Attracting international investment in Research & Development (R&D)

OCTOBER 2023
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Attracting international investment in Research & Development (R&D)
Introduction

This report contains a description of the policy context for international investment into research & development (R&D), a literature review of the factors affecting the location of foreign direct investment (FDI) into R&D and summary of two evidence commissions on the performance of the UK’s nations and regions in attracting FDI into R&D and the impacts of corporate decision-making processes on the location of FDI.

The long-term competitiveness of the UK is dependent on our performance as a knowledge economy. International investment is important to UK research, innovation and economic growth.

There is a positive relationship between research and development (R&D) investment and economic performance (OECD, 2015). In the UK, the majority of expenditure on research and development is by the business sector. In 2020, gross expenditure on R&D performed by business was £44bn, 71% of the UK total (Office for National Statistics, 2022). Approximately, £15.5bn of this expenditure was by businesses with overseas ownership, 25% of UK total (Office for National Statistics, 2022).

NCUB’s 2020 R&D Taskforce identified that becoming a ‘Science Superpower’ requires capturing a larger share of the global R&D market. The Taskforce report recommended that, ‘The Government should develop a foreign direct investment (FDI) in R&D strategy to retain and attract a higher level of globally mobile business investment to R&D in the UK’ (National Centre for Universities and Business, 2020).

The report went on to note that to develop an effective FDI strategy, the UK must first understand the basis on which firms decide where to invest in R&D. This understanding can then inform and define the policies and regulations that should shape the strategy. This requires a data and evidence driven approach to understand firms’ priorities, and design and implement effective measures in response. The 2023 Higher Education Policy Institute (HEPI) report, The role of universities in driving overseas investment into UK Research and Development (R&D), recognised the continued need for an approach [to FDI into universities by Government] underpinned by a dynamic and up-to-date evidence base.'

NCUB’s ‘Attracting International Investment in R&D’ project is intended to improve understanding of the factors that attract international investment into R&D in the UK. An advisory group of representatives from academia, industry and government was convened to help inform this work1.

NCUB commissioned advisory firm OCO Global to undertake analysis of the performance of the UK’s nations and regions in those factors that attract international investment into R&D and to explore the impact of company decision-making processes upon the location of investment in R&D. This report includes a brief description of the policy context in the UK for a strategy to attract FDI into R&D, an evidence review on the recent literature on the location of FDI in R&D by Professor Nigel Driffield (Warwick Business School, Warwick University), Dr Katiucia Lavoratori (Henley Business School, University of Reading) and Dr Xiaocan Yuan (Warwick Business School, Warwick University), a summary of the results of the OCO evidence commission and finally, observations on the work and next steps.

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1 Information about the participants in this group is included in Appendix 1 – Acknowledgements. The Advisory Group provided guidance to the project. Formal commissioning was undertaken by NCUB staff.
Policy context for an FDI into R&D strategy

The 2020 Taskforce highlighted the lack of an effective strategy to attract foreign direct investment in R&D. This work seeks to improve the evidence base.

It is intended to complement existing analysis, including that by the Department for Business and Trade and regionally focused projects including the Midlands Innovation project, Foreign Direct Investment into Midlands Universities R&D. To ensure effective policy action significant coordination is necessary across central, national and local government.

Improving the UK’s performance requires consideration of both policy to improve our performance in the different factors that attract globally mobile investment as well as policy focused on inward investment promotion. The creation of the Office for Investment (OfI) is a positive intervention but will require time to fully bed in given the complexity of its task. Guimon 2009 analysis, reflected by the House of Commons International Trade Committee report, identifies the complexity of this task:

"The key challenge for policy makers is to design a coherent and efficient strategy that encompasses the right set of policies considering the country’s circumstances. But determining the correct policy mix is an extremely difficult task because it involves different government departments and agencies and because the relative efficiency of the different policy instruments is uncertain ex-ante and hard to evaluate ex-post.

In addition, the internationalization of corporate R&D means different things to different countries, so there is not a unique strategy towards R&D-intensive FDI. Government strategies to attract the R&D of foreign-controlled multinationals differ across countries depending on their size, level of technological development, institutional profile, and on the relevance of existing foreign subsidiaries in the national innovation system.

That said, in general terms an efficient promotion of R&D-intensive FDI calls for a closer connection between innovation policy and inward investment promotion, which have traditionally operated rather separately."

Guimon, 2009
Guimon goes on to suggest a policy framework for attracting R&D intensive FDI that illustrates the breadth of policy areas that are within scope. These policy areas are summarised in Table 1.

### Table 1. Attracting R&D intensive FDI: The policy framework

<table>
<thead>
<tr>
<th>Policy area</th>
<th>Key policies</th>
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<tr>
<td><strong>Innovation policy</strong></td>
<td>Fiscal and financial incentives to corporate R&amp;D</td>
</tr>
<tr>
<td></td>
<td>Human capital development and attraction of foreign talent</td>
</tr>
<tr>
<td></td>
<td>Enhance the research infrastructure and promote collaboration and linkages</td>
</tr>
<tr>
<td></td>
<td>Improve the intellectual property rights regime</td>
</tr>
<tr>
<td><strong>Inward investment promotion</strong></td>
<td>Target R&amp;D-intensive FDI and build the image of the country as an R&amp;D location</td>
</tr>
<tr>
<td></td>
<td>Provide R&amp;D specific pre-investment and implementation services</td>
</tr>
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<td></td>
<td>Emphasizes after-care services</td>
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<tr>
<td></td>
<td>Policy advocacy</td>
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</table>

The role of universities in driving overseas investment into UK Research and Development (R&D) (Brown, 2023) identifies at least seven central government departments alongside a range of national and regional organisations with responsibilities relevant to FDI in the UK. Consequently, a significant amount of coordination on behalf of policymakers across the UK is required to ensure the efficacy of government support to attract additional international investment into R&D.

This following short piece on ‘The location of FDI in R&D’ describes the evidence on location of FDI. It includes further areas of consideration for policymakers.
The location of FDI in R&D

Nigel Driffield¹, Katiuscia Lavoratori² and Xiaocan Yuan³, "Warwick Business School, Warwick University, ³Henley Business School, University of Reading"
Attracting international investment in Research & Development (R&D)

THE LOCATION OF FDI IN R&D

After that, one then needs to consider the nature of the interaction between these two, for example, does the firm seek integration with, or insulation from the local economy. Does the firm for example seek to develop linkages with local businesses, or rather a degree of isolation to prevent spillovers of leakage of proprietary knowledge?

In order to address this, studies tend therefore to adopt one of two approaches to exploring the determinants of R&D. The first is to focus on the firm, and its response to fiscal stimuli such as tax credits. The existing literature focused on factors contributing to explaining the location of international R&D has been classified into two broad categories, external and internal factors to the firm (Castellani and Lavoratori, 2019). Castellani and Lavoratori (2019) further summarise that the external factors include agglomeration economies, other location characteristics, geographical distance, the presence of universities and the role of global cities (e.g., Du, Belderbos, and Somers, 2022), whereas internal factor points to intra-firm linkages that encourage the co-location of R&D investment and other activities along the value chain.

The literature also notes that more recently, there have been significant changes in R&D location patterns (Papanastassiou, Pearce, and Zanfei, 2020). These result from different firm level responses to resolving the tensions between different forces, such as on the one hand agglomeration economies and co-location of firms’ R&D activities; gravitational forces and in particular distance factors (Papanastassiou et al., 2020), and on the other the constraints that firms have experienced in terms of attracting skilled labour (Becker, Driffield, Lancheros and Love, 2020).

Finally, another element that needs to be consider is the level of analysis to investigate the phenomenon. Recent studies have moved towards fine-grained geographical scales, since sub-national and sub-regional analyses can overcome country boundaries and investigate location phenomena more precisely. A micro-geography approach "emphasises the importance of "zooming in" to a much smaller scale to get a true picture of locational advantage" (Mudambi, Li, Ma, Makino, Qian, Boschma, 2018: 936). Among different city types and other sub-national areas for studying MNEs’ location decisions, global cities and their metropolitan areas have been recently highlighted as preferred locations for MNEs activities (Belderbos, Du and Goerzen, 2017; Goerzen, Asmussen and Nielsen, 2013; Sassen, 1991), especially for knowledge-intensive activities like R&D. These cities offer high degree of interconnectedness to (local and global) markets, a cosmopolitan environment, high levels of advanced producer services and human capital, which are able to reduce the liability of foreignness for foreign MNEs (Zaheer, 1995).

The importance of agglomeration economies

External agglomeration economies have traditionally been proved to considerably affect MNEs’ location decisions in an extensive body of empirical analysis, and tend to be one of the important determinants of locational patterns of

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2 According to the authors, these include "demand and market size, productivity and wage levels, corporate tax rates, developed formal institution, and also physical infrastructures and advanced human capital, in terms of education and skills."
internationalisation of R&D and innovation by MNEs. Typically, by adopting an approach to minimise risks, those enterprises usually choose destination countries, regions, and cities with low information costs and limited sunk costs (Mariotti and Piscitello, 1995), and they are especially interested in investing in clusters with advanced infrastructures and global connectivity (McCann and Acs, 2011). Arauzo-Carod and Viladecans-Marsal (2009) find that the preferred location of knowledge-intensive activities (such as R&D labs) is in the centre of metropolitan areas where there is a higher availability of skilled people and other high-technology firms. Geographical proximity facilitates face-to-face communication, (tacit) knowledge transfer and knowledge spillovers, especially when it cannot be substituted with temporary proximity mechanisms (Torre and Rallet, 2005).

More recently, increasing attention has been paid to the intra-firm co-location phenomenon and internal agglomeration economies (Alcacer and Delgado, 2016; Papanastassiou et al., 2020), and previous research has also emphasised the trade-off between external agglomeration economies, which lead to locate R&D and production activities in different places, and internal agglomeration forces, which give rise to intra-organisational co-location of activities (Castellani and Lavoratori, 2019). MNEs seek for geographical proximity with their previous activities in foreign countries to benefit from internal economies of scale and scope, inter-functional linkages between activities, reduction of information costs and the uncertainty to operate in a foreign market, as well as mechanisms of coordination and control of geographically dispersed intra-firm value chain activities. More recent evidence can be found in Castellani and Lavoratori (2020), who investigate the propensity of co-location between MNEs’ R&D labs and production activities abroad and further investigate the factors which affect the level of such propensity, looking at the level of international experience of the firms and the nature of the knowledge (codified vs. tacit). Yet, as the virtual R&D teams are developed as a way of managing and coordinating international innovation activities (e.g., Castellano, Davidson and Khelladi, 2017), one may discover that physical co-location co-exists with such virtual teams (Papanastassiou et al., 2020).

The importance of international connectivity

Among the different location features that can drive MNEs’ location choices, scholars have been recently devoted attention to the role of international connectivity (e.g. Aasmussen, Nielsen, Weatherall, and Lyngemark, 2019).

MNEs orchestrate geographically fragmented networks of cross-border activities, thus international connectivity has a critical role in their activities and location decisions. From a geographical perspective, connectivity arises through linkages between places, through (nationally and internationally) well-connected physical infrastructures, but also through ‘the flows
of knowledge capital, people and goods that circulate” globally (Beaverstock, Doel, Hubbard and Taylor, 2002: 114). Thus, international connectivity is a multidimensional construct which involves different types of connectivity, including inventor, producer services, and infrastructural connectivity (Castellani, Lavoratori, Perri and Scalera, 2021). These dimensions can impact differently the location of MNEs’ knowledge-intensive activities in terms of R&D laboratories due to the specific characteristics and needs that these activities require.

The study by Castellani et al. (2021), based on evidence of US metropolitan areas, demonstrates that MNEs' R&D activities are attracted to areas that are connected to other places worldwide through international inventors, in other words locations that allow the firms to access internationally connected network of inventors and to access a novel, diverse and complementary knowledge developed in multiple geographies, but always controlling for the role of external and internal agglomeration economies.

The importance of distance

Recent literature has focused on two aspects of distance, which are of particular relevance for R&D FDI decisions (Papanastassiou et al., 2020). First, the multidimensional nature of distance factors has come under the spotlight, and the role of cultural and social obstacles to international transaction, different from geographical distance, has been recognised (Papanastassiou et al., 2020). The second aspect is that the combination of barriers and connectors differs in relation to the nature of R&D FDI (Castellani, Jimenez, and Zanfei, 2013). As far as the location decision of R&D FDI is concerned, the effect of different components of distance has found to be varied according to the characteristics and motivations of investing firms (Nachum and Zaheer, 2005), to market-seeking versus efficiency-seeking FDI (Slangen and Beugelsdijk, 2010), and to the characteristics of subsidiaries in foreign markets (Berry, Guillen and Zhou, 2010) and of MNEs themselves (Ghemawat, 2017). Nevertheless, at the same time, distance seems to play a less important part in R&D FDI location decisions, considering that uncertainty aspects are more relevant to institutional than geographical distance and that the use of digital technologies tends to facilitate virtual collaboration (Papanastassiou et al., 2020).

The growing role of emerging economies

Thirdly, another key feature of changing locational patterns of innovation activities is the growing participation of emerging and developing countries, especially as the receivers of R&D FDIs (D’Agostino, 2015), a trend which is related to the R&D-specific location advantages in these countries. Specific factors involve big pools of science and engineering talents (Manning, Massini, and Lewin, 2008), wage gaps (Demirbag and Glaister, 2010), and the advancement of local technological capabilities (Gassmann and Han, 2004). However, it is worth noting that the role played by emerging MNEs in the internationalisation of R&D has drawn limited research attention in the recent works (Di Minin, Zhang, and Gammeltoft, 2012).

Conclusion

Summarising, the extant literature suggests the importance of the choice of geographic level of analysis, and what is less studied is how subnational sites as the basic unit of analysis affect MNEs’ location choices for knowledge-intensive FDI (Damioli, Vértesy, Castellani, 2019). This emphasises the need of more research to examine the role of locational factors, which ought to be carried out at a more fine-grained geographical level, for example, regions and cities as attractors of R&D FDIs (Papanastassiou et al., 2020).

This highlights that in seeking to make decisions concerning the location of R&D, firms pursue a number of trade-offs. These stem from both the nature of proprietary knowledge, and the nature of the labour market. The extant literature emphasises the former, but rather neglects the latter, or treats labour market conditions as fixed. That is to say that it may consider the availability of skilled labour, but does not consider how the investment may change the nature of the labour market, increasing the demand for already scare labour for example.

The first trade-off is therefore that which considers the nature of the host location. For example, it is reasonable to assume that firms seeking locations for R&D activities require a certain degree of technological competence locally, in the form of suppliers, an available labour force, universities, inventor connectivity and perhaps (internal and external) agglomeration economies. At the same time, such locations are likely to have higher levels of absorptive capacity, thus potentially stimulating knowledge leakage, with other firms being able to assimilate that knowledge. Such locations often experience both high levels of labour turnover, and significant wage inflation.
In order to influence these decisions, public policy needs to consider both of these aspects. We assert that FDI in R&D is likely to demand a constant stream of skilled workers, both for their own businesses, but also to support the local ecosystem. In addition, collaborations with universities (rather than other private sector firms) protect intellectual property and limit spillovers due to the nature of these collaborations and the contracts that can be specified. Coordination therefore between the supplies of skills, in terms of both HE and FE, and efforts to encourage clusters, with HE research at the heart, is vital for the attraction of high-tech FDI.

Table 2. Factors driving location choices of the internationalisation of R&D

<table>
<thead>
<tr>
<th>Number</th>
<th>Author(s)</th>
<th>Title</th>
<th>Year</th>
<th>Data</th>
<th>Locations considered</th>
<th>Empirical results</th>
<th>Journal</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marina Paparastassiu, Robert Pearce and Antonello Zanfei</td>
<td>Changing perspectives on the Internationalization of R&amp;D and innovation by multinational enterprises: A review of the literature</td>
<td>2020</td>
<td>446 location decisions of R&amp;D activities by multinational firms in the European Union over 1999–2006</td>
<td>233 NUTS 2 regions in the European Union (EU-27) countries</td>
<td>The location probability of a representative R&amp;D foreign affiliate increased with agglomeration economies from foreign R&amp;D activities, human capital, proximity to centres of research excellence and the research and innovation capacity of the region.</td>
<td>Journal of International Business Studies</td>
<td>Review article</td>
</tr>
<tr>
<td>2</td>
<td>Iulia Siedschlag, Donald Smith, Camelia Turcu, and Xiaocheng Zhang</td>
<td>What determines the location choice of R&amp;D activities by multinational firms?</td>
<td>2013</td>
<td>2580 new R&amp;D greenfield investments made by 1376 MNEs over the period 2005–2014 from 190 Markets</td>
<td>110 Global cities</td>
<td>The results confirm the positive role of external agglomeration economies. The effect of co-location is higher with production activity, confirming the role of intra-firm linkages between R&amp;D and production.</td>
<td>Research Policy</td>
<td>Empirical research</td>
</tr>
<tr>
<td>3</td>
<td>Davide Castellani and Katiuscia Lavoratori</td>
<td>Location of R&amp;D Abroad—An Analysis on Global Cities</td>
<td>2019</td>
<td>1483 greenfield international investments in R&amp;D activities made by 855 firms in 587 cities worldwide</td>
<td>City level</td>
<td>The propensity of MNEs to co-locate offshore R&amp;D labs with their production plants is higher among firms with less international experience and geographical dispersion of international activities, as well as with a lower share of intangible assets.</td>
<td>Journal of International Business Studies</td>
<td>Empirical research</td>
</tr>
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<td>4</td>
<td>Davide Castellani and Katiuscia Lavoratori</td>
<td>The lab and the plant: Offshore R&amp;D and co-location with production activities</td>
<td>2020</td>
<td>3,101 greenfield investments of MNEs in US Metropolitan Statistical Areas</td>
<td>US Metropolitan Statistical Areas</td>
<td>Research and Development laboratories are attracted toward areas connected worldwide by international networks of inventors.</td>
<td>Global Strategy Journal</td>
<td>Empirical research</td>
</tr>
<tr>
<td>5</td>
<td>Davide Castellani, Katiuscia Lavoratori, Alessandra Perri and Vittoria Scalera</td>
<td>International connectivity and the location of multinational enterprises' knowledge-intensive activities: Evidence from US metropolitan areas</td>
<td>2021</td>
<td>1537 cross-border R&amp;D investments by 650 MNEs in 55 global cities during the period 2005–2012</td>
<td>Global cities</td>
<td>Cities’ technological and university strengths are stronger attracting factors for research activities, while global cities’ market potential and intellectual property rights protection attract investments in development activities.</td>
<td>Regional studies</td>
<td>Empirical research</td>
</tr>
<tr>
<td>6</td>
<td>Helen Du, René Belbedros and Dieter Somers</td>
<td>Research versus development: global cities and the location of MNCs cross-border R&amp;D investments</td>
<td>2022</td>
<td>277 comparable functional urban areas (cities and their agglomeration) located in 28 countries</td>
<td>Supranational integration blocs’ borders do matter when firms decide the location of their knowledge-intensive activities.</td>
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<td>7</td>
<td>Giacomo Damidi, Daniel Viertjes, and Davide Castellani</td>
<td>The ERA of International R&amp;D investments</td>
<td>2019</td>
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THE LOCATION OF FDI IN R&D

Attracting international investment in Research & Development (R&D)
Key findings from the evidence commission
Purpose of the commission

The literature review highlights important insights into foreign R&D investment into the UK, but also sizeable gaps in evidence and understanding. The purpose of the NCUB ‘Attracting International Investment in R&D’ project is to improve understanding of the factors that attract international investment into R&D in the UK.

To do this, NCUB, with the input of an advisory group, undertook to:
1. Review current evidence on the factors that attract international investment in R&D; and
2. Identify key gaps in the evidence base and attempt to fill at least some of these gaps through work commissioned from external consultants.

This initial review focussed on four major themes:
1. Factors that attract international investment in R&D: The factors that attract international investment in R&D, how their importance varies across sectors and following the pandemic.
2. Decision-making processes: The ‘real-life’ processes by which investment decisions can be made within firms and within Government and the impact of this, respectively, upon appetite to invest internationally and prioritise engagement in particular markets and research areas.
3. Benchmarking the UK: The relative performance of the UK’s nations and regions across those factors that attract international investment including policies designed to attract investment.
4. Impacts of international investment in R&D: The positive and negative impacts of international investment in R&D, and how these may be mitigated.

Ultimately, following limited review of the evidence available for each of these four themes and consideration of the time and resource available, the following two projects were selected:
1. Benchmarking the UK’s nations and regions performance in the factors that attract international investment in R&D; and
2. The impact of company decision-making processes upon the location/s of international investment/s in R&D.

The objectives of the commissioned work were to:
1. Better understand how the different UK locations/nations perform and compare across key factors influencing R&D FDI;
2. Detail current levels of R&D FDI by UK locations/nations;
3. Identify global comparator locations and detail best practices/ key learnings for developing regional R&D capacity and attracting FDI; and
4. Provide stakeholder insights into private sector R&D decision making process and identify ways into which UK based companies could be supported in securing R&D investment.

Note on the analysis

This work is intended to provide an input into understanding how the component nations and regions of the UK, and the UK as a whole, perform in those factors that attract international investment, as well as how this investment is distributed in reality. It is not intended to provide a complete answer. The work on company decision-making, while containing some consistent findings and actionable insights, is exploratory.

Two specific choices made in the national and regional benchmarking that require further explanation are the selection of the unit of geography and the use of the demographically and economically and demographically adjusted models:

- **Unit of geography:** Companies invest in places – clusters, cities, regions – rather than countries. In selecting any size geography there is a trade-off between the availability of internationally comparable data and granularity and specificity. Within this work, International Territorial Level 1 geographies have been used. This unit of geography enables comparison but is large and does not – in all instances – equate to ‘a place’ in the sense of a bounded area in which one would live and work.

- **Demographically and demographically and economically adjusted models:** The analysis uses two models to facilitate comparison between the UK’s nations and regions. The first seeks to adjust for demography while the second seeks to adjust for demography and economic output.
How do the different UK nations and regions perform and compare across key factors influencing FDI into R&D?

The first part of this work seeks to understand how the nations and regions of the UK perform and compare across the key factors influencing FDI into R&D. The evidence review, 'The location of FDI in R&D' within this report describes several important factors including R&D activities, human capital and access to centres of research excellence. The NCUB 2020 Taskforce, references drivers identified in analysis by the Organisation for Economic Co-Operation and Development (OECD) and others including skills and human capital, knowledge and R&D, an innovative culture and market opportunities.

The analysis describes these factors in terms of nine pillars: Human capital; R&D environment; Innovation; Investment opportunities and markets; Established value chains; R&D infrastructure; Governmental support; Familiarity; and Growth trend. For each pillar, several related quantitative indicators have been selected to enable analysis. For example, the following indicators drawn from the data source fDI Benchmark have been used for the pillar ‘Human capital’:

- Estimated total number of researchers in research and development activities per 100,000 inhabitants (2020)
- Percentage of employment in research and development (2020)
- Percentage of population aged 25-64 with a BA degree or higher (2020)
- Total number of university students per 100,000 inhabitants (2020)

Key findings

- London, the South East of England and the East of England perform the most strongly within the demographically adjusted model. This group of regions benefits from high levels of expenditure on R&D, higher than average economic complexity, and larger and more developed established value chains. This group is weakest in R&D infrastructure.
- Scotland, the South West (England), North East (England), Yorkshire and the Humber, North West (England) and the West Midlands perform relatively well in terms of ‘R&D infrastructure’, ‘Government support’ and have registered increases in expenditure on R&D. However, there appear to be relative disadvantages in terms of ‘Investment Opportunities and Markets’ and ‘Innovation’.
- Wales, Northern Ireland and the East Midlands (England) demonstrate a positive ‘Growth Trend’ with increases in R&D expenditure and perform well in some aspects of R&D Infrastructure. However, in terms of Innovation, fewer patents are granted and trademarks registered in these regions, while Investment Opportunities and Markets are also relatively limited.

3 A complete list of indicators for each pillar is included in Appendix 1 of the evidence commission.
How do levels of FDI into R&D vary across the different UK nations and regions?

The second part of this work compares the performance of the different UK nations and regions against actual levels of FDI in R&D. This comparison uses the economically and demographically adjusted model as a basis for comparison.

Performance in FDI in R&D is quantified using the following methodology:

Number of R&D FDI Projects Score (35%)
- Number of R&D Projects between 2017 and 2022
- Growth in number of R&D projects between 2017 and 2019
- Growth in number of R&D projects between 2017 and 2022

Capital expenditure (Capex) of FDI in R&D Score (35%)
- Total Capex of FDI in R&D in million GBP
- CAGR of Capex of R&D projects (2017-2019)
- CAGR of Capex of R&D projects (2017-2022)

Jobs Creation Score (30%)
- Total number of jobs created by R&D projects (2017-2022)
- Growth of jobs created by R&D projects (2017-2019)
- Growth of jobs created by R&D projects (2017-2022)

These three groups of indicators seek to capture number, size and impact of FDI. This data is drawn from fDi Markets. Their definition of an FDI project is included below:

- fDi Markets tracks crossborder investment in a new physical project or expansion of an existing investment which creates new jobs and capital investment.
- Joint ventures are only included where they lead to a new physical operation. Mergers & acquisitions (M&A) and other equity investments are not tracked.
- There is no minimum size for a project to be included.

Additionally, a sector taxonomy was created to aggregate sector definitions into eleven broad sectors: Chemicals, Consumer product, Energy, Financial services, Food & agriculture, Healthcare, Leisure & entertainment, Manufacturing, Mining, Professional services, and Technology.

Key findings

Comparison between capacity to attract FDI and actual levels of FDI demonstrated that:
- London performs strongest in both its capacity to attract FDI and in its performance in FDI in R&D.
- The South East (England), Scotland and the East of England appear to make effective use of their capacity, demonstrating both significant capacity and performance in attracting R&D FDI.
- Conversely, regions such as the North East (England), Yorkshire and the Humber and the East Midlands (England) appear, comparatively, to have underutilised capacity, suggesting potential for increased levels of FDI into these regions.

Further analysis of FDI in R&D in the UK demonstrates that:
- The United States and Germany are important source markets for FDI into R&D in both regions with higher and lower capacity for attracting FDI. However, the importance of source markets differs across both these types of location.
- Within high-performing locations, the greatest levels of investment are in Technology, Healthcare and Manufacturing.
- Across the UK, there is a divergence between the numbers of FDI projects and Capex. For example, Northern Ireland attracts a high number of projects but these tend to be relatively low Capex.

Details contained in Appendix 2 of the evidence commission.
How do the UK’s nations and regions compare to nations and regions overseas?

Finally, we sought to understand how the different nations and regions compared internationally. The following model was developed to identify international comparators:

**Regional similarity score (60%)**:
- Population
- Region size in km squared
- GDP in million GBP

**FDI project attraction score (30%)**
- Number of R&D FDI projects with customised weighting (to ensure nations and regions were only being compared with those with similar sector strengths)

**Capital intensive FDI attraction score (10%)**
- Average capex of R&D FDI projects per sector with customized weighting (to ensure nations and regions were only being compared with those with similar sector strengths)

The weightings and indicators used in this model mean that the comparator locations identified should be broadly similar in their size, economy and population and the sectors that are dominant within their economies. The relatively low weighting given to average capital expenditure of FDI projects means that comparator regions may be the destination for more capital intensive FDI projects and as such the comparisons should be considered as indicative of with whom a UK nation or region should seek to compete rather than, in all cases, a nation or region with similar levels of investment.

**Key findings**
- All nations and regions of the UK are included in the data for the top 100 destinations of R&D FDI projects. However, analysis of regional similarity, FDI project attraction and capital intensive FDI attraction suggests that the level of similarity between the nations and regions of the UK and the other geographies included in the top 100 FDI R&D destinations may be limited in many cases.
- Comparison between the UK nations and regions and selected international comparators reinforces existing observations about the relative strengths and weaknesses within the UK.
How do corporate decision-making processes impact the location of FDI into R&D?

Discussion in the Attracting Investment in R&D Advisory Group suggested that individual organisational locations, structures and processes impact the locations of investment decisions in ways that may not be externally obvious. Within the scope of this project, we thought it would be useful to understand the kind of things that impact decision-making within different companies. This project was envisioned as a complementary, exploratory piece of analysis. While further analysis would be beneficial, OCO Global have identified a number of common themes and practical actions that are immediately useful to those seeking to understand how to attract more international investment into R&D in the UK.

Key findings

Exploratory analysis of a small number of research-intensive companies based across the globe suggests that:

- In country offices are often expected to develop and present business cases to compete internally within their company against other locations for investment. This can take place ‘at pace’ and so the availability of information in a suitable form is key to assisting companies to win additional investment into the UK.

- Geopolitical tensions play an important role in decision-making and can affect the appetite of companies to invest in all overseas R&D not just in those regions and technologies that are subject to tension.

- Brexit has weakened the attractiveness as the UK as an investment location. Particular obstacles include the impact on talent and capacity to access the wider European market.

- In addition to the provision of data, companies would benefit from accessible contact points within government to support internal bids to attract additional investment into the UK up to and including direct support in the development and presentation of an investment offer.
Observations and next steps

The 2020 NCUB R&D Taskforce recommended that the government develop an FDI into R&D strategy. The purpose of this project is to improve understanding of the factors that affect the UK’s capacity to attract R&D.

The analysis undertaken by OCO Global for NCUB suggests that the long-established variance in economic performance across the UK is reflected in the capacity of the different parts of the UK to attract international investment. Though actual investment figures suggest there remains under-utilised capacity to attract investment in certain regions and nations across the UK. International comparison appears to reinforce this.

The policy context is fragmented and complex. This is true in general but appears complicated in the UK by difference in the form, structure and capacity of different levels of government across geographies. Since the publication of the 2020 Taskforce report, government has rearranged existing departments, resulting in the Department for Business & Trade and the Department for Science, Innovation & Technology and established new organisations including the Office for Investment and the Office for Science and Technology Strategy. These appear to be positive moves both in terms of elevating the importance of R&D within government as well as enabling cross-departmental coordination to attract international investment. However, the picture remains complicated at a national and regional level, particularly within England. Any future FDI into R&D strategy will at least have to be cognizant of this.

The analysis undertaken by OCO Global of decision-making within companies suggests a few practicable relative low resource actions that could be taken now:

1. The development and provision of data in a format relevant to those within companies competing to attract additional investment into R&D in the UK.
2. Clearer access points within government able to support those in companies tasked with attracting international investment in the UK.
3. Resource to provide additional assistance when needed to help develop and present offers for larger scale investments in the UK.

This all currently exists at least in part in the UK, but there appears a need to make this more accessible and at an increased scale.

NCUB welcome input from stakeholders across the system on this work. It is intended to support decision-making rather than present ‘the answer’. Other data and other approaches are needed, particularly those that present a more granular focus on specific geographies and sectors. We intend for the outputs of this work to feed into our continuing engagement with government to support the attractiveness of the UK as a destination for international investment in R&D.
Appendices
Appendix 1 – Acknowledgements

Advisory group

NCUB are grateful to the members of the Advisory Group for their contributions to this work. In addition to those listed below, we are grateful to the representatives of the Department of Business & Trade and Foreign, Commonwealth and Development Office that provided input and guidance into this work.

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The commissioning process for the OCO Global evidence commission and drafting of this report, except for the review ‘The location of FDI in R&D,’ was undertaken by NCUB staff. We are grateful to Professor Nigel Driffield, Dr Katiuscia Lavoratori and Dr Xiaocan Yuan for their contribution to this report.
Appendix 2 – References

Introduction


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