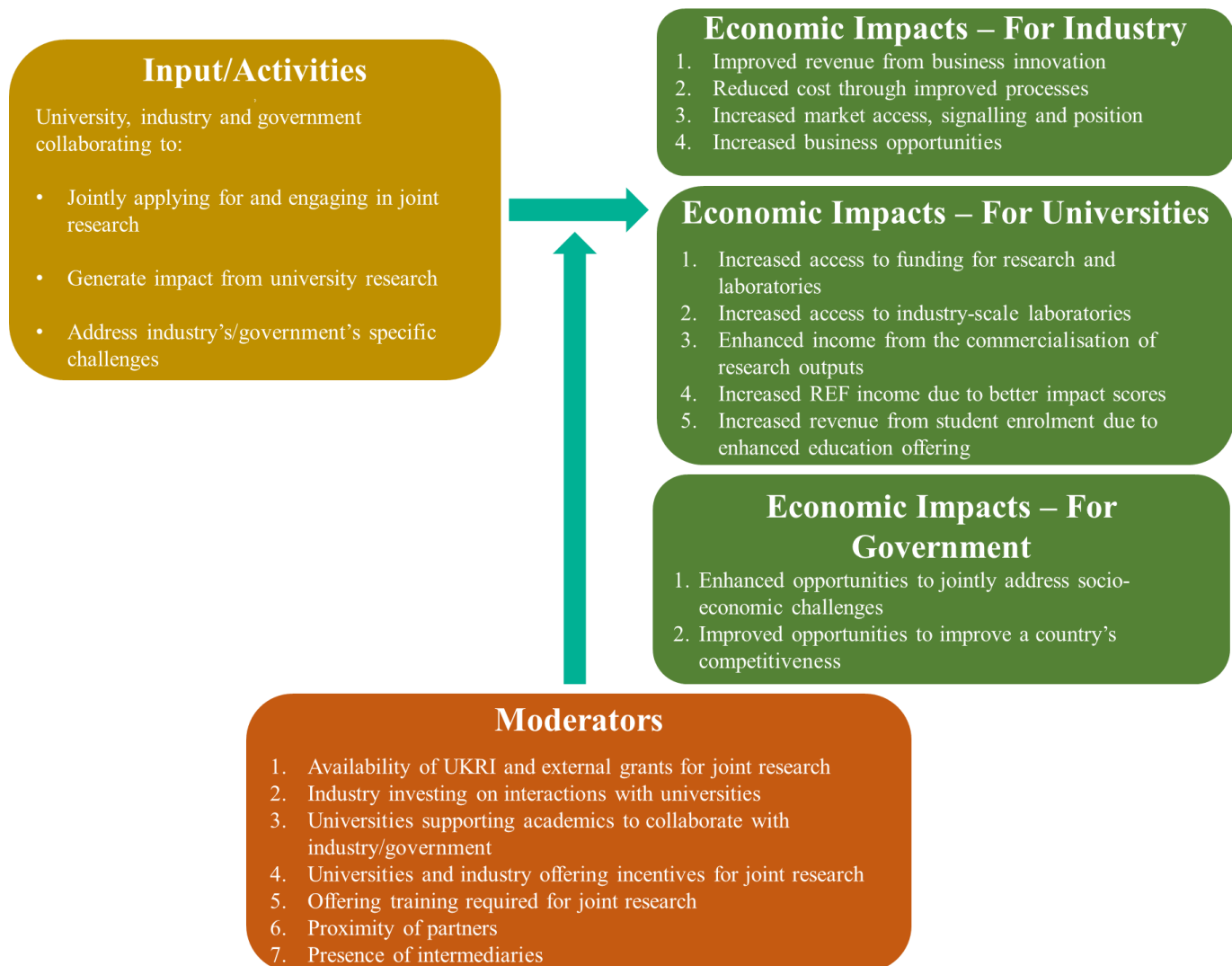


Figure 7: Generating economic impacts through the porousness that results from engaging in joint-research

5.3. Joint-research centres as bridges between universities, industry, and government

Activities. Joint research centres are another mechanism suited to enable universities, industry and government agencies to enjoy long-term porous movements, which sometimes also involve the co-location of individuals from different institutions (De Silva and Wright 2018; De Silva et al. 2024). Such centres—which, together with co-labs and living labs, are established collaboratively by these institutions—are either funded by the private sector or funding bodies. The main reasons underpinning their establishment are to share research infrastructure, to facilitate interactions, and to enable individuals to develop long-term interactions and engage in research of mutual value (Fernández-Esquinas et al. 2016). Research institutions, especially living labs, attract the beneficiaries of joint research, resulting in the upfront incorporation of their needs in research projects. Examples include: the Liverpool and Unilever joint research lab, whereby researchers are co-located and engage in joint research by sharing a joint infrastructure; the Commonwealth fusion system, a spinout of the MIT that has several industry members as investors and collaborators; the Larrain Smart Cities Living lab, established by Université de Lorraine to conduct joint research with industry and citizens; and corporate accelerators in which corporations jointly interact with universities, small businesses, and other stakeholders (Mulligan et al. 2022; De Silva et al. 2024) (Figure 8).

Economic Impacts. Such joint infrastructure provide collaborators with opportunities to engage in long-term, strategically significant, cutting-edge joint research and innovation, especially in relation to generating solutions for complex problems—opportunities they would not have had within the boundaries of their independent organisations (Mulligan et al. 2022). Joint labs offer companies opportunities to collaboratively engage in research and innovation that are relatively high risk and at lower-to-mid-technology readiness levels (i.e., not very close to the market), to develop research capabilities, and to build up their market advantages and reputations as research-intensive companies (Nilsen et al. 2020; Mulligan et al. 2022). Similarly, universities can access large-scale industrial infrastructure facilities, enjoy enhanced opportunities for commercialisation, and engage in commercially important high-risk research projects (De Silva et al. 2024). Any reputation built through such joint infrastructure facilities improves the attraction of university teaching programmes because, besides gaining access to such facilities, students get opportunities to engage with industry

and government, which improves their employability (Business Industry and Higher Education Collaboration Council 2007; Borah et al. 2023). In some instances, government agencies act only as funders; in others, they also act as collaborators, opening up opportunities to capitalise on the strengths of universities and businesses to the end of collaboratively addressing complex socio-economic challenges (Lenihan et al. 2019; De Silva et al. 2024).

Moderators. The partners' ability to identify any potential for joint research of mutual benefit is key for these joint infrastructure facilities to generate the stated impacts. Such facilities are often established with the commitment of senior leadership, which has a positive impact on the engagement in strategically important projects (Rosli et al. 2018). Yet, continuous commitment and the use of the output for the partners' core operations is key to scaled-up continuous investment. This is especially the case because working in such facilities is unlike working within a single organisational boundary, and it is thus important to support staff members with opportunities to build any necessary skills, knowledge, and required incentives, and train them on the management of intellectual property rights (De Silva and Rossi 2018; Halilem et al. 2017; Perkmann et al. 2021). In some instances, the government funds the establishment of commercially oriented joint infrastructure, especially when industry and university are engaged in high-risk projects (e.g., the initial stages of fusion energy plant development) with the expectation that businesses will subsequently make investments of their own. Therefore, the availability of funding also ensures the translation of joint infrastructure into economic benefits (De Silva et al. 2024).

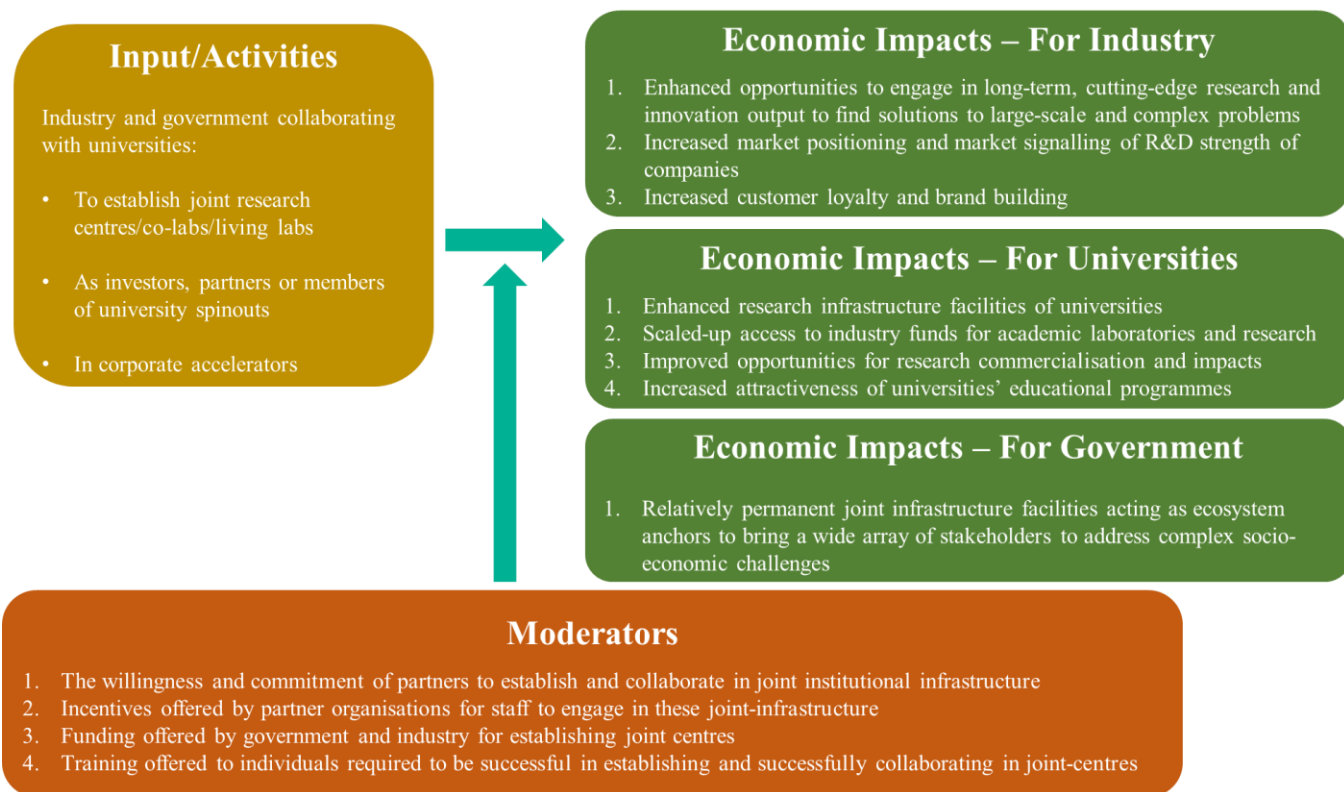


Figure 8: Generating economic impacts by means of the porousness resulting from the establishment of joint infrastructure facilities

5.4. Collaborating for skill development and training, making the boundaries between universities and industry porous

Activities. As teaching is their main income generation activity, universities find significant value in collaborating with industry in the training and skill development of the latter's current and future workforce. These collaborations are tightly interlinked with individual movements (Orazbayeva 2019)—for instance, when industry and universities engage in temporary placements or permanent staff moves, the individuals involved are likely to collaborate, to some extent, in offering skill development. Also, universities may invite industry personnel to jointly co-develop and co-deliver educational offerings because such efforts have been found to improve student employability (Business Industry and Higher Education Collaboration Council 2007; Plewa et al. 2015). Universities often collaborate with industry when they offer it executive education, tailored training, and short courses (Patrick et al. 2008; Phillips 2014). Due to the interaction between teaching and research, professional

doctorates and DBA programmes—wherein students conduct industry-specific research—are often conducted in collaboration with companies (Orazbayeva et al. 2019) (Figure 9).

Economic Impacts. Training collaborations may result in the industry developing cutting-edge knowledge and skills in research and innovation, besides a future workforce suited to fill any industry skill gaps (De Silva et al. 2024). Through these interactions, universities improve their teaching delivery by taking industry needs into consideration (Patrick et al. 2008; Phillips 2014). During some interactions—which, being aimed at training, may start small scale—universities and businesses can explore opportunities for collaboration and for the development of new strategically important networks. Engagement with industry improves the educational offerings of universities—and graduate employability—thus making them more attractive (Business Industry and Higher Education Collaboration Council 2007; Fernández-Esquinas et al. 2016).

Moderators. The translation of training-based interactions into economic benefits is more likely to occur when the university's and industry's structures, processes, and incentive mechanisms support the engagement. In particular, their processes should support the exploration and implementation of educational collaborations. It is also important for universities to raise industry awareness of their tailored training offerings. The generation of impacts through such interactions can be further strengthened by strong alumni offices that act as gatekeepers, as alumni are more likely to engage in such educational interactions with universities (Butcher and Jeffrey 2007; Tartari and Breschi 2012; Borah et al. 2021). Finally, any new government initiatives—such as cross-sectoral skill development (e.g., Skill England)—are more likely to improve the translation of educational collaborations into economic impacts.

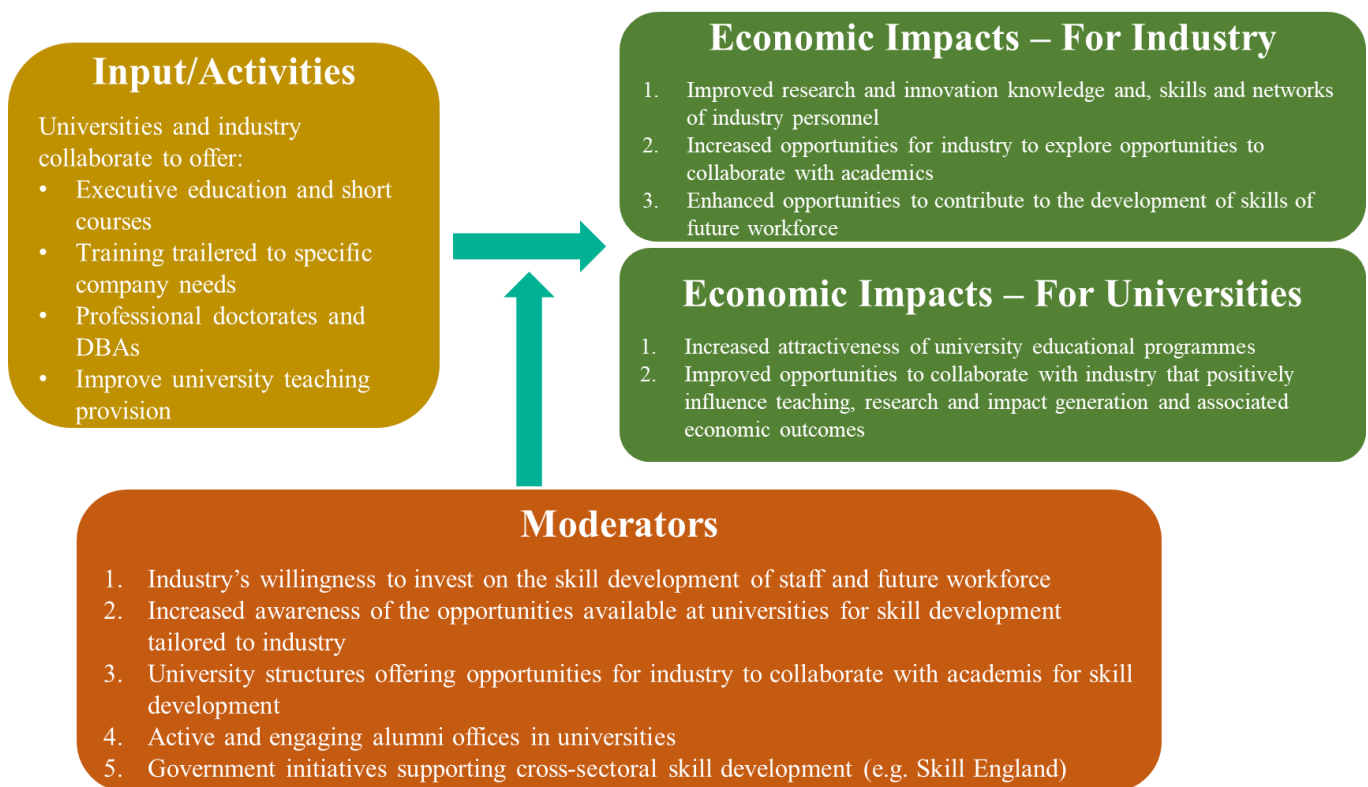


Figure 9: Generating economic impacts by being porous through joint skill development

6. Towards a Multi-Layered Economic Impact Assessment of Researcher Mobility

The development of a measure suited to quantify economic benefits would be of value to objectively articulate the wide array of economic benefits offered by university, industry, and government interactions, as discussed in the previous section of the report. Therefore, in this section, we outline the potential for such a measure together with the related limitations and challenges.

6.1. Challenges in Measuring the Economic Impact of Researcher Mobility

Measuring the economic impact of researcher mobility presents several challenges stemming from the inherent difficulty involved in fully tracking the outputs of such mobility, the complexity of the processes involved, and the availability of data.

- **Types of Researcher Mobility.** The multitude of programmes pertaining to researcher mobility and the even more informal types of such mobility preclude the direct identification of its overall economic impact. Instead, scrutiny is required to identify the economic impacts that pertain to each type before aggregating them towards the estimation of its overall impact. For example, policy fellowships are more tailored towards research suited to feed into policy development, whereas innovation fellowships are more focussed towards the development of practical innovative solutions that mainly benefit the private sector. Mobility outcomes are influenced by other characteristics of researcher mobility programmes—such as the duration and intensity of the mobility, the nature of the work, and geography. This heterogeneity complicates the aggregation of data and the drawing of valid inferences applicable to the whole mobility programme population.
- **Intangible Benefits.** The outputs of researchers often involve the creation of knowledge. This is hard to observe and, even when it is observable, it is not easily quantifiable. As such, any benefits accruing from researcher mobility may be also hard to observe as they are often of an intangible nature. For example, it is not easy to measure the development of professional networks, the diffusion of tacit knowledge,

and the fostering of collaborative cultures across institutions. While these intangible benefits significantly contribute to innovation, knowledge spillovers, and, eventually, economic growth, they cannot be easily directly captured by researchers. Therefore, besides quantitative research, any assessment of such benefits would also necessitate conducting qualitative research through a mixed-method approach, whereby quantitative data is combined with qualitative insights drawn from interviews, case studies, and documents.

- **Attribution of benefits.** One of the core difficulties involved in measuring the economic impact of researcher mobility pertains to the direct attribution of specific economic outcomes to the mobility itself. Alongside researcher mobility, other observable and unobservable factors influence the economic benefits that are thought to be its products. Other members of the researcher's team, policy changes in the host institution, technological advancements, and wider changes in the macroenvironment are some such factors. Isolating the effects of researcher mobility from other factors requires access to rich datasets and the employment of sophisticated econometric models suited to estimating the counterfactual—i.e., what would have happened in the absence of researcher mobility. At the same time, researcher mobility itself may not be independent of other factors in the economy, such as government budgets for R&D, shifts in innovation policy, and researcher-specific abilities and ambition. All this makes it rather challenging to identify the exact causal relationships stemming from researcher mobility.
- **Data Availability.** Comprehensive and detailed data on researcher mobility are often scarce. Despite the availability of administrative data on formal programmes entailing researcher mobility, such as policy or innovation fellowships, a lot of researcher mobility goes unnoticed. For example, intra-organisation mobility, short research visits, and informal collaborations that involve researcher mobility are not captured in publicly available data and are often not classified as information on researcher mobility when captured. In many cases, the self-reported nature of information on researcher mobility (such as in the R&D workforce survey) can introduce self-reporting biases and inaccuracies. Additionally, sensitive information related to personal and professional movements may be difficult to access due to privacy concerns and regulatory restrictions (as is the case with researchers in the defence industry).

- **Time Lag.** The economic benefits of researcher mobility often do not materialise in real time, but may require an extended period to develop. This makes it difficult to identify any immediate impacts. For instance, the skills and knowledge acquired by researchers through mobility may take substantial time to translate into tangible economic outcomes, such as revenue streams from commercialised innovations, startups, or enhanced economic output. It is therefore necessary to conduct longitudinal studies to capture these longer-term effects, however, data availability in this respect may be rather limited. Also, appropriate econometric methods are required to capture these longer-term effects, which are often rather data-demanding in terms of the depth of the time series. The potential time lag affecting the impacts of researcher mobility also means that such impacts can also be affected by a multitude of external influences and changes in the wider research and innovation landscape, thereby complicating the measurement process.

6.2. A Tentative Framework in Measuring the Economic Impact of Researcher Mobility

Bearing in mind the challenges outlined above, we propose a high-level and multi-layered framework that, conditional upon data availability, is suited to identifying the economic impacts of researcher mobility. Figure 10 presents a simplified version of the framework, which is organised across two economic impact dimensions: mobility-based and mobility-output based.

Mobility-Based Economic Impact

Some impacts of researcher mobility, generated by both the home and host organisations, can be directly measurable. The home organisation may be in receipt of a research grant to enable researcher mobility (as it the case with UKRI funded fellowships) which can, in turn, invest in the home organisation. The host organisation may invest in creating suitable conditions for the incoming researcher (with part of this expense potentially also being sourced externally). These investments may pertain to equipment, the employment of additional researchers to support and/or leverage the research resulting from the mobility, new technologies, software, etc. Researchers moving across organisations may also enjoy personal benefits, such as an increased remuneration, improved career prospects, skill development, research support grants, etc.

MOBILITY-BASED ECONOMIC IMPACT



MOBILITY-OUTCOME BASED ECONOMIC IMPACT



Figure 10. A multi-layered framework in estimating mobility outcome economic impact.

Source: authors

7. Mobility-Outcome Based Economic Impact

7.1. Attributing Effects to Researcher Mobility

To estimate the benefits of researcher mobility, academics would need to identify any outputs directly attributable to the mobility itself but occurring both during and after it. To this end, scholars would need to employ counterfactual analysis, estimating what would have happened in the absence of the mobility. This could be done through methods that enable the construction of a counterfactual and allow for the estimation of *Average Treatment Effects (ATEs)*; with the ‘treatment’ here being researcher mobility). Of the various options available depending on data availability, we indicatively describe only two: one that accounts only for the observable characteristics of the host institutions and one that also takes into account their unobservable characteristics:

- **Matching methods.** These methods are widely used in evaluations conducted to estimate causal effects by matching treatment and control units with similar characteristics. There is no reason to assume that the institutions that participate in researcher mobility programmes are randomly selected from the eligible population. Instead, if left unchecked, the selection method used may be prone to giving rise to selection bias (i.e., the non-random allocation of units in the two groups) and thus affect the reliability of the results. The aim is to simulate randomisation, conditional upon a set of observable characteristics of the units under investigation. This takes place by ensuring that any matched units are comparable across a series of observed characteristics. Common methods include Propensity Score Matching (PSM), which matches units based on the probability of being in the treatment group, and nearest neighbour matching, which matches each treated unit with the closest control one.
- **Difference-in-Differences (DiD).** This method involves comparing the temporal changes in outcomes occurring between the treatment and control groups. By examining the pre-treatment and a post-treatment outcome differences for both groups, the DiD method enables the identification of the treatment effect by accounting for any temporal trends affecting both groups. This method helps control for both observable and unobservable influences and identifies any causal effects when randomisation is not possible.

7.2. Identifying the Impacts of Researcher Mobility Outputs

Researcher mobility outputs may include innovation (e.g., new products, processes, business models, business opportunities, and markets), growth, productivity, skill development, network building, policy change, and research collaboration, among others. These outputs, however, may generate their economic impact at a later stage. For example, an innovative product stemming from researcher mobility may generate future revenue streams for the industry, which would constitute an economic impact. Another example could be any policy change that may, in turn, yield a wide economic impact—for instance, a change in policy in how R&D tax credits are provided may result in increased R&D expenditure on behalf of the private sector, with far-reaching implications for the economy. Identifying and especially measuring these impacts can be rather difficult for the reasons mentioned above. Researchers should thus identify, inasmuch as possible, the impact channels and then use secondary evidence in the literature to develop realistic assumptions on the impact of mobility outputs.

Accounting for multiplier effects across the economy

Multiplier effects refer to the broader economic impact generated by an initial increase in spending within an economy. In our case, this additional spending would be linked to any increased revenue streams generated by the outputs of researcher mobility programmes. Besides the direct (i.e., initial) ones, two types of multiplier effects—indirect and induced—make up the total impact on the economy.

- The direct effects are the estimated impacts of any researcher mobility output on revenue or added value (whereby spending can be translated into added value for each sector in the economy, and vice versa).
- The indirect effects occur when an initial spending increase (revenue) leads to increased demand for goods and services from suppliers and related industries. For example, if researcher mobility yields an innovation that, in turn, generates a certain amount of revenue in the textile industry, the textile companies will purchase materials and services from their suppliers, which, in turn, may need to acquire additional resources and hire more workers, thus spreading the economic benefits across various sectors in the economy.

- The induced effects arise when the increased disposable income stemming from the direct and indirect effects leads to additional consumer spending. Employees in the directly and indirectly affected industries will spend their disposable income on various goods and services, such as housing, food, and entertainment. This consumer spending further stimulates economic activity, creating a ripple effect.

Together, these multiplier effects will boost the overall economic impact of the initial outputs of researcher mobility. Failing to account for such multiplier effects would cause serious underestimations of the impacts of researcher mobility.

Table 5. A multi-layered framework for estimating the economic impact of researcher mobility.

MEASUREMENT OF THE ECONOMIC IMPACT OF RESEARCHER MOBILITY

MOBILITY-BASED ECONOMIC IMPACT

Directly associated with researcher mobility:

- Increased spending/funding to accommodate researchers (equipment, other researchers, technology, software, etc.)
- Increased income for collaborating institutions (e.g., grants)
- Increased remuneration for researchers

Outcomes of the collaboration made possible by researcher mobility:

- Improved revenue through industry innovation (e.g., products, services, processes, business models, and markets)
- Improved revenue for universities (income accrued through the commercialisation of research; REF income due to better impact scoring; improved income through increased student enrolment)
- Improved revenue of university-industry joint centres
- Improved career prospects (e.g., promotions)
- Capacity building (e.g., skill development, which is essential for growth and productivity)

RESEARCHER MOBILITY OUTCOME-BASED IMPACT

Step #1 Attributing Outputs to Researcher Mobility

- Estimating a counterfactual using data at the organisation level (i.e., what would have happened in the absence of researcher mobility?)
 - An output-focussed investigation (e.g., patents, innovations, policy changes, etc.)
 - Analysis by homogeneous groups of mobility types / programmes (e.g., same type, same duration, similar host institutions, etc.)

Step #2 Identifying the Impacts of Researcher Mobility Outputs

- Estimating the direct impact of outputs (patents, innovations, policy changes, etc.) on economic output (e.g., value added)
- Capturing longer-term effects (dynamic modelling)

Step #3 Incorporating wider-economy benefits (by sector)

- Indirect effects

(capturing demand increases along the supply chain)

- Induced effects

(capturing demand increases due to increased disposable income)

7.3. Maximizing Economic Gains: Finding the Optimal Level of Mobility

HESA data offers a pathway to the measurement of one type of mobility; namely, indefinite moves across universities, industry, and the public sector. According to the data, between 2014 and 2023, approximately 0.6% of academics (as a percentage of the total number of academic staff) permanently moved yearly between academia and the public sector. Permanent mobility between academia and the private sector was more pronounced (reflecting the much larger size of the private sector vis-à-vis the public one), amounting to approximately 3.6% of the total number of academic staff. Adding private and public mobility means that, in total, 4.2% of academics, on average, moved yearly between academia, industry, and the public sector. This is in the context of total inflows and outflows as a percentage of total academic staff, on average over the observed period, being 11.6%. Out of all the newcomers to UK HE institutions (i.e., those recruited to academia) between 2014 and 2023 academic year, approximately 5 % came from the public sector and 33% from the private sector. On average, approximately 8% of “leaving” academics (i.e. those who left academia) moved to the public sector and 36% of “leaving” academics moved to industry over the nine years under observation.

However, the assignation of the economic impact of researcher mobility on the academic sector is not straightforward. Although we know that about one out of three researchers working in academia were working in the public/private sector the previous year, we are not aware of the magnitude of their economic impact. Was it larger or smaller compared to that made by those researchers who never ventured outside academia? How long does it take for this impact to come to fruition, on average? Also, what percentage of these academics moved out of academia

in the following years? All these questions are hitherto unanswered, which makes it difficult to gauge the extent of the economic impact of researchers moving from the private and public sectors to academia.

Should researcher mobility increase, would it have a greater economic impact? This is a very difficult question to answer.

It is, first, because increased mobility does not always benefit the individual researcher. There is a need to balance the different cultures, expectations, and incentive structures found in these two different organisation types, especially when a researcher is based in a private or public organisation. Neither organisation may have in place the processes needed to acknowledge the uniqueness of those academics acting as boundary spanners. Also, how many days a week these academics should work in each organisation in order for their contribution to be optimal remains unclear. Therefore, for researcher mobility to work optimally, the right balance needs to be struck.

Second, from a macro-perspective, more mobility is not always beneficial and economic-impact generating. If researcher mobility in the wider economy is at a suboptimal level, then increasing it would indeed boost economic impact and growth. However, increasing mobility when it is already above its optimal level would do more harm than good. Especially when we consider the specific roles played by universities, businesses, and government agencies in the ecosystem, which would make it unadvisable to make these institutions look alike. Should we force these organisations to deviate from their core competencies, they would be less likely to generate optimal economic value. So, the critical question is: what is the optimal level of researcher mobility? While the qualitative evidence points at the many economic benefits derived from researcher mobility, each individual organisation remains responsible for deciding its own optimal level of mobility and to introduce the related processes, opportunities, and incentives while helping their employees reap the expected benefits.

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