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# Comparing university-centred ecosystems in the UK and the rest of Europe

## Final report

SQW

Middlesex University London

# Contents



This report has been prepared by a joint team from SQW and the Centre for Enterprise and Economic Development Research at Middlesex University.


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# Executive Summary

## Study background and purpose

1. Research England, working with partners from London universities, the National Centre for Universities and Business (NCUB) and the British Business Bank, seeks to develop and use an ecosystem approach to help inform research commercialisation and wider entrepreneurship in the UK. It has commissioned a series of studies, including a literature review on the concept of the entrepreneurial university ecosystem and a technical note on the options to compile further evidence on the London ecosystem specifically.

2. International comparators can provide useful lessons on entrepreneurial university ecosystems, though care is needed in transferring these to different contexts. Building on an earlier study to develop a pragmatic framework of indicators that could help match entrepreneurial university ecosystems in the UK and USA, this study sought to identify and describe comparable ecosystems in the UK and the rest of Europe[1]. The overarching aims were to:

   - develop an indicator framework to identify ecosystem pairs between the UK and the rest of Europe
   - undertake qualitative research to explore matches further and areas for mutual learning.

3. Five UK ecosystems were in scope, namely London, Cambridge, Edinburgh, Manchester and Oxford, covering the six most research-intensive universities in the UK.

## Approach and matching

4. Drawing on the previous UK-USA study, and following a review of academic and grey literature and considerations of data availability, a shortlist of indicators was identified. Ten indicators on different aspects of ecosystem 'performance' and context were then selected based on their feasibility, relevance, balance and comparability (see below). Four other desirable indicators on aspects of performance could not be used due to significant gaps or issues with the data.

| Performance indicators | Contextual indicators |
|---|---|
| • Research intensity<br>• University rankings<br>• Business school rankings<br>• Number of seed stage investments<br>• Value of seed stage investments<br>• Shared specialisms | • Number of students<br>• Number of staff<br>• Local population size<br>• Size of local economy (GVA) |

[1] Ecosystems in Israel were also included in the analysis to identify potential matches.

5. Data were collated and analysed for the five UK ecosystems in scope and a selection of ecosystems from the rest of Europe and Israel. Drawing on the quantitative indicators and an assessment of specialist areas, potential matches were identified. These were sense-checked and consulted upon with the project steering group, and representatives from the SixU[2] and TenU[3] groups of universities. The agreed set of matches are set out below in Table 1.

6. There are a number of caveats and limitations to the matching approach, including issues such as geographical definitions, constraints in data availability, and the fact that many aspects of ecosystems cannot be readily measured. This is acknowledged, and the purpose of the subsequent qualitative case study research was to test the matches further and identify where there may be potential for mutual learning. It is the potential for learning that may lead to subsequent actions; the matching was a pragmatic way of narrowing down the ecosystems for this purpose. The case studies involved consultations with ecosystem representatives from the UK and overseas. Not all of the matched ecosystems could be engaged in the research, and so the case studies focused on those that could be consulted – see Table 1.

**Table 1: Ecosystem matches**

| UK Ecosystem | Matches used in case studies | Other matches identified |
|---|---|---|
| Cambridge | Lausanne and Leuven | - |
| Edinburgh | Dublin and Helsinki | - |
| London | Amsterdam & wider Randstad and Stockholm | Greater Paris |
| Manchester | Vienna | Lyon |
| Oxford | Zurich | Munich |

## Key findings from across the case studies

7. The case study write-ups (included in the main report) explore both good practice and areas for mutual learning between the ecosystem matches. Through the research, several cross-cutting themes and challenges emerged.

8. A common theme was acknowledgment of the fluidity and permeability of the geographical boundaries of ecosystems and that they operate simultaneously at various levels including locally, regionally, nationally and internationally. The borders of ecosystems are not fixed and instead can be stretched in different directions as required.

9. Leadership within ecosystems and having senior-level buy-in to commercialisation within universities were highlighted as important. Several of the UK universities consulted had a Provost/Vice Chancellor for Enterprise with some of the institutions in the rest of Europe having an equivalent role. University practices associated with structures, processes and

[2] SixU's members are Cambridge, Edinburgh, Imperial College London, Manchester, Oxford, and University College London
[3] TenU's members are those in SixU plus: Columbia (USA), Leuven (Belgium), MIT (USA), and Stanford (USA).

incentives, such as the recruitment and progression of academics and ownership of equity in companies, were found to help support a culture of commercialisation with university staff. Good practice and challenges were also identified in encouraging a student enterprise culture, and this was a particular emphasis amongst several ecosystems in the rest of Europe.

10. Finance and funding for early-stage technology companies was an area that exercised all of those consulted. Some ecosystems benefited from active investor networks (e.g. business angels) and from significant seed funds, which were often linked to universities. These were seen as key to success, though even here there were still challenges, often due to the levels of funding required and the time horizons of investments in certain technology areas. In other ecosystems, early-stage finance was a key barrier, and there was appetite for learning how to improve the flow of funding for knowledge-based enterprise.

11. Attracting and retaining talent was mentioned as a challenge for many of the ecosystems. There was a mix of issues in play. The cost and location of housing was seen as a significant barrier. Related to this, a lack of transport connectivity was reported to constrain the growth of ecosystems. Competition for highly qualified and mobile talent is global, and case study consultees commented that they can lose talent to the pull of other places, especially if they can offer more opportunities for career advancement or funding for start-ups. These issues demonstrate the criticality of the interplay between the various factors, from housing, transport and quality of life to career opportunities and environments to scale-up ideas.

## Implications for learning

12. The transferability of good practice or learning needs to be done with care given the unique nature and context of a place, such as its history of development, sector mix, people, culture and university structures. Developing an entrepreneurial culture can take an extended period of time and replicating processes that have been effective elsewhere may not always be possible. That said, consultees were open to learning and collaboration, and some of the common areas identified were as follows:

- Funding mechanisms for commercialisation, especially for technology-based start-ups, and attracting investment for early-stage ventures
- Learning from effective practice in building an enterprise culture, for both academics and students, and how to animate this and ensure a joined-up approach within and across institutions in an ecosystem
- Engagement strategies for developing strong university-business partnerships and better coordination of these partnerships within universities
- How to use networks, successes and role models to attract and retain talent in an ecosystem and ensure its continued development, e.g. through successful entrepreneurs 'giving back' their expertise and networks to the next cohort.

# 1. Introduction

## Background

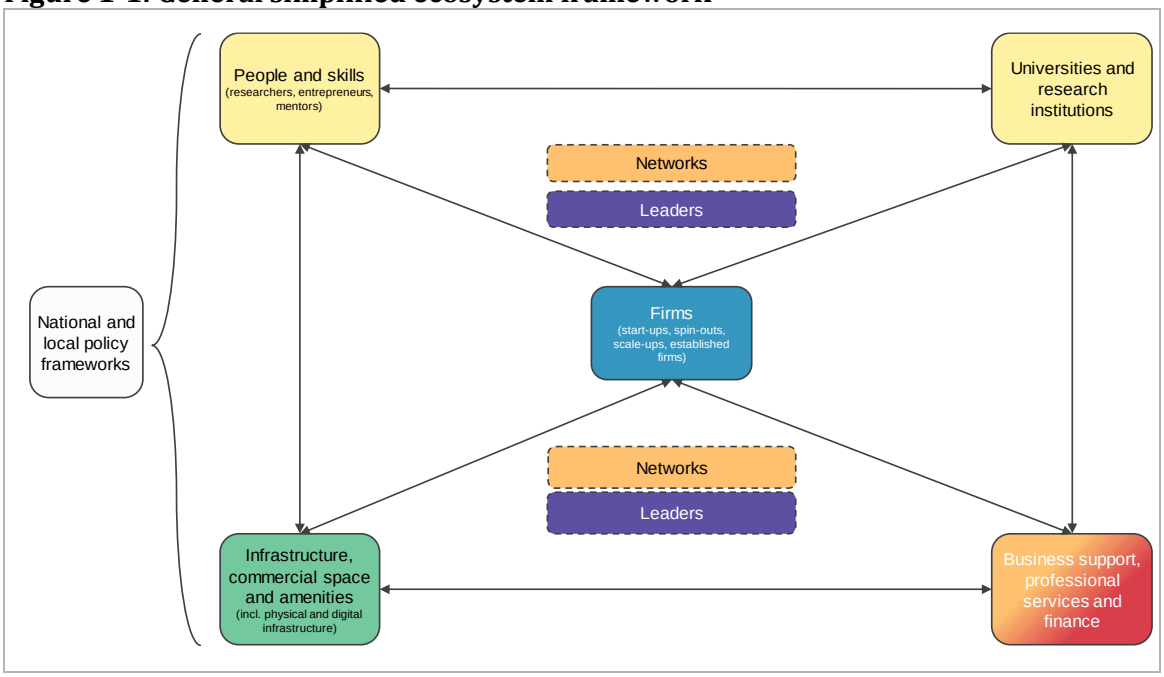
**1.1** The McMillan Review recommended the development of an ecosystem approach for the UK[4] and identified important aspects of well-functioning ecosystems, drawing on international good practice. It highlighted that comparators can provide useful lessons, but that care is needed in transferring these to a UK context. This led to the recommendation for a context-specific ecosystem approach in the UK.

**1.2** In response to the review, in 2019 Research England, a group of London universities, the National Centre for Universities and Business (NCUB) and the British Business Bank (the 'project group') commissioned SQW to develop a literature review on the concept of the entrepreneurial university ecosystem and a technical note on the options to compile further evidence on the London ecosystem. This was the first stage of a longer-term study that would support the project group to develop policy recommendations on how to support the university-centred ecosystem(s) in London – with scope for this to be rolled out elsewhere in the UK.

**1.3** The literature review paper presented a simplified ecosystem framework – see Figure 1-1. This sets out the major actors in the ecosystem as well as physical aspects such as infrastructure, commercial space and other amenities. It also shows that links between these different actors are important in supporting and developing the ecosystem. Outside of the immediate ecosystem, but still with an influence, are wider national and local policy frameworks such as national innovation and enterprise policies, and regulatory frameworks.

[4] McMillan Group (2016) University Knowledge Exchange (KE) Framework: good practice in technology transfer, Report to the UK higher education sector and HEFCE

**Figure 1-1: General simplified ecosystem framework**




*Source: SQW, Middlesex University*

**1.4** Following this work, the project group was interested in understanding potential international comparisons between university-centred ecosystems in order to learn lessons. As such, SQW was commissioned to provide support in developing a simple framework of indicators that could help match entrepreneurial-university ecosystems in the UK and USA. This framework was intended to be used as a pragmatic and quick-to-implement tool for identifying city pairs in the USA and UK that *could potentially* have comparable ecosystems.

**1.5** Whilst the study identified a range of indicators that were used to identify potential matches, one of the key challenges highlighted was in relation to scale. Many US ecosystems are in much larger places in terms of economic size with over half of those reviewed having populations of over 4 million people. This is problematic in seeking matches for most places in the UK outside of London. However, the picture on scale was not always straightforward: the numbers of students was more closely matched between UK and US ecosystems, though university R&D was somewhat skewed to the US ecosystems.

## Purpose of the study

**1.6** To build on the previous work considering international comparisons of university entrepreneurial ecosystems and taking into consideration the lessons learned, SQW was commissioned to identify and describe comparable ecosystems in the UK and the rest of Europe[5]. It was hoped that the European context would reduce the issues associated with economic and geographical scale (especially outside of London) identified in the US, though it was also recognised that the European context offers some differences and complications

[5] Ecosystems in Israel were also included in the analysis to identify potential matches.

because of varying policy agendas and flows of labour, knowledge and capital in the European Union.

**1.7** The overarching aims of the study were to:

- develop an indicator framework to identify ecosystem pairs between the UK and the rest of Europe
- undertake qualitative research to explore matches further and areas for mutual learning.

## Structure of this report

**1.8** The rest of this report is structured as follows:

- Section 2 sets out the approach taken as well as the caveats and limitations
- Section 3 summarises key findings from the research, covering the indicators for comparing ecosystems, matches with UK ecosystems and key messages from the case study research
- Sections 4-8 contain the five case studies covering London, Oxford, Cambridge, Edinburgh and Manchester, and the key learning from their international ecosystem matches.

**1.9** Alongside this, Annex A provides a more detailed overview of the methodology for the study.

# 2. Approach

**2.1** The overall approach taken to the study, key caveats and limitations are set out in this section. A more detailed overview of the methodology can be found in Annex A.

## Developing the indicator set

**2.2** To develop the proposal for the short list of indicators, several steps were taken. First, the long list of indicators that was compiled for the UK-US study was reviewed to define the indicators and check the availability of the data for Europe and Israel. In addition to this, other possible indicators were sourced from initial scoping work undertaken by Research England, suggestions from the TenU group[6], and the team's desk research and rapid review of academic and grey literature.

**2.3** Following a data collation and analysis phase, six performance indicators and four contextual indicators were used (four additional indicators[7] were not used due to significant gaps or issues with the data). The indicators used are set out in **Error! Reference source not found.** and Figure2-2.

## Defining ecosystems and matching

**2.4** It was agreed that the study scope for the UK would be the ecosystems covered by the 6U, i.e. London (UCL and Imperial), Oxford, Cambridge, Edinburgh and Manchester. This was in line with the UK-US comparator work and reflects the fact that the six largest research universities in the UK are based in these cities. These universities are amongst those in the UK with the greatest potential to develop knowledge-based entrepreneurial ecosystems. Given the small number of case studies, we have focused on one or two institutions in each place and recognise that there are a number of other HEIs that are less involved or play different roles. Alongside this, a long list of 28 possible comparator ecosystems in the rest of Europe and Israel was compiled.

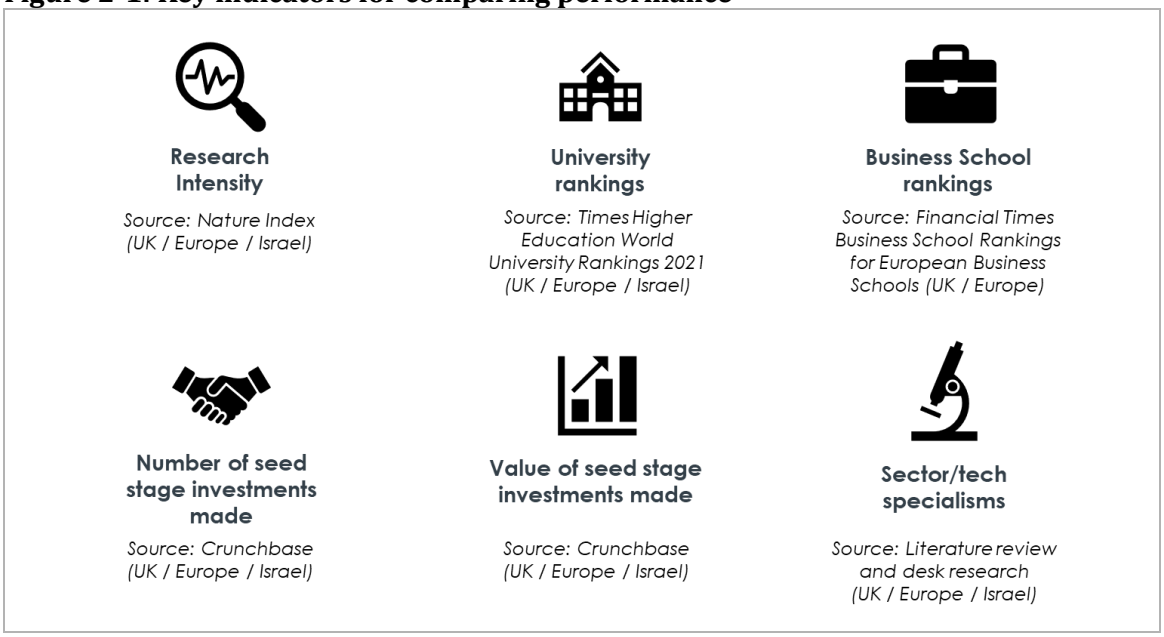
**2.5** A pragmatic approach was taken to defining the geography of each ecosystem in terms of core and surrounding areas. The definitions were chosen to enable the retrieval of comparative data for each ecosystem. It needs to be acknowledged that the definitions used were not perfect and that we have not consulted on these. Additional caveats and points to be aware of in relation to the geographies of ecosystems, as well as the geographic definitions for the ecosystems in the UK and rest of Europe can be found in Annex A.

[6] TenU is a transatlantic group of technology transfer offices (TTOs) who have come together to leverage their combined tech transfer knowledge and experience. TenU's members are Cambridge (UK), Columbia (USA), Edinburgh (UK), Imperial College London (UK), Leuven (Belgium), Manchester (UK), MIT (USA), Stanford (USA), Oxford (UK), and University College London (UK).
[7] These four are: university R&D expenditure, start-up/spin-out activity, enterprise start-up rates and business R&D spend.

**2.6** Data on the indicators were collected and analysed along with qualitative evidence. This was used to inform the process of matching the UK ecosystems with those in the rest of Europe. The approach to matching was pragmatic, rather than scientific, and was based upon an informed judgement. Care was taken to avoid, as far as possible, putting too much emphasis or reliance on individual metrics. To do this, five key criteria were used, covering HE research intensity and reputation, HE scale, enterprise and early-stage finance, shared specialisms and context/scale.

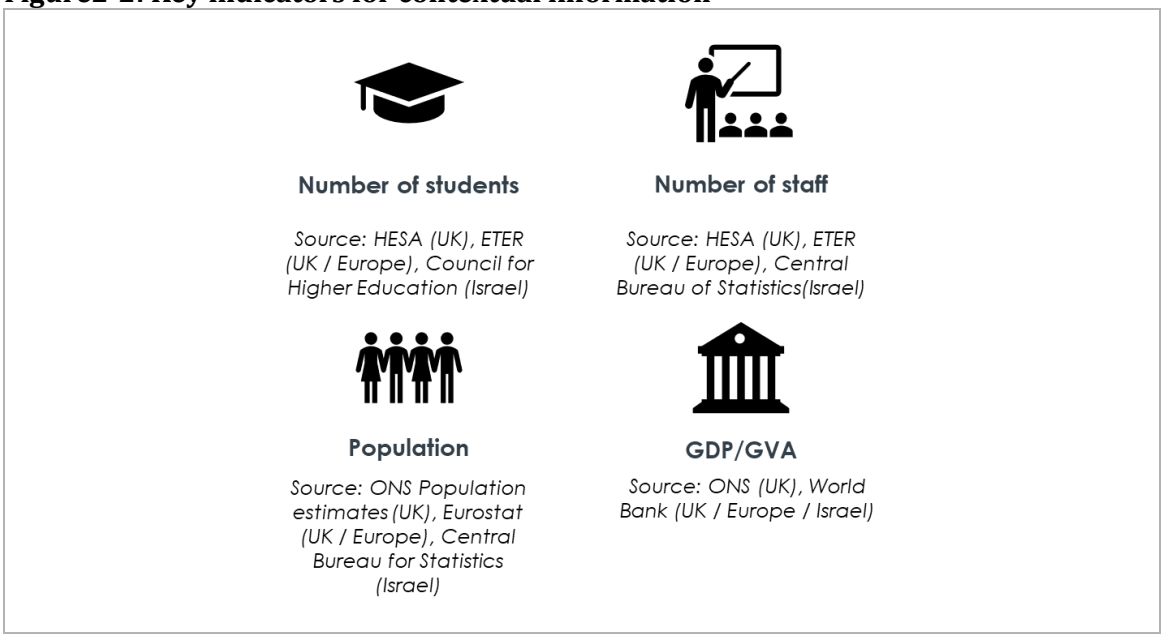
**2.7** A series of recommended matches were shared with the client, and these were also tested and validated with the project group and wider contacts before the start of the case study research.

**Figure 2-1: Key indicators for comparing performance**




*Source: SQW*

**Figure2-2: Key indicators for contextual information**




*Source: SQW*

## Case study research

**2.8** Once appropriate and relevant matches had been selected, five case studies were conducted to provide primary qualitative evidence and feedback. Each case study focused on one UK city and one or two matches from the rest of Europe.

**2.9** The case studies involved further desk research, an initial conversation with a representative from the UK ecosystem followed by joint interviews with a small number of representatives from the ecosystems from the rest of Europe together with UK representatives. In total, representatives from eight of the 11 matched European ecosystems were consulted with. These interviews were semi-structured and, given resources available and the time-limited nature of the interviews, were focused on a small set of key issues drawing on: contextualisation of the indicators; key features of the respective ecosystems (especially the role of the universities); key priorities and challenges; and areas of alignment and potential mutual learning.

**2.10** The case studies are based on a very small number of views, and so reflect the particular perspectives of those consulted. The case studies were certainly not intended to be representative assessments; rather they were undertaken to identify areas for potential learning.

## Caveats and limitations

**2.11** Given the focused nature of this study, it is subject to several caveats and limitations. First, this research was intended to be exploratory, rather than comprehensive. The matching process was undertaken pragmatically and designed to accommodate the limitations of the available and comparable data. There are many aspects of ecosystems that have not been

considered as part of this study and only a small number of qualitative interviews have informed it.

**2.12** Second, the accuracy of the data gathered is limited by the availability of comparable data for the UK and the rest of Europe at the right geographic level and timeframe. In addition, the genuine comparability of the data depends on how each indicator has been defined by data sources in the UK and the rest of Europe. Whilst this was considered when identifying possible data sources, in some cases detailed definitions for variables were not readily available.

**2.13** Third, considerations of scale and geography pose challenges for the effectiveness of comparisons. Whilst closer alignment on scale was found than in the previous UK-US study, the scale and breadth of ecosystems was variable, and it was particularly challenging to match London due to the size of its population and high number of key institutions.

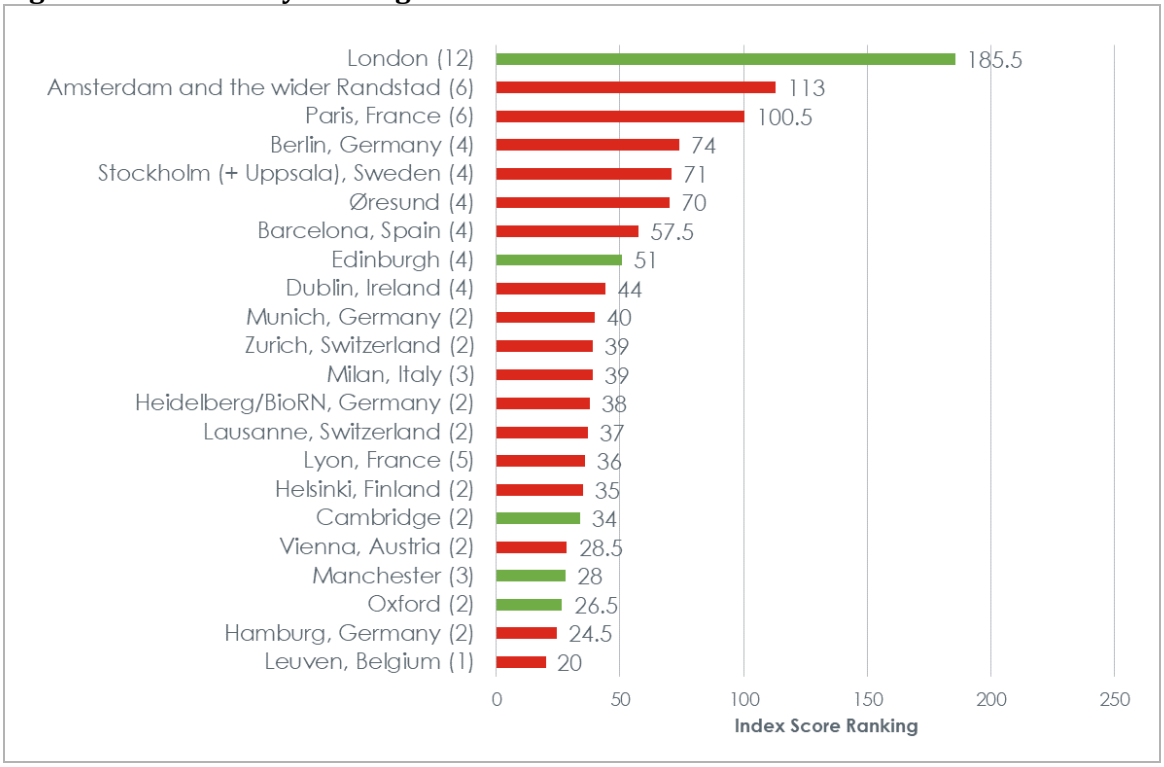
# 3. Key findings from the research

**3.1** This section covers reflections on the process of analysing the data and presents the key findings from the data collected on the shortlisted indicators for the UK cities and longlist of ecosystems from the rest of Europe. It also sets out the chosen matches for the five UK ecosystems and key findings from the case study research.

## Indicators for comparing ecosystems

**3.2** Overall, the data analysis on the chosen indicators provided a good overview of each ecosystem and allowed comparisons to be made, particularly on the scale and strength of universities and seed stage investment. There are three overall reflections to note about the process of using this approach to inform ecosystem matching. First, several metrics were influenced by the number of institutions in an ecosystem and the availability of data for those institutions. For some indicators, the analysis involved creating a sum of scores or an index score based on each institution in an ecosystem. This meant that, other things being equal, those ecosystems with more institutions, or more institutions with available data, had a greater chance of scoring highly on an index score. For example, the chart below shows an index score ranking based on institutions overall ranking in the World University Rankings 2021 and the top three ecosystems have the highest number of institutions. In this sense, the university rankings index score reflects both numbers of institutions AND the performance on rankings. To provide context, the chart below includes the numbers of universities considered in the analysis, and so consideration of this alongside the index score is instructive.

**Figure 3-1: University rankings index score**

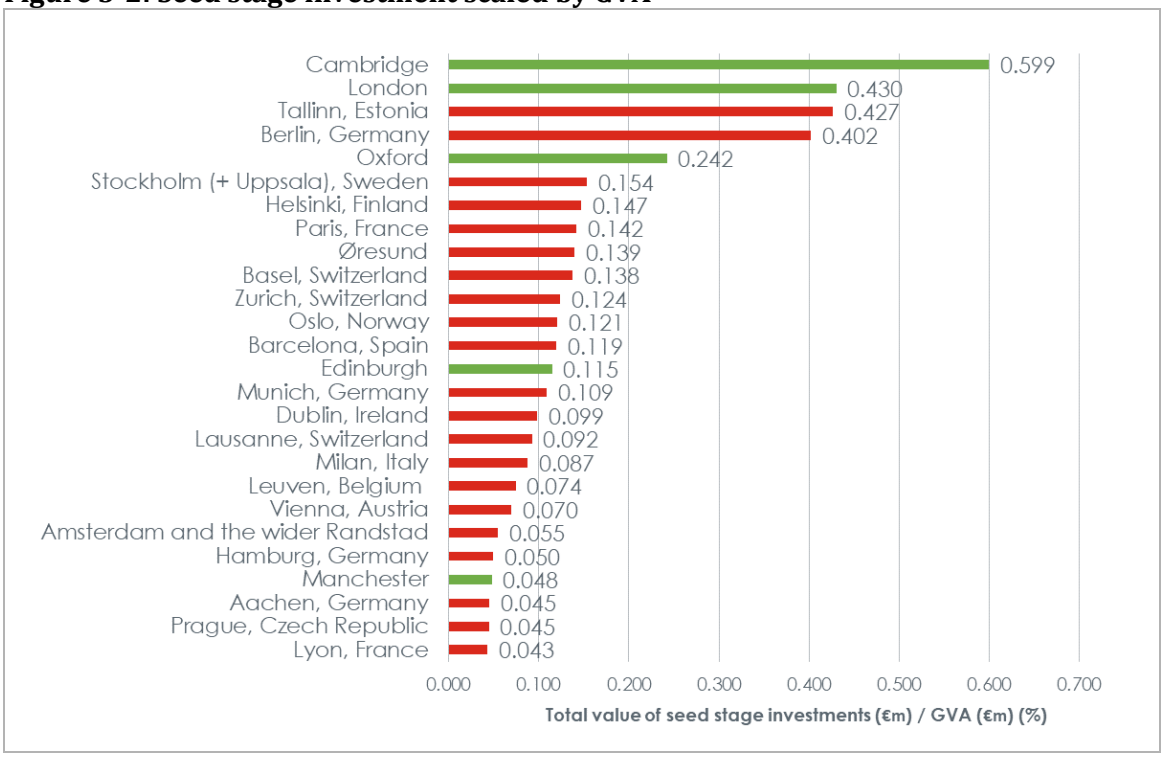



*Source: SQW analysis of THE World University Rankings 2021. Index score was based on Overall Ranking in THE World University Rankings 2021 for key institutions with available data. Figure in brackets indicates number of institutions with available data. Excludes scores under 20.*

**3.3** Second, seed stage investment analysis provides a snapshot in time, rather than a comprehensive assessment. This analysis used Crunchbase data which is constantly being updated so the analysis captured a snapshot of activity in 2018, the time point for which data was collated and analysed. It is also possible that the number of deals and value of seed stage investment will increase for 2018 as more deals become public and added to the Crunchbase dataset given some of the time lags[8]. Alongside looking at the number of investments and value of these, seed stage investment data was also scaled by GVA to provide an alternative metric to consider how well places performed relative to their size. Whilst five places had both the highest number of investments and highest value (London, Paris, Tel Aviv, Berlin and Stockholm), the top five ecosystems when seed stage investment was scaled by GVA were Cambridge, London, Tallinn, Berlin and Oxford.

[8] In part, 2018 was selected to minimise the risk of time lags significantly affecting the data.

**Figure 3-2: Seed stage investment scaled by GVA**




*Source: SQW analysis of Crunchbase data. Based on a sum of the value of seed stage investments on Crunchbase for 2018 for each ecosystem divided by GVA data for 2018 from Eurostat. Excludes ecosystems with a percentage below 0.040. Please note data is in Euros.*

**3.4** The final overall reflection is that, in terms of the contextual data, issues of scale are somewhat less pronounced than when comparing UK and US cities. There was limited variation in the data on the number of students and staff at each ecosystem, once the number of key institutions was taken into consideration. London was an anomaly here, simply given the much higher number of key institutions. On population and GVA, with the exception of London, there were relatively close matches between ecosystems in the UK and rest of Europe in relation to population and/or GVA.

## Matches with UK ecosystems

**3.5** By reading across the set of indicators that were collected, some key findings for each of the UK cities have been drawn out and are included below:

- **London** comes out top in almost all indicators. On metrics linked to HE, this is partly due to its scale, in terms of the number of key institutions in its defined geography, and partly due to many of these institutions being high performing universities. Despite this, there are two consistent potential matches which are Paris and Amsterdam and the wider Randstad. London's performance on seed stage investment is far ahead of the other ecosystems, both in terms of the number and value of seed stage investment deals. It comes second to Cambridge when seed stage investment is scaled by GVA and is closely matched with Tallinn and Berlin on this metric. Matches based on shared specialisms

included Tel Aviv (e.g., finance, AI, big data and analytics), Stockholm (e.g. life sciences, fintech) and Zurich (e.g., bioscience, fintech).

- **Oxford and Cambridge** perform similarly to other ecosystems with two or three institutions (e.g., Munich, Lausanne, Helsinki, Zurich) on indicators related to HE; and they are ranked more highly on the indicators relating to Research Intensity. In terms of seed stage investment, Cambridge and Oxford perform well when this is measured relative to the size of ecosystems, rather than in terms of the number and value of investments. In fact, Cambridge comes out top when seed stage investment is scaled by GVA.

- For **Oxford**, matches based on shared specialisms included Munich (e.g., engineering, biotechnology), Tallinn (e.g., engineering, digital) and Aachen (e.g., natural sciences and engineering, life sciences). Whilst for **Cambridge**, matches based on specialisms included Øresund (e.g., life sciences), Eindhoven (e.g., pharma/life sciences) and Leuven (life sciences).

- **Edinburgh** appears in the middle of many HE indicators. It has a range of potential matches across these indicators, including Barcelona and Dublin. Edinburgh performs more strongly on seed stage investment when this is measured relative to the size of ecosystems, with matches such as Barcelona, Munich and Dublin. Matches based on specialisms included Tel Aviv (e.g., finance, AI, big data and analytics), Eindhoven (e.g., data, IT) and Helsinki (e.g., AI, big data, IT).

- **Manchester** performs better on Industry Income than the research intensity metrics, with one fairly consistent match (Vienna) and a number of other relatively close matches here (e.g., Milan, Heidelberg, Dublin, Helsinki, Hamburg). Manchester has a fairly modest amount of seed stage investment, even when scaled by GVA. Matches based on specialisms included Leuven (e.g., life sciences, manufacturing), Eindhoven (e.g., pharma/life sciences, materials) and Munich (e.g., creative/media, materials).

3.6 Based on the data analysis, the five UK cities were initially matched with five or six ecosystems from the rest of Europe based on the strongest matches from the quantitative metrics and/or from shared specialisms. The suggested matches were then discussed with Research England, the project group and other contacts, and two or three European ecosystems were selected to be the focus of the case study research. Table 3-1 sets out the chosen matches with further discussion of these below.

**Table 3-1: UK and European ecosystem matches**

| UK city | Matches from the rest of Europe |
|---|---|
| **London** | Amsterdam and the wider Randstad<br>Stockholm<br>Greater Paris |
| **Oxford** | Zurich<br>Munich |

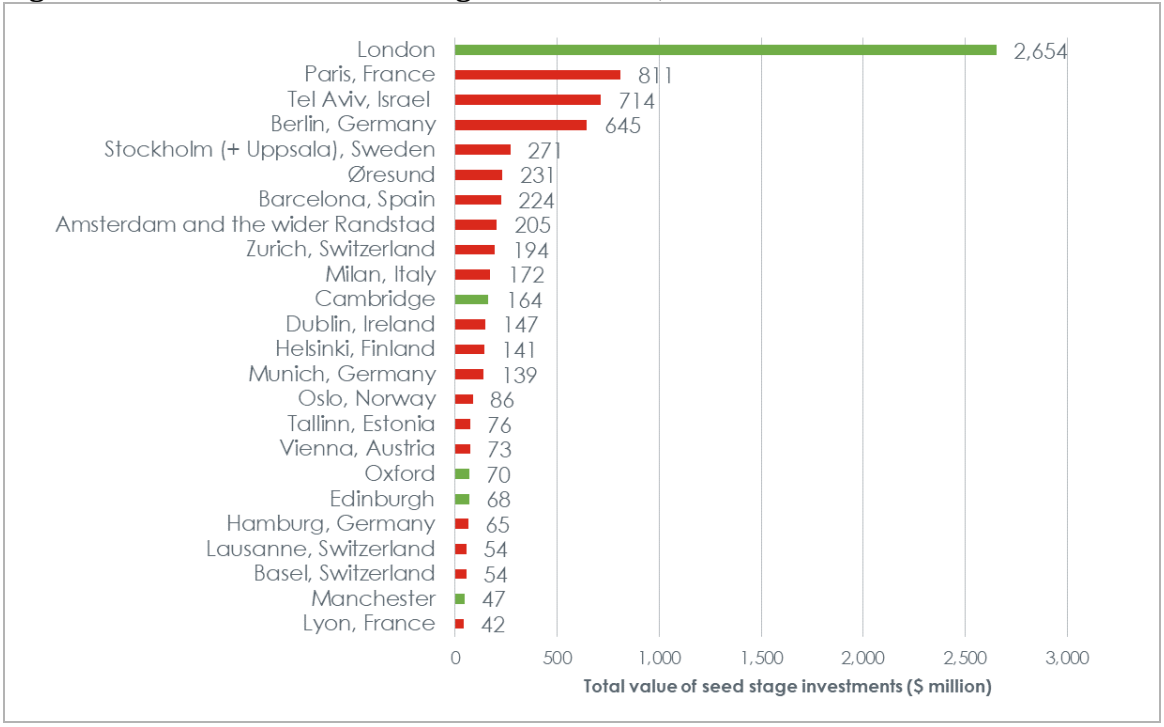
| UK city | Matches from the rest of Europe |
|---|---|
| **Cambridge** | Leuven<br>Lausanne |
| **Edinburgh** | Dublin<br>Helsinki |
| **Manchester** | Vienna<br>Lyon |

*Source: SQW*

## London

**3.7** Due to its scale and breadth of institutions, it was difficult to match London to other European cities. This was particularly true when looking at the number of key institutions, with London having more than double the number of all the other cities considered, and seed stage investment, with activity in London far above other ecosystems (see Figure 3-3 below). Despite this, three matches were identified: Greater Paris, Amsterdam and the wider Randstad, and Stockholm and Uppsala. Greater Paris came closest to London on seed investment, population and GVA, whilst Amsterdam and the wider Randstad performed second to London on research intensity and student numbers. However, it must be noted that a significantly extended geography of Amsterdam was used in this analysis and there were still large differences on seed investment, population and GVA.

**Figure 3-3: Total value of seed stage investments, 2018**




*Source: SQW analysis of Crunchbase data. Based on a sum of the value of seed stage investments on Crunchbase for 2018 for each ecosystem. Excludes ecosystems with under $40m seed stage investments in 2018. Please note that data is in US Dollars.*

**3.8** The remaining match, Stockholm and Uppsala, was selected primarily from the shared specialisms with London, particularly around health and life sciences, and fintech. The scale of Stockholm and Uppsala is much smaller than London, but its five key institutions perform strongly on research intensity and in university rankings. Overall, the value of seed investment in Stockholm and Uppsala was ranked fifth, but it was above both Greater Paris and Amsterdam and the wider Randstad when seed investment was scaled by GVA.

### Oxford

**3.9** The Oxford ecosystem was matched with the cities of Zurich and Munich. Both Zurich and Munich had a higher number of key institutions, four and three respectively, than the two key institutions in Oxford. However, all three ecosystems were closely aligned on metrics relating to research intensity, and Oxford and Zurich had similar industry income scores (as taken from the THE World University Rankings). It should be noted that Munich's industry income score was nearly double Oxford's. Both Zurich and Munich performed better than Oxford in terms of the number and value of seed stage investments; however, Oxford was ranked higher when seed stage investment was scaled by GVA. Shared specialisms included life sciences, engineering and biotechnology.

### Cambridge

**3.10** Two matches were selected for the Cambridge ecosystem: Leuven and Lausanne. The three ecosystems were closely aligned on university rankings metrics, with similar industry income scores in Cambridge (86.2) and Leuven (97.2) in particular. The scale of HE, in terms of numbers of students and staff, is similar across the three; and all three ecosystems share a specialism in life sciences. The Cambridge ecosystem has higher numbers of research outputs and levels of seed stage investment than the other two ecosystems.

### Edinburgh

**3.11** The Edinburgh ecosystem was matched with the cities of Dublin and Greater Helsinki (henceforth referred to as 'Helsinki'). Of the three ecosystems, Edinburgh had the highest number of key institutions at five, followed by Dublin with four and Helsinki with two. Edinburgh and Helsinki performed similarly for the number of research outputs and Dublin and Edinburgh were closely aligned on university rankings and total industry income score. Both Dublin and Helsinki had higher levels of seed stage investment than Edinburgh, but the performance of Dublin and Edinburgh was much closer when this was scaled by GVA. The population of all three ecosystems was within 20 per cent. The shared specialisms across the ecosystems included finance, IT/software, AI and big data.

### Manchester

**3.12** The cities of Vienna and Lyon were matched with the Manchester ecosystem. Both Vienna and Lyon had six key institutions, similar to the five in Manchester; and Dublin and Manchester

had similar levels of research outputs. The value of seed stage investment was similar in Manchester and Lyon, and all three ecosystems were closely aligned when seed stage investment was scaled by GVA. Manchester's population was higher than in Vienna and Lyon, though the three ecosystems were more similar on the size of the local economy (in terms of GVA). Shared specialisms included life sciences, information technology and the creative industries.

## Overarching findings from the case study research

**3.13** The five case study write-ups (included in sections 4 to 8 of this report) explore both good practice and areas for mutual learning between the ecosystem matches. Through the research, several cross-cutting themes and challenges emerged. This sub-section sets out some of these overarching findings from the case study research. It should be noted that the case studies were based on a small number of interviews and, inevitably, focus on one or two institutions in each ecosystem. The findings reported reflect this focus.

### Geographical flexibility

**3.14** Across all of the case studies, a common theme was acknowledgment of the fluidity of the geographical boundaries of ecosystems and that they operate simultaneously at various levels including locally, regionally, nationally and internationally. The borders of the ecosystems are not fixed and instead can be stretched in different directions as required. For a minority of consultees, there was some surprise that consideration was being given to local/regional university ecosystems, though the study itself had encouraged the Amsterdam and wider Randstad ecosystem to consider exploring opportunities from taking a Randstad-wide approach.

### Role of universities

**3.15** A common issue across the ecosystems reviewed related to funding and finance, in particular the availability of funding for spin outs and early-stage technology companies more generally. Sectoral/technology-related differences were cited in relation to the levels of funding required and the time horizons of investments, which in some cases posed barriers to getting finance. Consultees noted that securing investment in digital start-ups was much easier than in other technology areas, and there were acute difficulties for 'deep tech' commercialisation. Some ecosystems benefited from active and long-standing investor networks (e.g. business angels) and from significant seed funds, which were often linked to universities (e.g. Cambridge, Oxford, London, Edinburgh and Stockholm). As such, there was interest from some of the other European ecosystems in models for early-stage investment vehicles that could provide greater scale to help finance spin-outs. This included interest in the Northern Gritstone initiative, linked to the Manchester ecosystem.

**3.16** Leadership within ecosystems, and in particular the importance of university buy-in to commercialisation from senior leadership, was highlighted in the case studies. Several of the

UK universities consulted had a Provost/Vice Chancellor for Enterprise with some of the institutions in the rest of Europe having an equivalent role. A supportive culture can be embedded through structures, processes and incentives, such as the recruitment and progression of academics and ownership of equity in companies. The Edinburgh ecosystem provided an example of good practice in terms of creating an active enterprise culture among academics with several initiatives and structures to encourage spinout activity and engagement with industrial partners among academics. These included: the role of commercialisation activities in supporting a promotion; incentives for academics through equity stakes in spinouts; and the university provision of seminars and classes linked to commercialisation and developing an entrepreneurial mindset.

**3.17** Both good practice and challenges were cited in relation to encouraging an enterprise culture among students within universities. In general, there was a greater emphasis placed on student enterprise activities in the ecosystems outside of the UK that we spoke to. For example, there was a challenge-focused incubator in Helsinki, well-developed entrepreneurship training in Stockholm, and programmes, lectures and workshops to encourage student enterprise in Vienna. Imperial College London's Enterprise Lab and mentoring scheme were also seen as examples of good practice.

**3.18** Across the case studies, ecosystems had differing levels and types of engagement with industry partners, which in some cases reflected the economic and broader contexts. For example, Oxford and Edinburgh have been very effective in attracting industry income whilst, historically, Helsinki has benefited from lots of state funding and was keen to learn how to rebalance the sources of income. Manchester has numerous partnerships with industry and other partners, and was interested in the most effective ways of expanding its industry income. In Vienna, it was reported that there was good engagement with industry networks from the perspective of assisting with entrepreneurial development.

### Role of other factors

**3.19** Attracting and retaining talent was mentioned as a challenge for many of the case study ecosystems for a variety of reasons. First, the cost and location of housing for academics and other talent can be a significant barrier as people cannot afford to live in the limited accommodation available, particularly in central locations. Second, and linked to this, a lack of transport connectivity was reported to constrain the growth of ecosystems. Third, whilst the ecosystems offer strong quality of life, often having vibrant cultural offers and plentiful green space, they can still lose talent to the pull of larger cities (such as London), which often offer more opportunities for career advancement or funding for start-ups.

**3.20** Related to this, there was recognition that ecosystems need to find ways to retain their successful entrepreneurs who can then 'give back' their expertise and networks to the next cohort. These entrepreneurs can also become part of the next set of investors. Cambridge provides an example of where this has been effective, aided by it being a well-networked place. There was also evidence of this in other ecosystems, such as through the Austrian Angel

Investors Association (aaia) in Vienna, a culture of 'leading by example' in Leuven, and strong connections between universities, alumni and investors in Stockholm. For other ecosystems, there was acknowledgement that this succession and recycling of expertise was underdeveloped. There may be potential opportunities for learning as to how this could be better facilitated in their ecosystems, but it must also be noted that this can take time to develop and can be particularly context-specific.

**3.21** A key challenge cited in several ecosystems was a lack of appropriate commercial space. This covered a lack of lab space, and more generally affordable space for start-ups. Many city centre locations were reported as constrained, with some ecosystems being stretched in order to find viable land for development. If not addressed, this may have an impact on the cohesiveness and growth potential of ecosystems. Collaboration with local planning authorities may be key here, and there are examples of the roles of innovation districts, both within the ecosystems reviewed and elsewhere.

## Areas for mutual learning

**3.22** Whilst several areas for learning have emerged through the case study research, it is important to note that the transferability of good practice or learning needs to be done with care given the unique nature and context of a place, such as its history of development, sector mix, people, culture and university structures. In particular, developing an entrepreneurial culture can take an extended period of time and replicating processes that have been effective elsewhere may not always be possible. That said, consultees were open to future learning and collaboration and were keen to hear about examples of good practice. From across the five case studies, some of the common areas for mutual learning are as follows:

- Funding mechanisms for commercialisation, especially technology-based start-ups, and attracting investment for early-stage ventures
- Replicating effective practice in building an enterprise culture, for both academics and students, and how to animate this and ensure a joined-up approach within and across institutions in an ecosystem
- Engagement strategies for developing strong university-business partnerships and better coordination of these partnerships within universities
- How to use networks, successes and role models to attract and retain talent in an ecosystem and ensure its continued development.

**3.23** The following table outlines the key areas for learning and includes the main direction of interest in the issues based on the case study research, i.e. UK interest in practice elsewhere in Europe and/or interest from the rest of Europe in UK practice. It should be noted that this is our summary based on the small number of consultations conducted.

**Table 3-2: Areas for learning**

| Direction of learning | Learning area |
|---|---|
| **Interest from the rest of Europe in UK practice** | Finance for early stage/tech companies and the role of seed funding, including seed funds involving universities |
| | Approaches to developing industry partnerships in order to attract more private investment to complement (or rebalance from) government funding for commercialisation |
| **UK interest in practice elsewhere in Europe** | Approaches to supporting student enterprise and designing entrepreneurship training |
| | Effective ways of attracting and retaining the talent and skills required for the continued development of the ecosystem |
| **Interest in sharing practice in both directions** | Developing industry partnerships and business links, and raising industry income |
| | Developing ways in which the experience and success of entrepreneurs can be used and passed on to the next generation through expertise and investment |
| | Incentivising/encouraging interest in commercialisation amongst academics |
| | Funding for 'deeptech' commercialisation, and the role of external/international partnerships and joined-up public financing in supporting this |
| | Organisations and initiatives that can improve engagement between stakeholders and encourage the development of networks |

*Source: SQW and CEEDR*

# 4. Case study: London

## Key findings

- The London, and Amsterdam and wider Randstad ecosystems operate at various levels with different sub-systems existing within them. The smaller scale of Stockholm has created stronger connections within the city.
- London, Stockholm, and Amsterdam and the wider Randstad had each established or explored various funding channels for entrepreneurial start-ups and early-stage finance but faced challenges, particularly on funding for deeptech commercialisation.
- A strong and active enterprise culture was being cultivated in London and Stockholm, whilst for Amsterdam and the wider Randstad this is a key area for improvement.
- Strategic partnerships with large industry players were important in London and Stockholm but they need careful relationship management.
- There was evidence of formal networks and collaboration between universities in Stockholm, and Amsterdam and the wider Randstad. In London, networks were more informal and often linked to specialisms.
- Leadership within universities was seen as important to fostering an entrepreneurial culture and to bring cross-faculty strategic cohesion.
- Distance between key sites and a lack of lab space were cited as key constraints.

## Context and overview of the ecosystems

4.1 Greater London (hereafter referred to as "London") is a major international city for finance, business, media, culture and tourism, and covers a large metropolitan area, comprising 33 boroughs and a population of almost nine million. It has many of the components needed for a thriving entrepreneurial ecosystem, including but not limited to:

- a wide range of HEIs (over 40) and a **high concentration of globally renowned universities**
- **established partnerships** between universities, research institutions and the private sector
- an **extensive network of physical infrastructure**, including incubators, accelerators and co-working spaces and recent university expansion out of core central London areas
- a **breadth of business support**, in the form of university provision and professional networks

- a **varied finance landscape**, including both university-centred funding and broader technology-based entrepreneurial finance
- a **range of sector and technology specialisms** including health and life sciences, finance and fintech, digital/AI and the creative industries.

**4.2** This does not mean that London is immune to challenges and barriers to growth. A lack of residential and commercial land, a lack of grow-on space for businesses, particularly for those in the life sciences sector, and challenges to extend innovation activity into some parts of London have been identified. Other challenges include ensuring a culture of mentoring and recycling of expertise. In addition, whilst London has a multiplicity of accelerators, in the past there have been lower levels of sector specialist support for start-ups when compared to other ecosystems such as the Boston ecosystem[9].

**4.3** As outlined in the previous chapter, the London ecosystem has been matched with three European ecosystems: Greater Paris, Amsterdam and the wider Randstad, and Stockholm and Uppsala. Some of the data on the key metrics used in the data analysis is included in Table 4-1 below. This, and the previous chapter, illustrate the challenges in identifying matches, in particular given London's scale and breadth. The sections that follow draw on evidence from consultations with a small number of representatives from universities in London, Amsterdam and the wider Randstad, and Stockholm and Uppsala. The evidence therefore reflects the insights and perspectives of those consulted (and their institutions), rather than a more exhaustive review of the ecosystems. It was not possible to speak with any representatives from the Greater Paris ecosystem.

[9] Entrepreneurial_University_Ecosystems_-_Literature_Review_Paper_FINAL.pdf (ncub.co.uk)

**Table 4-4: Evidence for ecosystem matches**

| Geography | Greater London (as per the 30 London boroughs) | Amsterdam and the wider Randstad | Stockholm and Uppsala | Greater Paris |
|---|---|---|---|---|
| **HE research intensity and reputation** | Over 2,000 research outputs between Dec 19-Nov 20<br>Over 14 key institutions with 4 ranked in the world Top 100 | Over 2,000 research outputs between Dec 19-Nov 20<br>6 key institutions with 5 ranked in the Top 100 | Over 1,700 research outputs between Dec 19-Nov 20<br>5 key institutions with 1 in the Top 100 | Over 2,000 research outputs between Dec 19-Nov 20<br>6 key institutions with 3 in the Top 100 |
| **Enterprise and early stage finance** | Most significant ecosystem for seed investment with $2,654m in 2018 | Ranked eighth for seed investment with $205m in 2018 | Ranked fifth for seed investment with $271m in 2018 | Ranked second for seed investment with $811m in 2018 |
| **HE scale** | Nearly 240k students and 33.5k staff across 14 institutions | Nearly 164k students across 6 institutions[10] | Nearly 90k students and 11k staff across 5 institutions | Around 162k students and 11k staff across 8 institutions[11] |
| **Shared specialisms** | Finance/FinTech<br>Digital/AI<br>Health/life sciences | Health/life sciences<br>Digital/AI | Life sciences<br>FinTech | Finance/FinTech<br>Digital<br>Health/life sciences |
| **Context/scale** | 8.98m population<br>€508,955m GVA | 6.14m population<br>€307,790m | 2.72m population<br>€145,394m | 6.84m population<br>€472,796m |
| **Overall match** | **N/A** | **Medium/High** | **Medium** | **Medium/High** |

*Source: SQW analysis, drawing on Nature Index, Times Higher Education World University Rankings 2021, Crunchbase, HESA, European Tertiary Education Register, ONS, Eurostat and World Bank data*

[10] No data available on staff numbers in Amsterdam and the wider Randstad
[11] Data on staff and students taken from 2014

## Overall functioning as ecosystems

4.4 **Ecosystems operate at various levels and can have various sub-systems within them**. The London ecosystem is not regarded as one whole system. For instance, Imperial and UCL representatives considered their institutions to have their own ecosystems, which encompass university buildings, hospitals, business partnerships and recent expansion with new campuses to the east and west of central London, as well as being part of something broader.

4.5 The Amsterdam and wider Randstad ecosystem can be considered in a similar way. Representatives from the ecosystem felt that there were several smaller ecosystems within the specified geography, with a lot of provincial activity and linkages often centred around sectors. It was felt that there could be better integration and that there could be opportunities from taking a Randstad-wide ecosystem approach, particularly in terms of finance.

4.6 In contrast, Stockholm and Uppsala was seen as a well-functioning ecosystem helped by its small size and tight-knit community. A representative from the ecosystem commented that there are strong connections between different actors in the ecosystem, particularly between universities, alumni and investors. This has been important in recent years, in particular for entrepreneurial activity in the digital space.

## Role of universities

4.7 This section considers different aspects of the role of universities within the entrepreneurial ecosystem. It covers the university commercialisation, enterprise culture, university-business partnerships and other university interactions, and draws out the strengths and weaknesses in each of these areas.

### University commercialisation

4.8 **UCL and Imperial are the largest contributors to London's academic research commercialisation highlighted by the scope and scale of their technology transfer offices (TTOs)**. Both UCL and Imperial are global top 10 commercialising universities. The universities seek to engage with all sizes of enterprise to 'champion entrepreneurship and business development'. A key point here is that whilst Imperial and UCL dominate London's university spin-outs, these only represent a small part of their overall entrepreneurial and business impacts. Activities relate to a range of sectors and technologies: Imperial is strong in oil and gas, pharma, fintech, creative sectors and mobility technologies; UCL is strong in biomedical, social sciences and engineering. Both of these London TTOs focus support on the 2-5 year research stage where venture ideas from post-doctoral researchers and research staff form. In particular, IP, early financing and university entrepreneurial culture (discussed in a later sub-section) were key elements which dominated consultations with London and its European university counterparts.

4.9 There was general agreement that IP ownership can be a barrier for university research commercialisation, and that a clearly defined IP process is crucial. In Sweden, IP is attached to researchers and KTH has additional guidelines on IP, access rights to further research and investment in spinoffs. Striking a balance between encouraging and promoting academics for their entrepreneurial impact work and retaining them as independent minded functioning academics is crucial. In addition, there needs to be a clear policy and legal framework in place. Whilst the same approach will not work everywhere, there are a number of enabling factors that can help make the chosen policy in this area effective.

4.10 **All of the university TTO consultees mentioned critical issues around the funding of entrepreneurial start-ups**. Here the scale and reach of Imperial and UCL's university seed funds is a considerable advantage. For example, UCL's seed fund, co-managed by UCLB and a private VC (Albion), received a first raise of £50m in 2016, with a second raise target of achieving £100m, with cornerstone funding from British Patient Capital (publicly supported funds through the British Business Bank) and other Limited Partners (including two strategic partners). However, it was noted that, whilst London is a financial centre, seed funders are less integrated and connected with UCL and Imperial, whereas Stockholm, for example, benefits from the 'denser' investing culture which has also been established in places in the UK such as Cambridge.

4.11 The Amsterdam and wider Randstad universities also highlighted the challenges of early-stage enterprise finance as there are many place-specific finance opportunities which leads to fragmented budgets and forced relocation to be able to benefit from these regional finance opportunities. In contrast, in Stockholm and Uppsala, the universities are more closely aligned to enable sharing of government backed seed funding. Stockholm benefits from a smaller scale population, with well-networked early-stage entrepreneurial financing and a culture of alumni 'pay it forward' recycling of investment through a dense and thriving angel and seed VC culture, where investors remain centred in the city and know each other. However, it was noted that Swedish government funding was only for small-scale university finance, such as proof of concept grants, leading to requirements for private sector corporate investment alliances.

4.12 All respondents felt that whilst the early-stage entrepreneurial finance system has developed to assist tech start-ups (the range of accelerators in London and Stockholm were cited), all of the countries face problems in raising larger scale funding for longer horizon, so called 'deeptech' commercialisation. A concern was that government may not have the funding for this (particularly post COVID-19) and that the Harvard Wyss Institute model of billionaire patronage may be a suitable way forward. In this respect, the close ties of Stockholm universities with large corporates has helped as well as the creation of the 'Stockholm Trio', an alliance between the three largest universities that work together to fund commercialisation activities (detailed further below). However, more is required to bring universities together – perhaps internationally – to develop collaboratively the funding scale and shared risk required to support early-stage deeptech.

## Enterprise culture

**4.13** **There was evidence of an active enterprise culture in both London institutions involved in the research with various commitments and initiatives**. Imperial College London commented that around 10% of their students are active in entrepreneurship with a key driver behind this being Imperial's Enterprise Lab. The Enterprise Lab combines programmes, events, expert advice and workspaces to encourage entrepreneurial activity, and describes itself as being "*passionate about inspiring the next generation of student innovators and entrepreneurs*" (more details in the box below). Imperial's new campus, located in White City and approximately 4km from the main campus, has a key focus on innovation. Provision has been made for start-ups, scale-ups and large companies to co-locate there alongside research activities. In the long run, it was hoped that investors and government regulators will also locate themselves at the campus in order to bring together different actors within the ecosystem and facilitate linkages.

### Good practice example

*Imperial College London's Enterprise Lab[12] was set up around five years ago and has played a key role in the development of Imperial's entrepreneurial ecosystem and in encouraging more students to engage in entrepreneurial activities. Students can take part in challenges and programmes, such as the Venture Catalyst Challenge, which is a seven-week programme that enables Imperial students and alumni to develop an innovative idea for commercialisation and have the chance of winning a share of the £80,000 prize fund.*

*The Enterprise Lab also offers co-working space as well as 'Advanced Hackspace' which is located on the White City campus and is a network of workshops, laboratories, world-class prototyping equipment and professional experts and is open to all students and staff at Imperial.*

*One of the most successful activities has been the Imperial Venture Mentoring Service (IVMS) which is open to both students and staff. IVMS offers team-based mentoring where entrepreneurs are matched with multiple mentors for an open-ended period. Advice is provided by a pool of over 100 mentors who are experienced in entrepreneurship and working on a pro-bono basis. It has been modelled on a similar service run by the Massachusetts Institute of Technology. IVMS has proved successful in providing high levels of expertise to those exploring entrepreneurial ideas.*

**4.14** UCL runs various student enterprise programmes and workshops. BaseKX, located in Kings Cross, was UCL's hub for early-stage start-ups and entrepreneurs. It offers co-working space, events, a team of entrepreneurial advisers as well as incubator and accelerator programmes. Students can take part in courses and workshops to explore entrepreneurship, test their

[12] https://www.imperialenterpriselab.com/

business idea and learn more about the steps involved in setting up a business or social enterprise. UCL's senior leadership is supportive of entrepreneurship and the university has in place Vice Deans of Enterprise who report to different departments and are a point of contact and feedback on enterprise activities.

### Good practice example

*One of the programmes run at BaseKX is called 'The Hatchery'[13] and it supports start-ups with a viable business venture founded by UCL students, researchers and recent graduates. Businesses, which can be in any sector, are assessed by a panel to make sure they are the right fit and only the most promising ventures are supported.*

*Support can last up to 24 months and can include use of facilities, hot desks, a dedicated mentor, monthly meetings with an entrepreneurship adviser, networking opportunities with angel investors and VCs, workshops and peer support group sessions. After completing the incubator programme, businesses are invited to take part in acceleration activities, including an investment readiness programme, clinics and targeted masterclasses. The programme has supported several successful start-ups, with some entrepreneurs returning to mentor others going through the programme.*

4.15 **Stockholm was also felt to have a strong enterprise culture with an integrated approach** to entrepreneurial teaching that helps to bring together critical mass across different institutions. The Stockholm School of Entrepreneurship offers courses, experiences and incubation free of charge to students and alumni of six Stockholm universities. These are Karolinska Institute, the University College of Arts, Crafts and Design, the Royal Institute of Technology (KTH), the Stockholm School of Economics, Stockholm University and the Royal College of Music. To date, it has delivered over 270 academic courses and over 17,000 students have taken part in activities. Alongside this, a representative from KTH described how the institution also has a one-year entrepreneurship course which involves both project and practical initiatives, and runs various events and programmes related to start-ups and discovery research at their city-centre campus.

4.16 **Representatives from the Amsterdam and wider Randstad ecosystem expressed mixed views on their entrepreneurial culture and activity**. In Rotterdam, there is work to revive a focus on entrepreneurship to make this part of the mission and vision, whilst in Leiden it was felt that entrepreneurial outcomes could be improved. Work was being done to overcome this both to ease restrictive rules currently in place and to draft guidelines as to how academia can participate in start-ups. This was felt to be particularly needed for medical students and physicians as medtech is a key sector of interest due to it being national supported (and therefore more integrated than most sectors) through medical challenge funding. Looking

[13] https://www.ucl.ac.uk/enterprise/students/join-hatchery-startup-incubator

forward, representatives from Amsterdam and the wider Randstad would like entrepreneurship teaching to be delivered more consistently across the country with much more collaboration and integration between universities, particularly in the area of science and technology. This has the potential to be a key area of learning from the examples of good practice in the London and Stockholm ecosystems.

4.17 **One challenge that was highlighted in relation to the enterprise offer was the risk of fragmentation and duplication**. This was due to the varying audiences of the offer and the scale of university institutions, which can result in variable knowledge on what is available and a lack of integration. This is not straightforward to resolve but could be alleviated through some central coordination that enables quick and clear understanding of the different programmes on offer.

### University-business partnerships

4.18 University-business partnerships were particularly highlighted in a discussion between representatives from the London and Stockholm ecosystems. Both ecosystems have strategic partnerships with large employers and recognise the importance of these and the ability to tap into the business ecosystem. One good example from KTH was their formal partnership with the H&M Foundation on their Global Change Award. This Award was launched in 2015 and aims to accelerate the process of creating a sustainable future for fashion through innovation. Each year, innovators and entrepreneurs from all over the world submit their early-stage ideas on how to improve the sustainable footprint of the fashion industry. The six most promising innovations share a grant of €1m and participate in a one-year tailor-made Innovation Accelerator Programme, provided by the H&M Foundation in partnership with KTH and Accenture.

4.19 However, there are also challenges in this area, in particular in terms of relationship management. In the Stockholm ecosystem, it was felt that more work could be done to understand the needs of their strategic partners and work with them on overcoming these. A representative from the London ecosystem highlighted how partnerships take time to set up and need to be handled and nurtured carefully. Representatives from both ecosystems commented on the fact that, from their experience, industry contacts can often find it difficult to navigate universities and often rely on a single point of contact. This can make it challenging for universities to map these relationships internally.

### Other university interactions

4.20 **There are strong connections between three universities in the Stockholm ecosystem**. Between 2018 and 2019, the 'Stockholm Trio' established an alliance between Karolinska Institute, KTH and Stockholm University. The Trio highlights Stockholm's high ranking research universities that have powerful European reach. The work of the trio was still evolving but one of the things they had done was to have a joint representative in Brussels, which may not have been possible through each institution acting alone.

4.21 **Collaboration between universities was also taking place in Amsterdam** through the Innovation Exchange Amsterdam (IXA) which is helping to facilitate the transition of academic and practice-based research and knowledge into innovations and real-world applications. IXA started in 2014 when several universities (the University of Amsterdam, Amsterdam University of Applied Sciences, Vrije Universiteit Amsterdam and Amsterdam UMC) partnered together. They now operate as a single interface between Amsterdam-based universities and external parties that are interested in their research findings and knowledge.

4.22 **Networks in London were considered to be more informal, and often along the lines of specialisations**. Although it was felt that these could be effective, there could be scope to learn from practice in Stockholm and Amsterdam. One positive example of collaboration between universities was the London Demo Day. This initiative brings together entrepreneurs from UCL's BaseKX, King College London's Kings20 Accelerator and Imperial's Enterprise Lab. The event provides the opportunity for start-ups to present to a group of international angels and investors, and facilitates connections between entrepreneurs and the investment community.

4.23 **National and international networks of universities were mentioned as helpful in facilitating sharing of ideas and practice**. UCL and Imperial are part of '6U', a UK-based network which has encouraged city-level thinking as well as a national overview, and TenU, an international network of institutions that discusses best practice, issues and challenges around technology transfer. KTH is part of the Nordic Five Tech group which is made up of the five leading technical universities in Scandinavia. A strategic alliance was established in 2006 in order to utilise their shared complementary strengths and create synergies within education, research and innovation.

## Role of other factors

### Leadership

4.24 **All of the consultees stressed the importance of leadership to raise the entrepreneurial culture within their universities**. Both UCL and Imperial currently have Provost/Vice Chancellors who are keen on supporting entrepreneurial development and cultures within their respective universities – driven by UK Government policy requiring (and funding) their local economic impact evidence. The Provost of UCL was cited as particularly keen to deliver high quality jobs and tackle poverty, health and climate issues in London. Furthermore, Imperial's strong entrepreneurial culture is driven by the Director of Enterprise role as '*champion of entrepreneurship and business development*'. In this sense, there appeared to be less academic entrepreneurial leadership evident from Amsterdam and the wider Randstad universities and a desire to learn from Imperial. In contrast, the consultee from KTH Stockholm confirmed the importance of their VC's pro entrepreneurial approach but noted that could change under a new leader.

4.25 **Leaders also need to develop their roles internally within their respective universities in order to achieve cross faculty strategic cohesion**. UCL's TTO consultee gave the example of regular faculty leader meetings, which was mirrored in Stockholm, but all consultees noted that universities could improve their external facing connectivity and engagement with industry. Leaders were also seen as crucial in forming linkages with other universities with TTO leaders such as Imperial, UCL and KTH sharing best practice and at the highest level. This includes international connections with, for example, Imperial fostering links with Technical University Munich, including between their respective high tech campuses. Other recent studies (including with research leaders at Imperial) also demonstrate that research leadership is crucial to raising government policy awareness, alongside corporate alliances (as also demonstrated in Amsterdam and Stockholm).

### Space / connectivity

4.26 **Space shortages were highlighted as a challenge in both London and Amsterdam and the wider Randstad**, particularly in relation to distance between key sites and the lack of lab space. Amsterdam has four science parks; however, they were felt to be too spread out with around 10km between each of them which has been an issue for cohesiveness. London faces a similar problem with recent expansion to the east and west of the city centre leading to university ecosystems becoming stretched. Travel barriers were raised but it was felt that COVID-19 might have reduced perceptions of physical travel barriers and made collaboration easier.

4.27 Despite this, physical lab space is still required and has grown in importance over and above traditional office space. Wet labs for life sciences were considered an important part of the ecosystem by consultees but a key challenge in London was the lack of this kind of lab space with only two available. However, there were currently 10 other sites being considered for wet lab development with real estate developers realising that developing wet labs, which require occupancy every day, will attract more consistent rent that offices. In contrast, representatives from both ecosystems noted that office space may be becoming less important with some small businesses ending their contracts in Amsterdam due to no longer needing the space.

4.28 It was noted that travel around the Stockholm ecosystem was good, and commuting was relatively easy. Instead, a growing problem for Stockholm was the demand from unicorns for expensive and more constrained central locations, both in terms of office space and residential space for staff.

## Looking ahead and learning

4.29 Whilst the breadth and scale of the London, Stockholm, and Amsterdam and the wider Randstad ecosystems might differ, alignment can be found on issues such as early-stage entrepreneurial finance, the importance of business partnerships and the role of leadership within institutions. Furthermore, all three ecosystems are facing challenges in relation to

funding deeptech research commercialisation and space shortages, whether this is in relation to lab space or constrained central locations. All consultees were open to opportunities for future learning and sharing of best practice. The box below highlights some areas where this could be explored further.

## Opportunities for learning

- **Funding for 'deeptech' commercialisation:** there could be learning around the role and importance of university collaborations and external partnerships if improved financing is to be achieved, particularly for the scale of funding and time horizons required for areas such as deeptech
- **Enterprise culture:** the extent to which other ecosystems could replicate the effective methods of cultivating an enterprise culture established in London and Stockholm could be explored further
- **University-business partnerships:** challenges were cited with understanding the needs of business partners and mapping industry contacts internally to enable a more strategic and coordinated approach. Joint working on this issue could provide potential solutions
- **Networks:** there is potential for developing stronger networks amongst London institutions

# 5. Case study: Oxford

## Key findings

- The Universities of Oxford and Zurich are key actors within highly successful and well-resourced ecosystems that are embedded within wider regional innovation systems. These span Oxfordshire, in central southern England; and in Switzerland includes the city of Lausanne as well as Zurich.
- Rather than being *university-led*, both ecosystems are better understood as highly *collaborative efforts* involving multiple actors, including other universities and numerous public and private sector actors focused on innovation and commercialisation and related support activities.
- Both the University of Oxford and ETH Zurich have strong knowledge transfer units and related mechanisms, incentives and cultures for supporting enterprise and innovation amongst their academics and research students.
- They also have strong networks with other UK and Swiss universities and research institutions for learning and policy influence. Oxford's international links are mainly with the US rather than Europe (with the exception of Leuven in Belgium and recently Zurich) and also include a recent collaboration with research partners in China.
- Areas of mutual interest and learning between Oxford and Zurich relate to the future development of the ecosystem - the process, direction and key factors which drive growth - and sharing ideas as to how to further develop the ecosystem and to work with others to set the agenda to help achieve this.
- Knowledge transfer is difficult, risky and expensive, and caution is needed when seeking to translate lessons from successful cases to other institutional/regional contexts.

## Context and overview of the ecosystems

**5.1** Oxford is a city in central southern England with a strong economy and a globally top-ranking university, the University of Oxford.[14] The city and the wider Oxfordshire county have all of the key elements and resources needed for a successful entrepreneurial ecosystem, including strong cooperative linkages and collaborative partnerships between a variety of actors in the university/public and private sectors, including:

- **two key universities in Oxford**, both involved in commercialisation activities and one that is world-leading in research with particular strengths in medical and life sciences
- **incubators and accelerators** which provide the student community with access to entrepreneurial skills training

[14] According to the Times Higher Education World University Rankings 2021

- **investment provision**, with Oxford Science Enterprises a key player and other investment groups that include Parkwalk Advisors, IP Group and Oxford Technology and Innovations EIS Fund (OTIF)
- **strong industry relationships and commercial partnerships**, including with AstraZeneca, Novo Nordisk and Rolls Royce
- **science and research parks**, including Harwell Science & Innovation campus, Milton Park and Begbroke, **which also provide homes for spinouts from University of Oxford**.

5.2 However, the Oxford ecosystem faces some constraints and challenges which, in part, arise from some 'downsides' to the city region's success. Constraints to further growth include: a lack of building space and affordable commercial accommodation, including for university spinouts; affordable housing; limitations related to transport infrastructure and broadband provision.

5.3 For the purpose of comparison, the Oxford ecosystem has been matched with university entrepreneurial ecosystems centred on Zurich and Munich. Some of the data on the key metrics used in the initial analysis undertaken are included in Table 2-1 below. The sections that follow draw on evidence from in-depth consultations with two key representatives from the universities of Oxford and Zurich, in both cases from key knowledge transfer units. Both individuals were able to draw on considerable experience and depth of understanding of their respective university/regional contexts and beyond. It was not possible to speak with any representatives from the Munich ecosystem, and so the remainder of the case study focuses on Oxford and Zurich.

**Table 5-1: Initial evidence for city ecosystem matches**

| Geography | Oxford | Zurich | Munich |
|---|---|---|---|
| **HE research intensity and reputation** | Over 1,400 research outputs between Dec 19-Nov 20<br>2 key institutions with 1 ranked in the Top 10 | Over 1,600 research outputs between Dec 19-Nov 20<br>4 key institutions with 2 ranked in the Top 100 | Over 1,250 research outputs between Dec 19-Nov 20<br>3 key institutions with 2 ranked in the Top 100 |
| **Enterprise and early stage finance** | Seed stage investment of $70m in 2018 and ranked fifth when scaled by GVA | Ranked ninth for seed stage investment with $194m in 2018 | Seed stage investment of $139m in 2018 |
| **HE scale** | Nearly 43k students and 8k staff across 2 institutions | Nearly 66k students and 20.5k staff across 3 institutions | Around 81k students and nearly 20k staff across 3 institutions |
| **Shared specialisms** | Life sciences, including pharma and MedTech<br>Engineering<br>Biology and Biotechnology | Life sciences, including pharma | Engineering<br>Biotechnology |
| **Context/scale** | 687k population<br>€23,929m GVA | 1.52m population<br>€153,595m GVA | 1.47m population<br>€105,898m GVA |
| **Overall match** | **N/A** | **Medium** | **Low/medium** |

*Source: SQW analysis, drawing on Nature Index, Times Higher Education World University Rankings 2021, Crunchbase, HESA, European Tertiary Education Register, ONS, Eurostat and World Bank data*

## Overall functioning as ecosystems

**5.4** Key strengths of the Oxford ecosystem reside in: its concentration of research and knowledge resources within the city and the wider Oxfordshire region; strong cooperative links between the numerous public and private sector actors; and related historical/geographical advantages.

**5.5** **The University of Oxford is a major contributor and collaborator in the ecosystem**, with Oxford University Innovation (OUI) being responsible for managing its considerable portfolio of knowledge transfer activity. OUI runs its own incubator for the university's students and the business school's Oxford Foundry delivers entrepreneurial skills training as well as operating a Creative Destruction Lab. Oxford Brookes is the other university involved in commercialisation activity

**5.6** **The Zurich ecosystem has experienced substantial growth and development over the past fifteen years or so**. ETH Zurich was described as being part of a domain comprising six institutions, with two universities, the other being École Polytechnique Fédérale de Lausanne in the west of Switzerland, and four other research institutions. The overall domain (both universities and the four institutes) produce 60 to 70 high tech start-ups per year, with 25 to 30 of these originating from the ETH Zurich. Inno-Swiss, a government organisation, provides a range of support, including: funding to foster collaboration between academic institutions and SMEs; a coaching service for start-ups; and educational programmes through private organisations throughout Switzerland.[15] There are also several Foundations set up to support start-ups.

## Role of universities

**5.7** This section considers various aspects of the role of universities by focusing on their commercialisation activities, enterprise culture, university-business partnerships and interactions with other universities, and draws out the strengths and limitations in each of these areas.

### University commercialisation

**5.8** **Both University of Oxford and ETH Zurich perform well in terms of commercialisation activity**. A fundamental strength of Oxford University is the quality and number of ideas generated. All of Oxford's research is rated as world leading, with medical sciences rated as particularly strong, having been at the top of the world league tables for seven or eight years. Around two-thirds of the companies which start-up/spinout from Oxford University are in life sciences. ETH Zurich also performs well in life sciences (combined pharma and MedTech), although it does not highlight this as a particular strength above ICT or engineering, which

[15] http://www.inno-swiss.com/

are the institution's other key sectors. Overall, the sectoral distribution of ETH Zurich start-ups and spinouts over the past 10 years is fairly evenly distributed.

5.9 **Start-ups and spinouts originate in different ways in Oxford and Zurich, which makes it difficult to compare like-for-like performance.** At the University of Oxford, spinouts are generally founded by senior academics with IP licenced from the university. Start-ups come out of the university incubator and the university has no equity stakes in them. Unlike Oxford, spin-outs from ETH Zurich are more often created by PhD students, or sometimes masters students, with the support of senior academics. It was acknowledged that this model can generate conflicts of interest. To account for this, ETH Zurich has introduced new regulations around the amount of equity a professor can have in a company, limited at 20% for a single professor.

5.10 **The scale and set of up of the two institutions' technology transfer offices also differs.** Oxford University Innovation (OUI) is a wholly-owned subsidiary of the university.[16] Of OUI's 80 staff, half are focused on licencing and ventures-based activity (signing licence deals and creating companies) and the rest support academics in their consultancy-based activity (i.e. making sure they are insured, negotiating day rates etc). ETH Zurich's technology transfer office (ETH Transfer) is smaller in scale, employing around 30 people.[17] ETH Transfer has three main areas of activity, which are broadly in line with OUI. These relate to: (i) collaboration with industry; (ii) intellectual property; and (iii) student entrepreneurship. In addition to ETH transfer there is also an industrial relations team which engages with companies. However, being a publicly owned institute, ETH Zurich has to be cautious in the ways and the amounts of money it receives from industry. In Switzerland, several institutions have attracted negative public attention and accusations of being "*steered by companies".*

5.11 **OUI and ETH transfer have different approaches to IP ownership**. Oxford has previously required that all IP generated by staff within the university usually belonged to the university, regardless of who funded it. However, a new approach was introduced just before the pandemic, which potentially allows the research funder ownership of the resulting IP, depending on the level of funding received and some other criteria. Conversely, ETH is an entirely public institution, which means it is bound (and empowered) by public law and legislation in terms of IP ownership with regard to IP generated by its employees. ETH looks towards Oxford University as an example for successful IP valorisation and spin off policy.

5.12 **For Oxford University, there is a clear emphasis on creating wider economic and social impact as well as financial income from commercialisation**. The Research Excellence Framework (REF), which all UK universities are subject to, is influential in this respect. Related to this, OUI has a greater focus on social enterprise creation, originally as a support for the social sciences and humanities, but now with academics across the university seeking to create social enterprises. Eleven have been created to date and OUI is seeking investment organisations who are looking to put money into social enterprises, although this has been

[16] https://innovation.ox.ac.uk/
[17] https://ethz.ch/en/industry.html

challenging to date. ETH transfer also aims to create social impact through its commercialisation activities. Being financed primarily by the Swiss government, there is a recognition that the research generated at ETH Zurich must "*give something back to society".* ETH Transfer therefore "*strives to make technology available as quickly as possible".*

**5.13** Both universities acknowledged the difficulties associated with quantifying and assessing wider economic and social impacts. OUI is not aware of any other university which has an accurate and efficient way of gathering this information, and it is a key topic of conversation in cross-institution discussions.

## Enterprise culture

**5.14** **Oxford University has grown a strong culture, including through structural changes, to support enterprise and innovation amongst academics**. It was, however, recognised that the university was starting from a low base, with many academics preferring to focus on pure research rather than innovation and commercialisation. The university now has a much stronger focus on enterprise, including through the leadership of a Pro-Vice Chancellor specifically responsible for promoting a culture of innovation. Also important has been a recent change to their founding equity policy for spinouts, as mentioned above, with the university having reduced the amount of equity it now takes from spinout companies. This is a substantial change from the previous position, and has been welcomed by both the academic and the investment community. There were previous concerns at the level of equity stake that the university was taking.

**5.15** **ETH Zurich has a number of incentives in place to encourage university researchers to help with commercialisation**. In terms of licencing income, ETH has similar regulations to Oxford. One third of the net income goes to the inventors, one third to the institute to fund further research, and the final third is kept by the central administration (as general income).

**5.16** **Student entrepreneurship is seen as crucial for both universities**, and they have mechanisms to support their student entrepreneurs and to foster enterprising behaviours and innovation amongst all their students. ETH Zurich is particularly reliant on post-graduate students for most of its start-up and spin-out activity, and has a number of clubs and mechanisms to support its students. For example, the ETH Entrepreneur Club is led by and for students, and was described as *"helping the ecosystem massively",* including by connecting student expertise with local organisations. The Entrepreneur Club also hold various events, including its very popular *F***-up Nights* which take the philosophy that *"Stories of success are incomplete without stories of failures."* [18] Diverse, high-profile speakers are invited to share stories of past failures and how these experiences have brought them closer to their current success. The emphasis is on "*breaking the taboo about failure", "learning*", and "*trying again."* These events attract many attendees, reportedly up to 1,800 in large venues such as movie theatres. As previously mentioned, OUI runs its own incubator programme for student

[18] https://entrepreneur-club.org/events/fuckup-nights/

entrepreneurs. Students also benefit from the Oxford Foundry which is part of the business school and provides students with access to entrepreneurial training.

### University-business partnerships

5.17 **Whilst both Oxford and ETH Zurich have strong industrial partnerships, the approach taken by their respective technology transfer offices is quite different**. OUI does not get involved at the research stage (although the university has a research services centre which deals with all of the research services contracting). OUI only gets involved with industry at the point that they are trying to find licensees to use the IP that has been generated. This means it is "*a commercial conversation right from the start"*, i.e. about licensing, patent costs etc. Conversely, of the 1,200 contracts which ETH transfer manages per year, around 400-600 are research collaborations with industrial partners.

5.18 **Both institutions regard industrial partnerships for research income as highly important**. Oxford University's reputation attracts a lot of industrial partners. As a result, the University has a number of strong partnerships, with companies such as AstraZeneca, Novo Nordisk and Rolls Royce, and is seeking to develop more partnerships. The university gets around £750m of research income per year, about £90-£110m of which is industrial research funding. In fact, Oxford receives the most research income from commercial organisations out of any of the six institutions in the 6U Group, the group of the six leading research universities in the UK, although the value is still felt to be lower than it potentially could be.

5.19 ETH Zurich has several key strategic partnerships with industry and recognises the value of such interactions. As a research institution that is strong on basic and fundamental research they are *"good at asking and answering the fundamental questions. But to solve problems you need exchange - there is a lot of talent in industry that the university wants to tap into and team up with."* Recent examples of collaboration between ETH and industry include the following:

- **A collaboration between ETH Zurich and IBM to build and equip a new cleanroom**. This shared infrastructure and the collaborative research which it hosts is described as "*a prime example of open innovation between the university and an industrial partner".* The cleanroom has resulted in numerous new technologies and significant IP generation.
- **Ongoing collaborative work with Disney, in the field of animation technology.** The Disney Research Centre in Zurich has worked with ETH over the recent years to develop the technology that is used in animated Disney films.

### Other university interactions

5.20 **Oxford University interacts and collaborates with other universities and research institutions throughout the world**. For ETH, the level of formal partnership working with other universities was reported to have progressed well over the past few years.

**5.21** Within the UK, Oxford University is part of the 6U Group. Together, these six universities undertake around 90% of the commercialisation activities in the UK. The heads of each of the technology transfer offices meet regularly through this group to *"share ideas, common thoughts, best practice, and messages for government*." At an international level, the 6U is part of the wider 10U which comprises the 6U in the UK, plus three US universities (MIT, Stanford and Columbia) and one EU university (Leuven). The 10U institutions meet every six months and host events. Oxford has good relationships in the US, and internationally in Europe with Leuven, Belgium's largest university, and more recently with ETH Zurich. A delegation from ETH Zurich has visited Oxford (OUI/OSE) in 2019 and ETH Zurich's former Rector Prof. Dr. Sarah Springman has become the Principal of St. Hilda College,. There is also an emerging partnership in China with an Oxford research centre set up there in 2018 with support from OUI.

**5.22** The Swiss Technology Transfer Association swiTT provides a strong link between the technology transfer offices of all the academic institutions in Switzerland. ETH's collaborations are driven in part by necessity: the university has three main sectors of interest, one of which is life sciences, but there is no medical faculty as the university does not have its own hospital. ETH therefore collaborates regularly with the University of Zurich which does have a hospital. Centres of competence are also important for collaboration. These are either across ETH Zurich, or across the ETH domain or national. There are around 30 centres in which ETH is involved, e.g. in mobility, energy and most recently AI.

## Role of other factors

### Leadership

**5.23** **The view of representatives in both Oxford and Zurich was that there was no single leader of the regional ecosystem**. Rather, it is a collaborative effort, with the universities' idea generation activity and outputs linking with others in the ecosystem. OUI's vision is to have a "*world leading innovation ecosystem, with Oxford University at its heart".* Similarly, the definition of the ETH Zurich as being "*university-led*" was described as only "*half-true*" because the leadership of other ecosystem actors was also recognised as important. The Oxford representative similarly felt that an ecosystem involving so many different actors cannot be 'managed' by a single institution in a top-down fashion. Hence a more devolved form of collaborative governance is required.

**5.24** It is also notable that both Oxford and Zurich have been able to grow their commercialisation activity as a result of strong strategic direction and leadership within their institutions over a number of years.

### Space / connectivity

**5.25** A main constraint on further growth of the Oxford ecosystem is a lack of building space and affordable accommodation for university spinouts, as well as housing provision for academics and other talent who cannot afford to live in Oxford.

**5.26** To help create affordable space for spinout companies, the university is looking at the creation of innovation districts. The university has two significant science parks which provide homes for spinout companies: one in the north at Begbroke, which is university-owned, and Oxford Science Park in the south, owned by Morley College. There is a particular focus on creating spaces where industry, researchers, spinout companies and students can physically co-locate, to foster collaboration.

**5.27** There is also a need for improved transport infrastructure and improved broadband infrastructure to support the number of emerging new companies. Oxfordshire Local Enterprise Partnership (OxLEP), with whom OUI has a good relationship, is a crucial partner in addressing such constraints by helping to find funding for infrastructure development.

**5.28** Issues around space and connectivity did not arise in the conversation with the Zurich ecosystem representative.

### Investment

**5.29** The investment landscape in the Oxford ecosystem has been significantly altered with the addition of Oxford Sciences Innovation (now Oxford Science Enterprises) in 2015. This £600m seed investment fund has spurred academics' interest in creating spinout companies and has driven "*a huge jump in the number of spinouts created each year*". Historically, securing early-stage investment has been a major limiting factor in the creation of start-ups and spinouts in Oxford. This is a common challenge across all innovation ecosystems due to the risky nature of early-stage investment and the length of time to commercialisation, particularly in research intensive areas.

**5.30** Oxford Science Enterprises was reported to be the Oxford University's preferred investment partner. Other investment groups include Parkwalk Advisors (which provide an EIS fund dedicated to Oxford spinouts); IP Group; and OTIF. Oxford is also proximate to London, and so benefits from investors located there.

**5.31** ETH Zurich credits Oxford University as a "*prime example*" of a successful approach to investment. The focus of the finance discussion with ETH Zurich was on various grant funding opportunities available. These include the following:

- **The Pioneer Fellowship**: A bi-annual call for applicants to receive 150k Swiss Franc in the form of a grant, in addition to an 18-month position in the Innovation and Entrepreneurship lab, where they receive coaching and expert advice. ETH provides around 10 of these grants each year (sponsored by donations to the University

Foundation) and the programme has generated many successful companies: around 66% of the grant recipients go on to create a company.

- **Grant allocation through the Wyss Zurich Translational Centre**[19]: ETH and the University of Zurich founded a new translational research centre "*at the interface of medicine, life sciences and engineering".* The centre was set up in 2014 with a donation of $120m US dollars, provided by an alumni of the two universities. Grants of between 1m to 5m Swiss Francs are available, alongside a further 60% of that value through infrastructure provision and other support.

## Looking ahead and learning

**5.32** The key priorities for the Oxford ecosystem are its *"continued growth, generation of good outcomes, strong companies that are delivering value, and continued research investment."* The main areas of mutual interest with other universities therefore relate to the future development of the ecosystem - the process, direction and key factors which drive growth - and they are keen to share ideas as to how to further develop the ecosystem and to work with others, including internationally, to design and achieve this: *"There is a big advantage to continue to work with universities in Europe to make sure that links are maintained."*

**5.33** The Oxford representative also reflected on the considerable challenge of raising the performance of other UK universities, and identified three key factors related to: the institutional culture and importance attributed to enterprise and innovation; willingness (or ability) to invest; and their history (or lack of) of innovative activity:

**5.34** For Zurich, several key priorities and challenges were identified:

- **Funding start-ups:** Although there is good early-stage investment provision, later-stage investments are more challenging to secure. Recent reports show that VC investment in Switzerland went over 2bn Swiss francs in 2019/2020. However, in 2019, of the eight top financing rounds, only one involved a Swiss entity.[20]

- **Clinical research** promises to add a lot of value but is a challenge: ETH puts a lot of focus on the medical area, with numerous activities related to pharma, bio, and MedTech, but are limited by not having a directly affiliated university hospital. Although clinical research is expensive and challenging, ETH is continuing to experiment with setting up and developing some these activities. The institution maintains strong collaborations with hospitals affiliated with Swiss cantonal (states) universities such as the University of Zurich.

- **Managing the new AI-related technologies**: One of the internal challenges is open source software, but getting to the right models is challenging. *"It creates tremendous*

[19] https://www.wysszurich.uzh.ch/
[20] https://ccvs.ch/wp-content/uploads/2020/12/VC-Report-2019_web.pdf
https://www.startupticker.ch/assets/images/VCReport_2020_web.pdf

*value, and you want to put things open source so that the whole community can work on it, but they struggle to work out how they can capture any of the value from it […] the university deserves a return on what is made public, if it is used commercially"*.

- **Creating a more co-ordinated environment and culture for entrepreneurship** amongst academics and students, including by better connecting the various clubs and activities.

## Issues of alignment and potential mutual learning

**5.35** The main learning area for Zurich relates to how Oxford approaches financing:

- In the Oxford system the university has a stake in all spin-outs (i.e. stemming from university research). That stake is now going to be either 20% or 10%, depending on the level of support provided, of which half goes to the VC funding partner – Oxford Science Enterprises. OSE provides a lot of seed funding, and a lot of follow-on funding. Having this model has helped increase spin-outs from just eight per year to over 20. This was seen by the ETH representative as a *"prime example of where ETH could learn from Oxford – internally it would create a very different picture. It is a very different environment though."*
- ETH Foundation is now experimenting with making small investments, with eight such investments to date, *"it is a first step and the dream for ETH transfer is to go further and create a model similar to Oxford."*
- ETH has also teamed up with four other European universities to create a shared university VC fund. Similarly in the UK, for example, Northern Gritstone involves three universities in the north of England seeking to develop a similar approach to the Oxford/OSE model.

**5.36** OUI also wishes to learn from ETH Zurich's commercialisation activities and experiences, and why they do things the way they do. However, it is important to recognise that every university has a different approach: it is not 'one size fits all', particularly given the quite different national/institutional and cultural contexts involved.

## Opportunities for learning

- **Areas of mutual interest and learning relate to the future development of the ecosystem** - the process, direction and key factors which drive growth - and sharing ideas as to how to further develop the ecosystem and to work with others to design and achieve this.
- **For Zurich in particular, specific challenges and learning opportunities include start-up funding beyond early stage**; creating a **more joined up environment** and culture for entrepreneurial academics and research students; and **specific knowledge/tech challenges** affecting the further development of its medical and AI related activities.
- **Knowledge transfer and commercialisation is clearly difficult, risky and expensive**, and caution is needed when seeking to translate lessons from successful cases to other institutional/regional contexts.

# 6. Case study: Cambridge

## Key findings

- The cities and universities of Cambridge, Leuven and Lausanne are all at the core of their respective ecosystems as 'anchor actors' for innovation and commercialisation.
- The three universities are research focused universities which have *pioneered* innovation and knowledge transfer within their regions.
- The ecosystem representatives agreed with the match between Cambridge and Leuven and Lausanne in terms of the potential for mutual learning and collaboration.
- Cambridge, Leuven and Lausanne had each established or explored various funding channels for entrepreneurial start-ups and early-stage finance but faced challenges, particularly on scaling up finance support.
- A strong and active enterprise culture was being cultivated in Cambridge, whilst for Leuven and Lausanne this is a key area for improvement.
- The universities have different intellectual property (IP) policies which are specific to their particular contexts and cultures.
- There were lots of areas of alignment for mutual learning between the three ecosystems. The representatives emphasised that is not a matter of copying and pasting things you see elsewhere, but implementing them within your specific context.

## Context and overview of the ecosystems

**6.1** The cities and universities of Cambridge, Leuven and Lausanne are all at the core of their respective university ecosystems. The representatives of the three ecosystems agreed that they are university-led ecosystems in the strict sense, with universities playing a pivotal role in innovation, commercialisation of IP, business creation and multi stakeholder collaboration. The three universities are research-focused and have pioneered innovation and knowledge transfer in their regions; and Cambridge, through the 'Cambridge phenomenon' and 50 years of proven growth through innovation, was seen as the 'gold standard' and model for university-led ecosystems.

**6.2** The three relatively 'small' cities are all located in close proximity to major urban centres, London in the case of Cambridge, Brussels in the case of Leuven, and Geneva, Lyon and others in the case of Lausanne. The representatives of the three ecosystems also agreed that there is a good match between Cambridge and Leuven and Lausanne, notably in terms of their potential for mutual learning and collaboration. Cambridge in particular has many of the key elements and components needed for a thriving entrepreneurial ecosystem. These include:

- **A university which plays the role of *'anchor actor'* for the ecosystem, provides a rich talent base (e.g. there are over 4,000 postdoctoral researchers in Cambridge), attracts talent into the ecosystem, and drives investment in innovation.** The University alongside the 31 colleges (all of which are independent entities) own most of the land in Cambridge, including the land occupied by the science parks. Key anchor initiatives driven by the university such as West Cambridge Innovation District and Cambridge Biomedical Campus provide a fulcrum for new opportunity and growth.
- **A strong investment network:** There are three different elements to Cambridge's funding ecosystem: (1) Cambridge angel investors (there are plenty of experienced and successful entrepreneurs who are '*putting investment back into the ecosystem'*); (2) a growing cohort of well experienced and well-funded Venture Capital firms; and (3) an increased presence of international VC funding (mainly US venture funding).
- **There is a large and diverse enterprise community**, with many early-stage and highly innovative businesses that produce more IP than any other place in the UK.
- **A cohort of large multinational corporations,** with particular specialisms in life sciences (e.g. AstraZeneca with its HQ on the Biomedical Campus) and IT (e.g. Apple, Amazon, Microsoft, Facebook all have operations in Cambridge and around).
- **A strong presence of science and technology parks:** Key areas of specialism are life sciences and technology e.g. biomedical.

6.3 While the elements described above make Cambridge a very strong example of a university-led ecosystem, this ecosystem is not immune to challenges and barriers to growth. Access to, and retention of, talents and skills is one of the biggest challenges the ecosystem has to confront. Although Cambridge does benefit from its proximity to London which can act as a '*talent sink'* for the ecosystem, the representative stated that the university is not producing enough talent to warrant the rate of growth of the ecosystem, and the primary reason for this is cost: the cost of housing, cost of living and cost of education. At a different level, Brexit and political situation in China and East Asia have negatively impacted on the influx of talent coming to Cambridge. The lack of availability of space for scaling up companies, and wider infrastructure issues are other important barriers to growth. Although there are plenty of sciences parks and places for companies of a certain size to scale, *'the journey of companies going from 50 to 200 to 2,000 people is quite challenging in Cambridge'*.

6.4 As previously explained, the Cambridge ecosystem has been matched with two European ecosystems: Leuven and Lausanne. Some of the data on the key metrics used in the data analysis is include in Table 6-1: below. The sections that follow draw on evidence from consultations with a small number of representatives from universities and other institutions in Cambridge, Leuven and Lausanne.

**Table 6-1: Evidence for ecosystem matches**

| Geography | Cambridge | Leuven | Lausanne |
|---|---|---|---|
| **HE research intensity and reputation** | Over 1,400 research outputs between Dec 19-Nov 20<br>2 key institutions with 1 ranked in the top 100 | Over 380 research outputs between Dec 19-Nov 20<br>3 key institutions with 1 ranked in the top 100 | Over 850 research outputs between Dec 19-Nov 20<br>3 key institutions with 1 ranked in the top 100 |
| **Enterprise and early stage finance** | Ranked 11th for seed investment with $164m in 2018 | Seed investment of $15.3m in 2018 | Seed investment of $54m in 2018 |
| **HE scale** | Around 48k students and 7k staff across 2 institutions | Around 49k students and 9k staff across 1 institution | Around 24k students and 7.5k staff across 2 institutions |
| **Shared specialisms** | Life sciences | Life sciences | Life sciences, esp. MedTech |
| **Context/scale** | 653.5k population<br>€22.5m GVA | 509k population<br>€17m GVA | 800k population<br>€48.5m GVA |
| **Overall match** | **N/A** | **Medium** | **Low/medium** |

*Source: SQW analysis, drawing on Nature Index, Times Higher Education World University Rankings 2021, Crunchbase, HESA, European Tertiary Education Register, ONS, Eurostat and World Bank data*

## Overall functioning as ecosystems

6.5 **The three university-led ecosystems matched in this study are well-functioning ecosystems**, each with an 'old' university in a relatively small city playing a key role in the performance and growth of their local economy.

6.6 The evolution of the ecosystem in Leuven is remarkable: going back 35 years (the representative of Leuven ecosystem reported), there was limited activity in Leuven: '*the city had a university, a hospital, a farmers' corporation and Stella Artois*'' and little else. Nowadays, the university, the university hospital and IMEC (a research institute specialized in nano electronics and digital technologies which spun out of a couple of universities, amongst which KU Leuven) are key actors when it comes to innovation and knowledge transfer. The University and University Hospital are '*pretty dominant*' in the city, and there are now around 18,000 high tech employees working in university spin offs and other high-tech companies.

6.7 The representative from Lausanne also saw Lausanne as being a genuine university-led and successful ecosystem. Lausanne is located in the Canton of Vaud and it is one of Switzerland's tops university cities. Out of the 800,000 people living in the Canton, 60-70,000 are linked to the university and polytechnique's schools, all of them developing applied science in some form. Most tertiary education institutions have business incubator or accelerator programmes to stimulate spin outs from their respective faculties; something that the Canton of Vaud (unlike other Cantons) has been promoting for the last 10 to 20 years.

6.8 As seen, 'smallness' and geographical 'proximity' are two key factors that help to explain these well-functioning ecosystems. However, the interviewees highlighted that there are important differences between the three ecosystems with regards to geography. Cambridge's geography for example is anything but straightforward. The Cambridge ecosystem stretches in different directions as required (towards London, Oxford, the rest of Europe and beyond) and it is in fact continuously evolving. Its geography is often described using two radii as references: 1) 7-8 miles radius of the city centre, which encompasses approximately 30 science and technology parks, 5,000 knowledge intensive companies and 100,000 people working in knowledge intensive jobs; 2) 2 miles radius of the city centre, which brings together the Cambridge Biomedical Campus, West Cambridge Innovation District, two science parks, and the growing artificial intelligence cluster close to the railway station.

6.9 Leuven's immediate geography is tightly defined, and the representative pointed out that you only have to travel 10-12 miles from Leuven to find big cultural differences. Lausanne's reach is broader, stretching to nearby cities such as Geneva, Neuchatel and Lyon (in France) with people commuting into Lausanne for work.

## Role of universities

6.10 This section considers different aspects of the role of universities within the entrepreneurial ecosystem. It covers the university commercialisation, enterprise culture, university-business

partnerships and other university interactions, and draws out the strengths and weaknesses in each of these areas.

## University commercialisation and financing

6.11 **This is an area in which Cambridge University excels.** A key distinctive feature is that the University runs its own seed venture investment fund. This fund is managed by Cambridge Enterprise (CE) on behalf of the University and their role is to capture the commercial opportunity from the research funding that goes through the university, looking at invention disclosures, patenting, licensing, company formation and consultancy. Cambridge also set up a scale-up fund to support the growth of companies much earlier than elsewhere in the UK, with Cambridge Innovation Capital established some 10 years ago. To assist the identification of intellectual property and investment opportunities, Cambridge has a very large team of specialists in commercialisation.

6.12 Cambridge also has a very different IP policy to the rest of the UK in terms of how they manage IP within the University. Essentially, the faculty can choose to opt in or opt out to working with the University to commercialise their IP. Other universities in the UK act as a gateway for any IP generated, and typically take a share of spin out companies that are formed or any licensing that happens. In Cambridge this is not the case: the Principal Investigator (PI) can choose to work with Cambridge Enterprise to commercialise their IP, or they can choose to do it themselves (e.g. with private sector investors). This creates a very liberal environment for IP commercialisation which, according to the representative, is very important to the functioning of the Cambridge ecosystem.

6.13 Unlike Cambridge, Leuven University has a relatively less decentralised IP commercialisation model which combines a very decentralised system with a centralised support infrastructure. Leuven Research & Development office is a centralised unit that deals with everything to do with knowledge transfer. They operate a 'one stop shop' approach and do everything in house (e.g. support for the creation of companies, professional training, consultancy, etc.). The system is in turn decentralised when it comes to taking decisions on what is done and who is in charge of the income generated from knowledge transfer, like in Cambridge, with income streams managed by the PI and not the University or faculty.

6.14 An important aspect for IP commercialisation is financing, which all start-ups need. The representative from Lausanne explained that Switzerland has a very liberal economic approach whereby the economy should regulate itself, with little government intervention. Within that context, Swiss 'cantons' (regions) have the freedom to regulate the activity of local businesses to a very high degree, something that does not occur in Cambridge. Canton of Vaud (where Lausanne University is located) has been recognised for its role in supporting innovation and collaboration among local stakeholders, which is anchored in the Canton's constitution. Innovaud (Lausanne's knowledge transfer office) exists to support start-ups and to guide and signpost them to organisations that can provide finance. They have a Foundation for Technological Innovation (FTI) where companies can apply for funding if they have a joint

project with a university in the Canton. Spin outs and PIs can also apply for seed funding offered by FTI.

### Enterprise culture

6.15 **University support for an enterprise culture is high on the agenda for Cambridge University**, with the strong commitment evidenced by the appointment of a Pro Vice Chancellor for Enterprise. There was also evidence of active promotion of an enterprise culture: there are numerous entrepreneurial and innovation training programmes across the University; fourteen out of the 30 colleges run some kind of innovation or entrepreneurship lab for their undergraduate students; and the Cambridge Entrepreneurship Post Doc Society focuses on entrepreneurial training and development for the post-doctoral community. Student societies are generally very active in cultivating an entrepreneurial culture within the college system and across the wider university.

6.16 A number of accelerator programmes aimed at early-stage companies have also been set up recently, with a focus on drawing out experiential learning. Accelerator programmes are very popular for young entrepreneurs looking for funding to create a company and develop a team. There are also a lot of experienced entrepreneurs in Cambridge who are willing to give up time to share their experiences and learning with the younger would-be entrepreneurs, often in informal ways.

6.17 **Developing an entrepreneurial culture on campus has been more of a challenge in Lausanne**. Historically the Swiss have been very risk averse (the representative explained) and this also applies to funders such as the VC community. Unlike the US where failure is acceptable, failure in Switzerland is something to avoid and perceived risks have paralysed certain ideas in the past. However, the representative explained that this is slowly changing, and that universities now offer degrees in innovation and entrepreneurship. As a result, the people coming into business now have a more entrepreneurial mindset. The representative from Leuven also reported that the entrepreneurial mindset of the average doctoral student is not as strong as in other countries e.g. in the UK or USA. Hence, whilst there are some specific contextual and historical factors that may affect transferability, there are interesting areas of practice that Lausanne and Leuven might learn from Cambridge; though it needs to be recognised that cultural change takes time and is not always possible.

### University-business partnerships

6.18 **University-business partnerships were mentioned as an important tool for business development and access to resources**. The representative from the Cambridge ecosystem commented that because of the freedom with which the academics in Cambridge operate regarding their IP, there are a lot of informal arrangements between academics/faculty and companies. Many of the university faculties undertake consultancy for companies too, and Cambridge is home to four of the most important tech consultancy firms globally.

**6.19** That said, university-business partnerships are an area where it was noted that Cambridge could improve upon. Evidence of this is in the lower levels of business/enterprise funding for research in Cambridge compared to peer institutions (e.g. Imperial and Oxford). This is partly due to relatively lower levels of academic engagement with industry and commercialisation agendas.

**6.20** There is also some resistance to collaboration with private companies in the Lausanne ecosystem. The representative explained that some university researchers distrust investment from private companies in their business ventures on the basis that private companies may take advantage of their relationship with university researchers. PIs should be seen as *'the big driver'* as it is their research that should attract the attention of potential investors, but they should also get the necessary support and encouragement to do so. There need to be more opportunities in the ecosystem for academia and business to meet. A similar view was expressed by Cambridge's representative: the PIs are key to relationships developing, but if they do not initiate these conversations, partnerships will not emerge; hence it is important to find ways to connect PIs with industry and stimulate those university-business conversations.

### Other university interactions

**6.21** For the University of Cambridge, collaboration with universities at national/international levels is more of a priority than at a local level. The University of Cambridge is part of the 6U and 10U groups and, through these networks, collaborates with universities in the leading ecosystems internationally. Interactions between the two universities in Cambridge (University of Cambridge and Anglia Ruskin University) are fairly limited.

**6.22** Recently Cambridge have tried to focus on a smaller number of strategic partnerships for the institution and have tried to grow their global connections, for example with organisations such as AstraZeneca, which has a major presence and HQ in the city. However, the representative remarked that more needs to be done to build relationships between the university and the wider ecosystem *'as there is a lot of informal interaction occurring within the ecosystem that is not capitalised effectively by the university'*. One example of this is the recruitment of talent from the university which in many cases takes place informally, and therefore without added benefit to the institution.

**6.23** To help facilitate engagement and networks both within and outside the ecosystem, and to inform agenda setting, various organisations exist that the University is also involved in. These include: Cambridge Ahead (looking at the innovation agenda); Cambridge And (looking at the FDI agenda); and the Cambridge Network (a networking organisation for business and academia).

**6.24** In Leuven, there are plenty of interactions at various levels between the key universities located in the area and also networks that try to stimulate such interactions. The role of leading by example has been significant in Leuven, with excellent researchers showing that

they can do successful partnerships with businesses, which have proved integral to the development of the ecosystem.

## Role of other factors

### Leadership

6.25 **All of the consultees highlighted the importance of institutional leadership in raising the entrepreneurial culture and enterprise agenda within their universities and more widely**. Cambridge (like UCL and Imperial) has Provost/Vice Chancellor for Enterprise whose role is to support entrepreneurial developments within and associated with the University. These include support for companies through the University's seed and venture funds, and ongoing developments of infrastructure such as through science parks, the West Cambridge Innovation District and the Biomedical Campus (the largest health hub in Europe). This highlights the ongoing focus and support for the innovation and impact agenda that builds on the longer history of the development of the ecosystem in Cambridge. These agendas require active involvement with other key local actors, such as local government, the Greater Cambridge Partnership (to which the University is a partner) and business.

6.26 Local leaders play an important role in the ecosystems of Lausanne and Leuven. One of Innovaud's most important missions in the Lausanne ecosystem is to bring together the different actors in the ecosystem, notably the University and the Canton government – the Canton of Vaud being one of the main University's partners. Innovaud organises dozens of events every year to bring actors together to achieve this mission. In this sense the role of 'leading by example' has been considerable in Leuven, the representative highlights, with lead researchers showing they can establish successful partnerships with business, which have proved really important to the development of the ecosystem.

### Space / connectivity

6.27 In Cambridge, transport and housing, and the connectivity between housing and the major employment centres are seen as factors that are limiting the growth of the ecosystem. Housing issues have become significant – the cost of housing and the location of housing is challenging, and without improvements to the public transport network there will be more private cars on the road, worsening the already high levels of congestion. If not seriously tackled, the physical infrastructure deficit will fundamentally limit the overall talent attraction and scaling potential of the ecosystem. The Cambridge City Deal (led by the Greater Cambridge Partnership) is key to helping to address these issues, though it is a long-term venture.

6.28 The small canton of Vaud is highly connected, with Geneva airport 35 mins away by train, the federal capital less than an hour away by train, and Zurich – the financial centre of Switzerland - two hours away. Physical infrastructure is rarely cited as a challenge. Digitalisation is something that is ongoing, and the government is funnelling a lot of money into securing the

infrastructure as they have ambitions to market Lausanne as being one of the best places worldwide in terms of cyber security.

## Looking ahead and learning

**6.29** A key challenge for Cambridge is making sure that there is the capacity to help companies scale up in the ecosystem, as it is often the case that start-ups in Cambridge acquire US VC funding or an IPO on US markets which means that economic output can leak out of the ecosystem. Another challenge relates to talent, specifically making sure that the flow of talent into Cambridge (and the UK more widely) remains viable after Brexit.

**6.30** For Leuven, they are a relatively small university in a small geography so there is a challenge around choosing the right alliances and deciding where to focus the pursuit of excellence. A key priority is on internationalisation of start-ups: as their local market is so small, they will not be able to survive without this.

**6.31** There were several areas for mutual learning between the matched ecosystems, some of which are detailed in the box below. The representatives emphasised that it is not a matter of copying and pasting things you see elsewhere, but implementing them within your specific context.

## Opportunities for learning

- **The case of Cambridge offers many different avenues for learning for other ecosystems in terms of its IP policy and finance**, among others. The faculty/PIs can choose to opt in or opt out to working with the University to commercialise their IP, which contributes to create a very liberal environment for IP commercialisation that is critical to the functioning of the ecosystem. In terms of finance, the University runs its own seed venture investment fund which aims to capture the commercial opportunity from the research funding that goes through the university.
- **There is a lot to learn from the culture of innovation which is very strong in Leuven**. In Leuven the importance of tech transfer and the university third mission is and has been firmly embraced and supported by the university, which, after 50 years or so, has helped to transform the culture and landscape for innovation in the region.
- **Leuven and Cambridge have well-developed engagement strategies with different stakeholders**. The Cambridge ecosystem, for example, is highly networked, some of which is hard to replicate, but there are organisations and initiatives that have contributed to this such as the Cambridge Network.
- **The Lausanne ecosystem has been successful in producing start-ups in life sciences and aerospace which feeds into the many science parks they have, and helps attract FDI**. The establishment of innovation-led partnerships, particularly between the University and the Canton of Vaud (the local government), has been crucial for these developments, with organisations specifically created to bring together the different actors in the ecosystem (notably, Innovaud).

# 7. Case study: Edinburgh

## Key findings

- All three ecosystems considered, Edinburgh, Dublin and Helsinki, are examples of strong, university-led ecosystems, which have seen success in commercialisation activities. Representatives from each ecosystem aspire to further growth, recognising untapped potential and areas for improvement.
- Edinburgh and Dublin function as local/regional ecosystems and also as part of wider national ecosystems. This is due to the small land areas of Scotland and Ireland.
- There is a strong enterprise culture amongst researchers in Edinburgh, stimulated through specific initiatives. More could be done to cultivate student entrepreneurship, with Helsinki providing an example of success in this area.
- Industry partnerships are important to Edinburgh and Dublin. They are of increasing importance in Helsinki to draw in more private investment to rebalance from historic high levels of public funding for research.
- Dublin and Helsinki have strong levels of collaboration between institutions within their ecosystems, and there may be lessons for Edinburgh.
- Attracting talent is a common issue across the ecosystems; universities are taking different approaches to address this.
- The Edinburgh ecosystem is constrained by a lack of space for new businesses; the Dublin ecosystem faces challenges around housing for workers.

## Context and overview of the ecosystems

7.1 Edinburgh is the capital city of Scotland and has one of the strongest economies of any city in the UK outside London. It is seen as one of Europe's strongest entrepreneurial ecosystems[21] with key attributes including:

- **two 'unicorn' start-ups** valued at over 1 billion USD
- **five key institutions involved in world-leading research**, particularly the University of Edinburgh
- a mix of **support programmes aimed at technology entrepreneurs** such as publicly supported programmes funded by Scottish Enterprise, university-led programmes and private initiatives including entrepreneur-led groups

[21] Edinburgh Ecosystem Whitepaper.pages

- **a deep pool of financial and legal advisors** to assist entrepreneurs to scale up innovation ventures as well as a plethora of experienced entrepreneurs and angel investors
- **sector strengths in data driven innovation**, finance and FinTech, IT/software and life sciences
- **strong partnerships** with commercial partners and technology incubators.

**7.2** However, like other ecosystems, Edinburgh faces challenges and barriers to growth. In particular, there is a lack of physical space in the city centre for new incubator and accelerator spaces. The spatial footprint of the ecosystem is having to expand outwards in order to find viable and affordable building space. The city centre is also a very expensive place to live and work. Alongside this, Scotland has a small venture capital network, a lack of large research-intensive companies, and it can be difficult to get academic buy-in to spinouts and industrial partnerships.

**7.3** The Edinburgh ecosystem has been matched with two European ecosystems: Dublin and Greater Helsinki (herein referred to as Helsinki). Some of the data on the key metrics used in the data analysis is included in **Error! Reference source not found.** below. The sections that follow draw on evidence from consultations with a small number of representatives from universities in Edinburgh, Dublin and Helsinki. The evidence therefore reflects the insights and perspectives of those consulted (and their institutions), rather than a more exhaustive review of the ecosystems.

**Table 7-1: Evidence for ecosystem matches**

| Geography | Edinburgh | Dublin | Greater Helsinki |
|---|---|---|---|
| **HE research intensity and reputation** | Over 700 research outputs between Dec 19-Nov 20<br>5 key institutions with 1 ranked in the world Top 100 | Nearly 400 research outputs between Dec 19-Nov 20<br>4 key institutions with none ranked in the Top 100 | Over 600 research outputs between Dec 19-Nov 20<br>2 key institutions with 1 ranked in the Top 100 |
| **Enterprise and early stage finance** | Ranked nineteenth for seed investment with $68m in 2018 | Ranked twelfth for seed investment with $147m in 2018 | Ranked thirteenth for seed investment with $141m in 2018 |
| **HE scale** | Around 67k students and nearly 10k staff across 5 institutions | Around 71k students and 3k staff at 4 institutions | Around 48k students and 6.5k staff at 2 institutions |
| **Shared specialisms** | Finance<br>IT/software<br>AI, Big Data<br>Electronics | Finance<br>IT | AI, Big Data<br>IT |
| **Context/scale** | 1.4m population<br>€48,924m GVA | 1.4m population<br>€122,635m GVA | 1.7m population<br>€79,114m |
| **Overall match** | **N/A** | **Medium/High** | **Medium** |

*Source: SQW analysis, drawing on Nature Index, Times Higher Education World University Rankings 2021, Crunchbase, HESA, European Tertiary Education Register, ONS, Eurostat and World Bank data*

## Overall functioning as ecosystems

7.4 **Each of the ecosystems considered in this case are university-led in that they have a small number of key universities that are key contributors to entrepreneurial activity**. Within the Edinburgh ecosystem, the University of Edinburgh is seen as the "*major creator of new technology-based companies*". Other universities, including Herriot Watt, are also important actors in the ecosystem although they do not carry out as much commercialisation activity. Similarly, the Helsinki and Dublin ecosystems are well-functioning ecosystems with universities at their core. In Helsinki, the University of Helsinki and Aalto University are key ecosystem players, particularly at the early stages of entrepreneurial activity. In Dublin, there are four universities which were regarded as key organisations in the ecosystem: University College Dublin, Trinity College, Technological University Dublin and Dublin City University. Dublin consultees emphasised a wider enterprise culture in the city with high numbers of technology start-ups unrelated to university activities. Overall, consultees had a strong sense that their respective ecosystems were performing well and that universities played a key role in achieving this.

7.5 **In addition to the universities, representatives also recognised the importance of a mix of other elements of the ecosystem.** In Edinburgh, the ecosystem benefits from having a strong quality of life offer, which attracts students, researchers, entrepreneurs and employees. It also has significant NHS research presence which offers opportunities for collaboration in life sciences. The Dublin ecosystem benefits from a "*reasonably vibrant*" investment community which is "*particularly well connected".* In addition, the Dublin ecosystem is set within a national context of strong support for innovation and entrepreneurialism. As a result, the universities are well supported: all Irish universities have an incubator as part of national government policy. Particular strengths of the Helsinki ecosystem include the role of the City Council in raising and allocating funds for innovation activity, and Slush, which is a large tech-focused investment event held annually in the city. Across the ecosystems Slush was recognised as a real asset to the Helsinki ecosystem. The model could be used to create similar events in Edinburgh or Dublin.

7.6 **For all three ecosystems, the importance of being part of a national ecosystem was referenced as key to their performance.** For both Edinburgh and Dublin, this was a reflection of the small sizes of the wider national economies, meaning that ecosystem actors will spill out more widely in the search for talent, finance, industrial partners etc. While this topic was not explicitly covered in the Helsinki discussions, it is noted that the Helsinki representatives often referred to strengths and weaknesses of Finland as a whole rather than just Helsinki, suggesting a similar stance.

## Role of universities

7.7 This section considers the role of universities in influencing various aspects of the entrepreneurial ecosystem. The main topics covered in the consultations with Edinburgh,

Helsinki and Dublin representatives were university commercialisation, enterprise culture and university-business partnerships.

## University commercialisation

7.8 **The University of Edinburgh is the largest contributor to academic research commercialisation in Edinburgh**, highlighted by the growing scale of the university's commercialisation service, Edinburgh Innovations. Edinburgh Innovations has nearly doubled in size (in terms of FTEs) in the past five years and now makes a significant contribution to start-ups in Edinburgh. In the 2020/21 academic year, Edinburgh Innovations supported 102 start-ups and five spin-outs, which together attracted in the region of £48m venture capital funding. This success is largely due to the *"fantastic backing"* by the University for commercialisation activity. The University recognises the benefits which commercialisation activity can bring, including: "*enhancing international profile, bringing in high quality research partnerships with industry and generating surplus".* The growth of commercialisation activity in Edinburgh has therefore come about through a virtuous cycle: Edinburgh Innovations is provided with support/resources, this generates benefits, and so warrants further support. The University of Helsinki is at an earlier stage in this growth journey, and so could potentially learn from Edinburgh Innovations' growth in recent years.

7.9 **The performance of Dublin universities in relation to spin-outs and start-ups is also considered to be "*very strong*"** relative to the amount of research funding that they receive. Like Edinburgh, commercialisation is undertaken through technology transfer offices which are individual to each university. The role of centralised government funding, however, seems to be more influential. The Commercialisation Fund, provided by Enterprise Ireland, was highlighted as a key factor in stimulating the commercialisation of research at Dublin Universities. This is similar in Helsinki, where commercialisation is often funded through government-provided 'Research to Business' (R2B) funding.

7.10 **The outcomes of university commercialisation in Helsinki are very dependent on government funding.** The R2B funding provided by the government has generated good outcomes for the ecosystem. However, public investment in this area is declining and there is a need for university commercialisation services to generate and demonstrate impact. The University of Helsinki has recently had noteworthy success in this area with the sale of Mobidiag, a biotechnology company. The total value of the sale was €660m, of which the University received a notable proportion, a clear success story coming from the University of Helsinki's investment into research-based start-ups. Building on this, Helsinki could potentially do more to market its offering and attract investment as well as research-intensive industry partners.

7.11 **The consultees from technology transfer offices agreed that IP processes can have a significant effect on the level of university research commercialisation** as it affects the incentives for academics to engage in commercialisation and the attractiveness of opportunities to external investors. In Finland, IP ownership is determined by the source of

the funding which is used to generate the IP. At the University of Helsinki, the University is one of the founding stakeholders. This creates challenges as the share that the University takes is usually considered by investors to be too high.

### Enterprise culture

7.12 **The University of Edinburgh has worked hard to create an active enterprise culture amongst staff and students at the institution.** Engaging academics in commercialisation activity is regarded as essential. Whilst there are a number of senior academics at the University who are *"passionate about the commercialisation agenda"*, for many academics their principal motivation is in academic merit rather than commercial success. The University and Edinburgh Innovations have therefore established a number of initiatives to encourage spinout activity and engagement with industrial partners amongst academics, which other ecosystems may be able to learn from.

#### Good practice example

*The University of Edinburgh has around 5,000 academics in total, and of these c. 1,000 are engaged in commercialisation activity in some way. This has doubled in the past five years. Edinburgh has encouraged this by:*

- ***Writing commercialisation into progression routes for academics:*** *As well as research and teaching, academics can also use commercialisation activities to support a promotion.*
- ***Implementing financial incentives:*** *If academics at Edinburgh make profit on work with industry, they can keep 50% of it to use in their own research.*
- ***Having liberal spinout policies:*** *Academics usually get a 50% equity stake in spinouts, meaning there is potential for them to earn a significant amount.*
- ***Demonstrating the quality of partners:*** *By bringing in high quality industry partners, the overall quality of research can be improved. For academics more interested in esteem/reputation than money, demonstrating the high quality of research encourages them to engage.*
- ***Offering seminars and classes:*** *These cover a variety of topics including linking research to practical application, overcoming challenges which prevent the growth of start-ups, and developing an entrepreneurial mindset.*

7.13 Both Helsinki and Dublin representatives recognise that more can be done to engage academics in commercialisation activity. This is particularly important in Helsinki, where public funding for research is declining and attracting industry funding is becoming

increasingly important. On this subject, there is scope to learn from the University of Edinburgh, which attracts a significant amount of industry funding annually.

**7.14** As well as encouraging academic staff to engage in commercialisation, all three ecosystems highlighted the importance of student entrepreneurship. The University of Edinburgh aspires to be a university of choice for student entrepreneurs. In the 2020/21 academic year, there were over 3,000 students engaged in the University's entrepreneurship programmes, and students started up over 100 companies. However, consultees from Edinburgh recognised that other universities, including the University of Helsinki, are further ahead in terms of student entrepreneurship.

**7.15** Within the Helsinki ecosystem there are a number of initiatives to encourage an entrepreneurial culture amongst students. One such initiative is the Hack for Society challenge which aims to "*build and scale an operating model to increase dialogue between political decision-makers and researchers, exchange information and share problem solving*".[22] Hack for Society has been credited with helping students to think about entrepreneurship as an option. Students at the University of Helsinki also benefit from the Think company, which is the entrepreneurship society of the University. It offers training programmes and runs events open to both students and researchers. Think Corner is a building located in downtown Helsinki where many of the events are held. It hosts discussions and other open events almost every evening as well as providing co-working spaces. Think Corner has proven to be very popular with student entrepreneurs.

**7.16** Dublin was unique in that an entrepreneurial culture seems to be ingrained in students at an early age by a national agenda. At school, pupils may undergo a 'transition year' during which they can engage in entrepreneurial activities.[23] Universities seek to build on this and offer support for entrepreneurship through competition funding and other means. Central to their approach is "*celebrating success in entrepreneurial activity*". This embeds the culture of entrepreneurship by recognising and rewarding achievements in this area.

**7.17** **For both Dublin and Helsinki, there was a sense that more could be done to improve the cohesion of the approach to student enterprise across different institutions.** For example, in Dublin, universities are individually implementing initiatives and encouraging student entrepreneurship, but the approach was seen as fragmented; more cross-institution initiatives could bring greater benefits. Similarly, the University of Helsinki is proposing a joint student entrepreneurship programme with Aalto University: "*Combining forces could improve outcomes".* The University of Edinburgh does not currently have any joint student enterprise initiatives or plans to instigate one. Student enterprise is one area that the University of Edinburgh seeks to improve, and there may be opportunities for learning in this area from Dublin and Helsinki institutions.

[22] Hack for Society, What is it about?
[23] The transition year is an optional one-year programme taken between Junior Cycle and Senior Cycle (around 15 years old).

## University-business partnerships

7.18 **The nature of university-business partnerships varied across the ecosystems.** The University of Edinburgh has a large number of SME partnerships in Scotland, the UK and further afield. However, the University's large industrial partnerships are mainly with non-Scottish companies, such as Huawei and Legal and General. This is considered to be "*normal*" for Scotland as Scotland has "*one of the lowest concentrations of research-intensive businesses of any region in the UK".* This means that the University of Edinburgh has always been very outward looking in its search for industry partners, although more could be done to anchor companies in the ecosystem. The situation is quite different in Helsinki where "*all of the universities want to work with Finnish industrial partners".* Helsinki may therefore be able to learn from Edinburgh in terms of looking outwardly and attracting international partners. As mentioned in the section on commercialisation, Helsinki universities could potentially work to improve their marketing to demonstrate their expertise and attract more large industrial partners. In particular, Helsinki would benefit from attracting more life science partners to Finland, which is a key research area for the University of Helsinki (50-60% of the research undertaken at the University of Helsinki is in life sciences).

7.19 Dublin also differs from Edinburgh in that around 80% of industrial partners are domestic. Industry partnerships are a key priority for Irish universities to not only bring in funding, but also to drive forward research: the quality of research, measured by number of citations, is higher when industry and academia work together rather than either working individually. Dublin benefits from a high concentration of "*good and interesting companies".* Some of these are university spinouts which help to attract other companies: "*good companies breed good companies".* Some of the Dublin spinouts are acquired by overseas companies, which may then anchor themselves or establish a research branch in Dublin. In Edinburgh, the process of anchoring more good companies is regarded as a priority. However, a current barrier to this process is the lack of affordable space in Edinburgh city centre (see in more detail below).

## Other university interactions

7.20 The University of Edinburgh has a good level of research collaboration with Herriot Watt University. Edinburgh University also has strong links with the institutions that make up the 6U[24]. Edinburgh is the only Scottish University in the network. Overall, the representative from Edinburgh University felt that the institution's closest ties are with institutions outside the ecosystem.

7.21 **The Helsinki ecosystem seems to differ from Edinburgh in that there are a number of close ties between geographically close institutions**. The VTT research institute, located in Helsinki, is another key player in the ecosystem. The University of Helsinki is currently in talks with VTT about how to improve interaction between the two institutions for the benefit of the ecosystem. A recent discussion on start-ups and spinouts allowed the organisations to

[24] Comprising University College London, Imperial College, and the Universities of Cambridge, Edinburgh, Manchester and Oxford.

reflect on the similarities and differences in their models with the aim of learning from one another. Another example of cross-institution collaboration in the Helsinki ecosystem is the Design Factory concept. Started by Aalto university, the Design Factory is an "*interdisciplinary product design and learning space*" which unites students, teachers, researchers and industry. The Design Factory expanded into a global network of innovation hubs in universities and research organisations. In 2021, the University of Helsinki joined the Design Factory Network with the Viiki Food Design Factory, which is the first ever sustainable food focused design factory.

7.22 **Dublin was also highlighted as having a strong level of collaboration between institutions in the ecosystem.** Ireland has a number of research Centres of Excellence which usually involve at least three universities. The universities therefore work together to attract funding and undertake research. In the past four years, the two main Dublin universities (University College Dublin and Trinity) have come together to create the university Bridge Fund. This is a dedicated seed fund for the two universities, and others in Ireland, to draw on. In the first round, approximately €40m was raised. The University of Cork was incorporated prior to a second round of fundraising which was carried out last year. Irish consultees pointed out that there is not the "*critical mass"* in Ireland to have multiple seed funds such as the Bridge Fund. It is therefore important for universities to work together. The University of Edinburgh has a small investment fund of its own (Old College Capital), one of only a few university seed funds in the UK outside of the 'golden triangle'. In Scotland there "*has been talk of*" a Scottish venture fund for a number of years. However, a representative from the Edinburgh ecosystem highlighted that the coordination required across several universities is a key barrier.

## Role of other factors

### Talent

7.23 A common challenge across all ecosystems is attracting and retaining talent. In Edinburgh, there seems to be little issue in attracting people from the 'quality of life' perspective – Edinburgh is an attractive city with a vibrant cultural offering as well as plentiful access to green space. However, the city often loses talent to London, where people move to advance their careers or secure funding for their start-up. Edinburgh Innovations is trying to prevent the loss of talent by working with the local business angel community to help entrepreneurs access the right investment in Edinburgh.

7.24 Access to talent was considered to be a limiting factor in the creation and subsequent development of start-ups and spinouts in Dublin. In particular, accessing management talent for new businesses is difficult although programmes do exist to help connect businesses to the right individuals. The Helsinki ecosystem faces a similar challenge: *"the common challenge across the Helsinki universities is finding the right people".* The University of Helsinki and VTT

are planning to discuss joint actions which could be taken to attract commercially experienced people who are well placed to lead new businesses.

### Space

**7.25** One of the main limitations for the Edinburgh ecosystem is around the lack of space for start-up companies. This stems from the historical focus of the Edinburgh economy. Unlike other cities in the UK, Edinburgh did not undergo an extensive period of deindustrialisation because the city's economy was built around professional services rather than traditional industries. Therefore, the city does not have large brownfield sites available for redevelopment. In the city centre, demand far outstrips supply of land and buildings. The University of Edinburgh, and other ecosystem actors, are working to expand the ecosystem outwards. For example, the Edinburgh BioQuarter, located three miles south of the city centre, is under development to become a more suitable space for start-up companies, particularly in life sciences.

**7.26** Unlike Edinburgh, Dublin has a number of sites which have undergone extensive redevelopment and now provide start-up accommodation, such as the docks area of the city. Accommodation for businesses has therefore not been an issue to date. However, consultees reported that it is often difficult for workers to find housing in the city, due to high house prices and limited availability.

## Looking ahead and learning

**7.27** Edinburgh, Helsinki and Dublin are similar ecosystems in terms of structure, sectoral focus and scale. They also face a number of similar challenges, particularly with regards to accessing talent and fostering an enterprise culture. It is clear from the above evidence that the ecosystems excel in different areas. There are therefore a number of opportunities for mutual learning, as summarised in the box below.

## Opportunities for learning

- **Industrial partnerships**: Helsinki wishes to understand more around how Edinburgh has cultivated its network of global industrial partners. Compared to the other ecosystems, Dublin seems to be more focused on domestic partnerships. Helsinki and Edinburgh may therefore be able to learn from Dublin regarding how to become more of a "*sticky platform"* to attract and retain innovative companies with partnership potential.
- **Enterprise culture:** Within the three ecosystems there are different approaches to creating an enterprise culture. The University of Edinburgh has been successful in engaging academics and has a number of initiatives it may be able to share its learning from. Helsinki has been particularly successful in student entrepreneurship, having implemented unique initiatives such as the Think company.
- **Talent:** All three ecosystems mentioned issues around attracting and retaining talent. Helsinki and Dublin institutions are considering developing joint initiatives within their respective ecosystems. This is not something that Edinburgh has considered so there may also be an opportunity for learning in this area. Consultees mentioned the need to retain experienced entrepreneurs in the ecosystem so that their knowledge and networks can be passed on. This may require initiatives which involve input from a mix of partners.
- **Funding structures for commercialisation services:** Within the ecosystems there are different approaches as to how university commercialisation services are set up and run. Helsinki representatives acknowledged that Edinburgh Innovations has managed to secure more resources than counterparts in Helsinki, and so there is potential learning regarding Edinburgh Innovations' growth in recent years and how it has secured such strong university backing.
- **Attracting investment:** There are various opportunities for mutual learning regarding attracting investment into early-stage businesses. For example, Dublin universities have successfully established a joint seed fund, the model for which could be replicated in Scotland more generally. Edinburgh is also interested in learning more about Slush – the annual tech investment event held in Helsinki.

# 8. Case study: Manchester

## Key findings

- The representative from Manchester emphasised that their institution (a HEI) belongs to several ecosystems that operate at different spatial levels (local, regional/pan-regional, and internationally). In comparison, the representative from Vienna viewed their ecosystem particularly within the boundary of Vienna and the surrounding area.
- The availability of funding for early stage investment was highlighted as a strength of the Vienna ecosystem but limited later stage investment was identified as a weakness. In Manchester these circumstances were reversed.
- Both ecosystems remarked on a disconnect between how commercialisation is presented in government rhetoric and how much funding it receives – in particular relative to the amounts of funding for research and teaching.
- Relationships between universities, entrepreneurs, spin-outs and wider industry seemed to be more actively encouraged in Vienna in comparison to Manchester.
- Interactions with other universities were evident in both ecosystems, including outside of the immediate ecosystem. This was exemplified by the Northern Gritstone in Manchester and WTZ Ost in Vienna.
- Networks and leadership were highlighted as integral to the functioning of the ecosystem in Vienna, in particular through the role of successful entrepreneurs 'giving back' through their expertise and through active business angel networks.
- Both ecosystems identified constraints around the availability of well-equipped and affordable space for start-ups.

## Context and overview of the ecosystems

**8.1** Greater Manchester (henceforth referred to as 'Manchester') is a major metropolitan area in the North West of England, encompassing 10 local authorities and a population of just under three million people. Manchester has a rich industrial heritage and sectoral strengths in life sciences (particularly cancer research), advanced manufacturing, and the creative industries[25]. Core components of Manchester's entrepreneurial ecosystem include[26]:

- **five higher education institutions (HEIs),** including the University of Manchester which is ranked amongst the top 100 universities worldwide

[25] *Greater Manchester Local Industrial Strategy (2019)*
[26] Points draw on: the *Greater Manchester and Cheshire East Science and Innovation Audit (2016)*; consultation feedback; and *https://www.greatermanchester-ca.gov.uk/media/4695/greater-manchesters-seven-devolution-deals.pdf*

- **two Enterprise Zones** (Corridor Manchester and Manchester Airport City), **dedicated innovation districts/areas** (such as Oxford Road Corridor and Salford Innovation Triangle) **and several renowned research institutions** that span Manchester's key sectoral strengths
- **a well-established business support environment**, including business support services (e.g., Greater Manchester Business Growth Hub), incubator and accelerator space, and a strong underpinning financial and professional service sector
- **evidence of cross-organisation collaborations** (e.g., amongst HEIs, and between HEIs and research institutions, the public sector (in particular NHS Trusts) and the private sector)
- **excellent air, road and rail connectivity and well-developed digital infrastructure**
- **strong local governance** - Greater Manchester was the first combined authority to be established in the UK and has had seven devolution deals to date.

**8.2** Despite its evident strengths, Manchester also faces a number of challenges. These include: skills deficits within the technology transfer offices (TTOs) of smaller HEIs and within start-ups; a scarcity of well-equipped low cost start up space; and a lack of finance (including public funding) for early stage investments. These issues are covered in more detail later.

**8.3** The Manchester ecosystem was matched with two European ecosystems: Vienna and Lyon. Headline the data on the key metrics used in the data analysis is included in Table 8-1 below. The sections that follow draw on evidence from consultations with representatives from the Manchester and Vienna ecosystems. The evidence therefore reflects the insights and perspectives of those consulted (and their institutions), rather than a more exhaustive review of the ecosystems. It was not possible to speak with any representatives from the Lyon ecosystem.

**Table 8-1: Evidence for ecosystem matches**

| Geography | Manchester | Vienna | Lyon |
|---|---|---|---|
| **HE research intensity and reputation** | Over 500 research outputs between Dec 19-Nov 20<br>5 key institutions with 1 ranked in the top 100 | Over 500 research outputs between Dec 19-Nov 20<br>6 key institutions | Just under 200 research outputs between Dec 19-Nov 20<br>6 key institutions |
| **Enterprise and early stage finance** | Ranked 23rd for seed investment with $47m in 2018 | Ranked 17th for seed investment with $73m in 2018 | Ranked 24th for seed investment with $42m in 2018 |
| **HE scale** | Around 104.5k students and 9.5k staff across 5 institutions | Around 131k students and 17k staff across 6 institutions | Around 77.5k students and 5k staff across 6 institutions |
| **Shared specialisms** | Life sciences<br>Biology/Biotechnology<br>Information Technology<br>Creative | Biology<br>Life sciences | Biotechnology<br>Information Technology<br>Creative |
| **Context/scale** | 2.88m population<br>€80,289m GVA | 1.89m population<br>€86,726m GVA | 1.87m population<br>€79,524m GVA |
| **Overall match** | **N/A** | **Medium/High** | **Medium/High** |

*Source: SQW analysis, drawing on Nature Index, Times Higher Education World University Rankings 2021, Crunchbase, HESA, European Tertiary Education Register, ONS, Eurostat and World Bank data*

## Overall functioning as ecosystems

**8.4** The representative from Manchester emphasised that their institution (a HEI) belongs to several ecosystems that operate at different spatial levels. This includes at a local level (for example, working with the other HEIs, hospitals, research institutions and innovative companies within the geography of Greater Manchester), regional/pan-regional level (working with other HEIs and organisations in the North of England, particularly in the advanced manufacturing sector), and internationally (working with investors from the USA, Asia and the rest of Europe). In comparison, the representative from Vienna viewed their ecosystem particularly within the boundary of Vienna and the surrounding area. They also remarked that over the past five to ten years there has been positive progress regarding the development and growth of the entrepreneurial ecosystem in Vienna; this is discussed in more detail below.

## Role of universities

**8.5** This section considers different aspects of the role of universities within the entrepreneurial ecosystem. It covers university commercialisation, enterprise culture, university-business partnerships and other university interactions, and draws out the strengths and weaknesses in each of these areas.

### University commercialisation and financing

**8.6** ***In some instances, the commentary around university commercialisation in the matched ecosystems aligned, however differences were also evident.***

**8.7** With regards to strengths, the University of Manchester now has a formal process to identify commercialisation opportunities and drive them forward to create companies or IP from which they can create future value. The representative explained that this was an effective process, particularly as the focus is on impact (as opposed to filing patents without cause) and because it ensures that businesses *'come out the other end'* having really thought through their commercialisation pathway and with commercially valuable IP.

**8.8** A strength highlighted by the representative from Vienna was the availability of finance, mainly public funding, for early-stage investments, which is advantageous for university commercialisation. However, the same cannot be said for later stage investment and as a result companies have to reach out to international investors (mostly in Germany, Israel, and the USA) to secure backing. In response to this, the Manchester representative remarked that the opposite is true in their ecosystem: there is an abundance of later stage investment but a scarcity of early-stage investment which in turn acts as a barrier to university commercialisation. The VC community does not fill this gap, especially for more risky 'deep-tech' ventures which require longer-term patient capital.

**8.9** The representative from Manchester also explained that although commercialisation is considered strategically important by the government, there is a disconnect between how this is vocalised and the amount of funding it receives in comparison to research and teaching. This is the same in Vienna: the ecosystem representative described commercialisation as '*the stepchild*' and stated that it receives much less funding than the traditional university functions. As a result, there are very few universities in Vienna (and Austria more widely) with good TTOs.

**8.10** Skills deficits within TTOs were highlighted as a university commercialisation weakness in the Manchester ecosystem: the representative explained that the recruitment of skilled individuals into TTOs (and also into newly formed spin outs) is particularly challenging. The comment about TTOs was echoed by the representative from Vienna who stated that few TTOs can afford to hire people with industry experience and thus are chronically understaffed. Furthermore, both ecosystems remarked on issues surrounding the retention of staff within TTOs: they explained that people tend to finish their PhDs, spend a year or two receiving valuable training in a TTO and then they move on, often to much higher paid jobs.

### Enterprise culture

**8.11** ***Wider university support for an enterprise culture was evident in the consultations for both ecosystems.***

**8.12** In Manchester, the Alliance Manchester Business School is a key player from higher education that supports the development of an enterprise culture in the ecosystem. It is a dedicated business school based at the University of Manchester which provides entrepreneurial training to undergraduates, postgraduates and executives. It has triple accreditation from AACSB International, AMBA and EQUIS and, due to its international links, has a global network of over 60,000 alumni. Alliance Manchester Business School is also ranked 2nd in the UK for research power[27]. The Masood Entrepreneurship Centre sits within the Business School and offers enterprise and entrepreneurship support activities. Its mission is to develop entrepreneurial skills in students, staff and alumni across the University and it does this through programmes within and alongside the curriculum, workshops, networks and competitions.

**8.13** In Vienna, support for an enterprise culture cuts across many institutions with almost every university and research institution having programmes, lectures and workshops dedicated to entrepreneurial thinking and acting. Furthermore, in the last two years the government has placed emphasis on encouraging women to become entrepreneurs. However, the representative also stated that entrepreneurial career opportunities in Vienna (and Austria more widely) need to be strengthened as the typical demographic tends to be people in their late twenties to early thirties who have just had their first child and thus are more hesitant to take the financial risk of starting up a new business; this acts as a constraint on the ecosystem.

[27] https://www.alliancembs.manchester.ac.uk/about/

## University-business partnerships

**8.14** ***It was apparent that university-business partnerships play an important role in the functioning of both ecosystems, with different relative strengths.***

**8.15** The University of Manchester works with a broad range of organisations from across the private, public and charity sectors, these include global companies such as AstraZeneca, BAE Systems, BP and Tesco; medical charities like Cancer Research UK and the Wellcome Trust; and public sector institutions such as local NHS hospitals and Greater Manchester Combined Authority[28]. The University has a dedicated business engagement service which manages relationships with industry partners, and sponsored PhDs are a particularly popular form of engagement. However, the representative from Manchester felt that university-business partnerships was an area the ecosystem could improve on.

**8.16** In Vienna, university-business partnerships are recognised as integral to the functioning of the ecosystem, in particular in relation to entrepreneurship. The representative explained that there is two-way dialogue between universities and business, with businesses actively encouraging students and professionals to '*knock on their doors when they have a smart idea*'. Furthermore, the representative's organisation (an incubator for innovative research/technology-based startups in Vienna) plays an active role in facilitating university-business partnerships: individuals from the incubator have initial conversations with start-ups to gain an understanding of the type of business partners they are looking for, and then they reach out to their networks to help facilitate new relationships.

**8.17** The representative from Vienna did highlight some limitations to university-business partnerships in the ecosystem however. For example, Vienna has very few large companies and although it does have some subsidiaries from international companies, it can be difficult to engage with these as their R&D centres tend to be located elsewhere. Furthermore, the relationship between universities and industry in Austria more widely is dominated by the fact that corporations receive substantial public funding and contracts tend to be tilted in their favour (e.g., universities don't get to keep the IP rights); although this is an inexpensive way for industry to do R&D, universities can lose out.

## Other university interactions

**8.18** ***The representatives from both Manchester and Vienna highlighted the importance of other university interactions.***

**8.19** Interactions between the University of Manchester and other HEIs in the North of England are very strong. The representative explained that in response to the lack of early-stage finance, the University of Manchester has joined up with the University of Leeds and the University of Sheffield to form a new investment company called Northern Gritstone. Northern Gritstone is seeking to raise £500 million from strategic corporate partners, institutional investors, and qualifying individuals to invest in the commercialisation of

[28] https://www.staffnet.manchester.ac.uk/rbe/beke/partnerships/

university science and technology related IP[29], thus enhancing the innovation ecosystem in the North of England. At the time of the consultation (November 2021), £350m had been raised. This kind of collaborative approach to generate scale is an interesting model that could be considered in other ecosystems facing similar challenges relating to finance availability.

**8.20** In Vienna (and Austria more widely), most of the interactions between universities and their respective TTOs are triggered by public money. For example, in 2013 the Austrian Federal Ministry of Science Research and Economy launched a programme called '*Knowledge Transfer and IPR Exploitation*'. As part of this, three regional knowledge transfer centres (WTZ Ost (in Vienna), WTZ Süd and WTZ West) were established to provide more attractive incentives for universities and public-sector research institutions to intensify the transfer of knowledge amongst themselves and with companies. By strengthening the cooperation and coordination, and by developing coordinated profiles and focuses, the knowledge transfer centres create ideal conditions for an efficient and successful transfer of scientific research results to the industry and to society, and further the development of key networks[30].

**8.21** A private initiative operating in Austria is Spin-off Austria. Established by two renowned investors (Hermann Hauser and Herbert Gartner) and their respective companies, the goal of the initiative is to promote entrepreneurship as the third mission of Austrian universities, alongside research and teaching. The three main elements of Spin-off Austria are: Spin-off Austria Dashboard, which provides data about how HEIs in Austria are performing with regards to spin offs; a schedule of training, networking and lobbying activities to embed incentive systems and procedures within the spin-off community; and an annual conference (The Spin-off Austria Conference) which highlights developments in Austria and connects the Austrian ecosystem with international best practice[31]. The representative from Vienna remarked that some of Spin-off Austria's activities were in the first instance controversial. For example, when the investors started reaching out to universities to ask how many spin-offs they had created within a specific time period, TTO managers were hesitant to provide this information as they didn't know whether Spin-off Austria was '*a friend or adversary*'. Therefore, although it strives to be a vehicle for cooperation between different actors, Spin-Off Austria was initially a driver for misunderstanding and there is room for better understanding on both sides.

## Role of other factors

**8.22** ***Other factors cited in the consultations with representatives from the matched ecosystems included: the density and quality of networks; leadership within the ecosystem; and the availability of affordable and viable commercial space for entrepreneurs.***

[29] https://northern-gritstone.com/about-northern-gritstone/
[30] https://boku.ac.at/en/fos/technologietransfer/cooperations/wtz-wissenstransferzentren
[31] https://www.spin-off-austria.at

### Density and quality of networks

**8.23** The representative from Manchester stated that angel investor networks in the North West of England are relatively under-developed at present. Conversely, the density and quality of networks were highlighted as a key strength of the Vienna ecosystem. The representative remarked that over the past ten years there have been positive developments in the ecosystem and cited the establishment of the Austrian Angel Investors Association (aaia) in 2012 as evidence of that (see below). In addition to the aaia, the representative from Vienna also highlighted that alumni networks play an important role in the functioning of the ecosystem.

#### Austrian Angel Investors Association (aaia)

*The Austrian Angel Investors Association (aaia) is based in Vienna and is Austria's leading network for angel investors, comprising over 200 successful entrepreneurs, investors and corporates. The aaia markets itself as a "Think and Do Tank of entrepreneurs for entrepreneurs" and strives to connect founders with experienced business angels interested in exchanging know-how, personal experiences and realising innovative ideas*[32].

### Leadership within the ecosystem

**8.24** Leadership was emphasised as being integral to the ecosystem in Vienna. In addition to the presence of a number of globally recognized investors who have been operating in and developing the ecosystem for a decade or more (such as Johann 'Hansi' Hansmann and Christopher Huber), the representative explained that in the last few years there have been some big exits of Vienna based companies which have triggered changes in the entrepreneurial community. For example, Themis Bioscience (a privately owned biotechnology company specialising in vaccines and immune-modulation therapies for infectious diseases, including COVID-19) was acquired by the US pharma giant Merck and Co (trading name MSD) in 2020 and Origimm Biotechnology (a privately owned biotechnology company specialising in skin disease) was acquired by French pharma company Sanofi in 2021. These exits are proof that it is possible to succeed as an entrepreneur in the Vienna ecosystem. The representative explained that the entrepreneurs that established these companies now act as role models and have spoken extensively in the media about their experience and the '*ups and downs of entrepreneurial life*'.

### Availability of affordable and viable commercial space for entrepreneurs

**8.25** Although there is dedicated commercial space for entrepreneurs in the Manchester ecosystem, the representative explained that it is often expensive and not entirely fit for purpose. Elaborating on this, they stated that there is a lack of low cost start-up space,

[32] https://www.aaia.at/en/about/

referring to these as '*rough and ready sheds where companies can go and set up at a very low cost'.* The representative from Vienna also highlighted challenges with respect to commercial space for entrepreneurs. They explained that there is enough office space but a lack of workshop and lab space, and that the places where you can rent this type of space have long waiting lists.

## Looking ahead and learning

**8.26** Whilst the scale of the Manchester and Vienna ecosystems might differ, alignment can be found, to some extent, on their respective approaches to fostering university support for an enterprise culture, research commercialisation and the importance of other university interactions. Furthermore, it is evident that the ecosystems are facing shared challenges in relation to: the amount of funding available for commercialisation; the recruitment and retention of highly-skilled staff in TTOs; and the availability of affordable commercial space. Both consultees were open to opportunities for future learning and sharing of best practice. The box below highlights three areas of potential learning between these ecosystems, and more widely for other ecosystems.

### Opportunities for learning

- **Funding for commercialisation and early-stage ventures:** the novel investment vehicle of Northern Gritstone offers potential for learning for other ecosystems in seeking to address funding gaps.
- **University-business partnerships:** Manchester and Vienna have different strengths in terms of fostering these partnerships and there could be scope for exploring mutual learning. For instance, Vienna has found success in developing dialogue and networks with industry around entrepreneurship and supporting start-ups. Manchester, on the other hand, has stronger links with larger corporate players.
- **Using networks, successes and role models:** building an entrepreneurial ecosystem can take time and a key part of this is in the development and retention of successful entrepreneurs, who can then bring their expertise and networks to help the next generation. Vienna's aaia offers an interesting model of practice in this area

# Annex A: Methodology

**A.1** More detailed information on the approach taken to the study, key caveats and limitations are set out in this section. In brief, the approach comprised: developing a long list of indictors of entrepreneurial-university ecosystems and refining this to a short list; identifying data sources for these in the UK and the rest of Europe; collecting and analysing the data to identify, pragmatically, potential ecosystem matches; and qualitative case studies with representatives from the UK and European ecosystems.

## Developing the indicator set

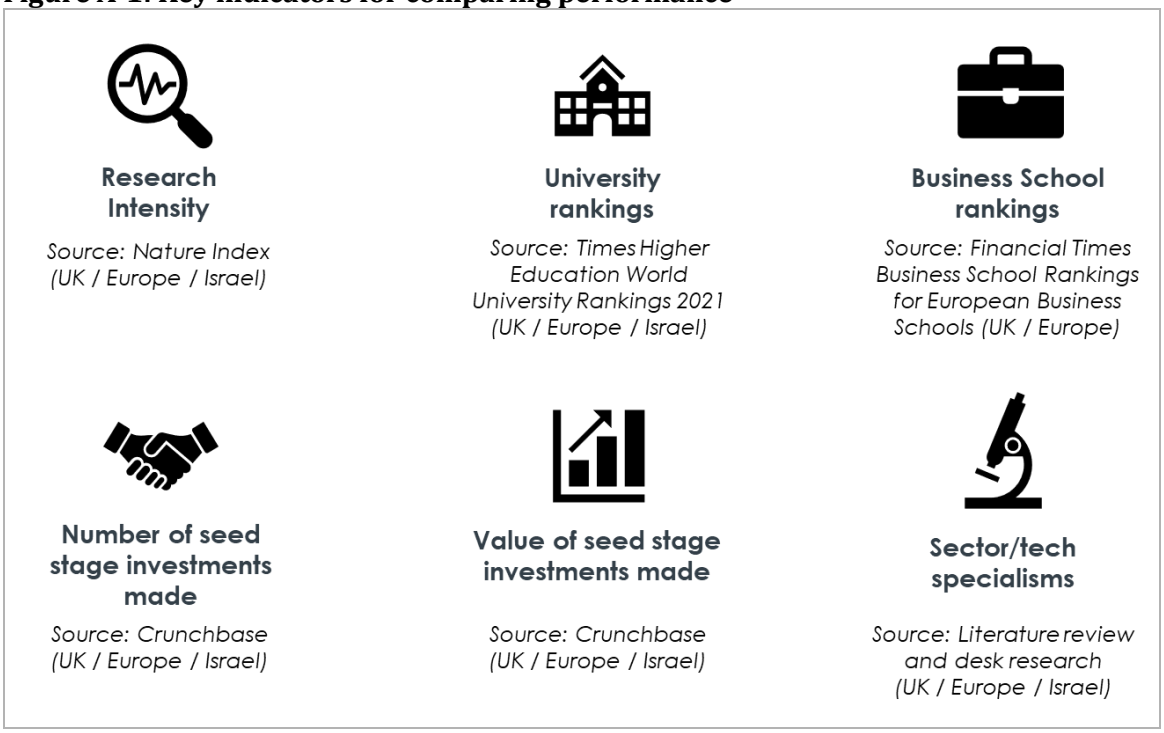
**A.2** A rapid literature review of academic and grey literature was undertaken, focusing on university-led entrepreneurial ecosystems in Europe and publications during the last decade. The initial search revealed few publications specifically on the university's role within the ecosystem, but an extended search found a number of papers either focused on, or at least which considered, the role of universities within European city or regional ecosystem boundaries. Seven academic papers and 10 grey literature reports provided the core review findings. This provided key findings on the main actors in university-led entrepreneurial ecosystems and indicators for university ecosystem benchmarking that had been used previously.

**A.3** Following this, to develop the proposal for the short list of indicators, several steps were taken. First, the long list of indicators that was compiled for the UK-US study was reviewed to define the indicators and check the availability of the data in terms of time, frequency and geographic level sources for Europe and Israel. In addition to this, other possible indicators were sourced from initial scoping work undertaken by Research England, suggestions from the TenU group[33], and the team's desk research and rapid review of academic and grey literature.

**A.4** Ten indicators on different aspects of ecosystem 'performance' and four indicators on contextual issues were identified based on their feasibility, relevance, balance and comparability. Following a data collation and analysis phase, six of the ten performance indicators were used (for the remaining four indicators[34] there were significant gaps or issues with the data).

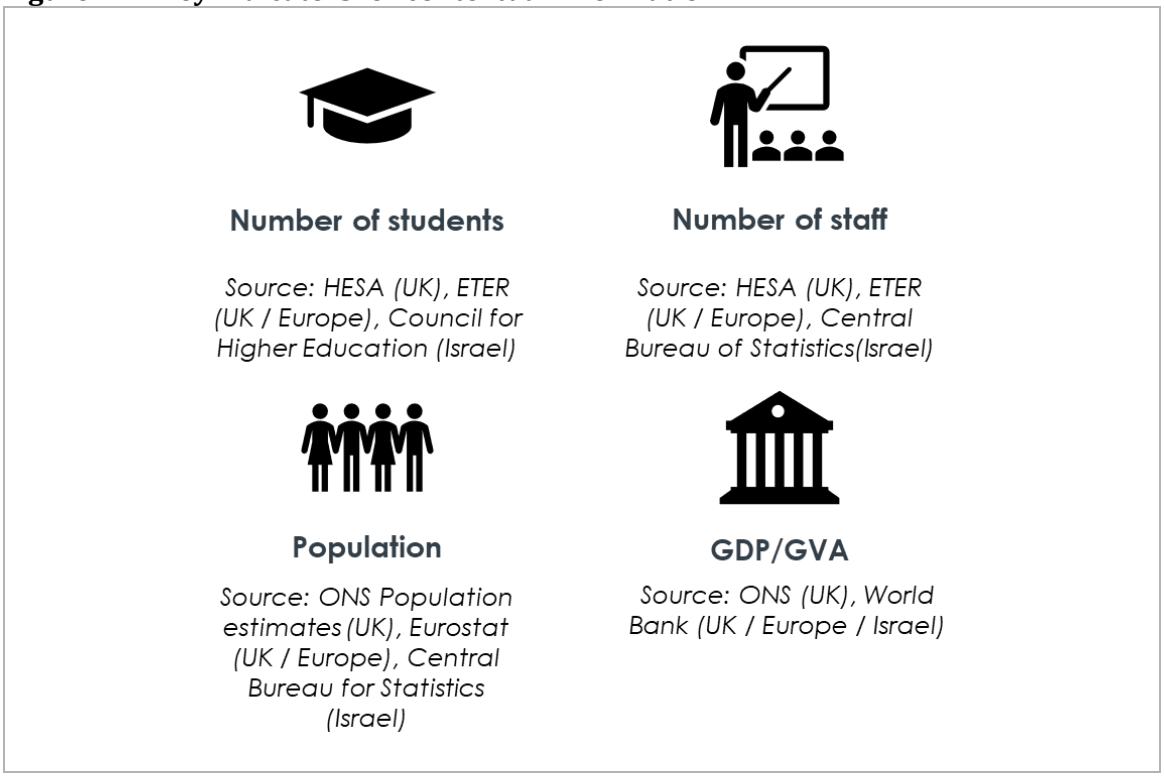
[33] TenU is a transatlantic group of technology transfer offices (TTOs) who have come together to leverage their combined tech transfer knowledge and experience. TenU's members are Cambridge (UK), Columbia (USA), Edinburgh (UK), Imperial College London (UK), Leuven (Belgium), Manchester (UK), MIT (USA), Stanford (USA), Oxford (UK), and University College London (UK).
[34] These four are: university R&D expenditure, start-up/spin-out activity, enterprise start-up rates and business R&D spend.

**Figure A-1: Key indicators for comparing performance**




*Source: SQW*

**Figure A-2: Key indicators for contextual information**




*Source: SQW*

## Identifying and defining ecosystems

**A.5** It was agreed that the study scope for the UK would be the ecosystems covered by the 6U, i.e. London (UCL and Imperial), Oxford, Cambridge, Edinburgh and Manchester. This was in line with the UK-US comparator work and reflects the fact that the six largest research universities in the UK are based in these cities. Therefore, these cities appear to be most likely to benefit from the further development of a knowledge-intensive entrepreneurial-university ecosystem. In line with the previous UK-US study, Table A-1 outlines the definitions of the UK cities that were used. Geographic definitions are often contentious, and data sources require administrative boundaries to be used, which do not normally reflect functional areas.

**Table A-1: UK cities and definitions**

| City | Definition |
|---|---|
| London | All London boroughs as per area covered by the GLA i.e., City of London, Barking and Dagenham, Barnet, Bexley, Brent, Bromley, Camden, Croydon, Ealing, Enfield, Greenwich, Hackney, Hammersmith and Fulham, Haringey, Harrow, Havering, Hillingdon, Hounslow, Islington, Kensington and Chelsea, Kingston upon Thames, Lambeth, Lewisham, Merton, Newham, Redbridge, Richmond upon Thames, Southwark, Sutton, Tower Hamlets, Waltham Forest, Wandsworth, Westminster |
| Cambridge | Cambridge City and South Cambridgeshire<br>*This is a 'tight' boundary; a wider geography was required for certain indicators* |
| Oxford | Cherwell, West Oxfordshire, Oxford City, South Oxfordshire and Vale of White Horse |
| Edinburgh | Edinburgh, Fife, East Lothian, Midlothian, West Lothian and Scottish Borders |
| Manchester | All councils covered by the GMCA i.e., Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, and Wigan |

*Source: SQW*

**A.6** Alongside this, a long list of 28 possible comparator ecosystems in the rest of Europe and Israel was compiled. This was drawn from the rapid review of literature, suggestions from the TenU group and SQW's original proposal. After an initial interrogation of the data, some ecosystems were removed due to not having strong research-led institutions. While most of the ecosystems in the long list covered a city or area in one country, two cross-border ecosystems were also included. These were Øresund (covering Copenhagen in Denmark and Malmö in Sweden) and the Eindhoven, Leuven, Aachen Technology Triangle (Netherlands-Belgium-Germany).

**A.7** Following this, and during the data analysis phase, a pragmatic approach was taken to defining the geography of each ecosystem in terms of core and surrounding areas. This drew on desk research and available NUTS (or other) definitions for the UK and rest of Europe. The definitions were chosen to enable the retrieval of comparative data for each ecosystem. It needs to be acknowledged that the definitions used were not perfect and that we have not consulted on these.

**A.8** There are a number of caveats and points to be aware of in relation to the geographies of ecosystems:

- Geographic definitions are the subject of much debate and, arguably, ecosystems do not necessarily have fixed boundaries – ecosystem boundaries can be very fluid, permeable and be constantly changing and shifting.
- There are a number of ways of thinking about geographies (e.g. functional or administrative areas) and ecosystem geographies can be multi-layered (e.g. local, regional, national and international).
- We have not assessed the effectiveness of the ecosystems, e.g. looking at whether they are indeed functioning ecosystems.
- Some of our key findings in the data analysis and our potential matches are dependent on how we have defined ecosystem geographies.

**A.9** The table below outlines our chosen geographic definitions for the long list of European ecosystems.

**Table A-2: European ecosystem geographic definitions**

| Ecosystem | NUTS2 | NUTS3 |
|---|---|---|
| Helsinki, Finland | Helsinki-Uusimaa | Helsinki-Uusimaa |
| Milan, Italy | Lombardia (Lombardy) | Milano |
| Oslo, Norway | Oslo og Viken | Oslo |
| Stockholm (+ Uppsala), Sweden | Stockholm, Östra Mellansverige (East Middle Sweden) | Stockholms län, Uppsala län |
| Aachen, Germany | Köln (Cologne) | Städteregion Aachen |
| Hamburg, Germany | Hamburg | Hamburg |
| Munich, Germany | Oberbayern (Upper Bavaria) | Munchen Kreisfreie Stadt |
| Berlin, Germany | Berlin | Berlin |
| Heidelberg/BioRN (+ Rhine-Main-Neckar region), Germany | Karlsruhe | Heidelberg Stadtkreis, Rhein-Neckar-Kreis, Mannheim stadkreis, Rhein-Pfalz-Kreis, Ludwigshafen, Frankenthal, Speyer |
| Freiburg, Germany | Freiburg | Freiburg im Breisgau, Stadtkreis; Breisgau-Hochschwarzwald; Emmendingen |
| Eindhoven, the Netherlands | Noord-Brabant (North Brabant) | Zuidoost-Noord-Brabant |
| Amsterdam and the wider Randstad | Noord-Holland (North Holland) | Utrecht, Haarlem, Het Gooi, Greater Amsterdam, Leiden |

| Ecosystem | NUTS2 | NUTS3 |
|---|---|---|
| | | and Bollenstreek, Delft and Westland, Greater-Rijnmond, The Hague |
| Barcelona, Spain | Cataluña (Catalonia) | Barcelona |
| Leuven, Belgium | Prov. Vlaams-Brabant (Flemish Brabant) | Arrondissement of Leuven |
| Brno, Czech Republic | Jihovýchod (Southeast) | jihomoravský kraj (South Moravian Region) |
| Prague, Czech Republic | Praha (Prague) | Hlavní město Praha (Prague City) |
| Paris, France | Île-de-France | Paris, Val de Marne, Seine-Saint-Denis, Hauts-de-Seine |
| Lyon, France | Rhône-Alpes | Rhône |
| Nice/Sophia Antipolis, France | Provence-Alpes-Côte d'Azur | Alpes-Maritimes |
| Zurich, Switzerland | Zurich | Zurich |
| Lausanne, Switzerland | Région lémanique (Lake Geneva region) | Vaud |
| Basel, Switzerland | Nordwestschweiz (Northwestern Switzerland) | Basel-Stadt |
| Geneva, Switzerland | Lake Geneva Region | Geneva |
| Dublin, Ireland | Eastern and Midland | Dublin |
| Tallinn, Estonia | Eesti (Estonia) | Põhja-Eesti (Northern Estonia) |
| Vienna, Austria | Wien (Vienna) | Wien |

*Source: SQW desk research*

## Identifying matches

A.10 Data on the indicators set out above were collected and analysed along with qualitative evidence. This was used to inform the process of matching the UK ecosystems with European ecosystems. The approach to matching was pragmatic, rather than scientific, and was based upon an informed judgement. Care was taken to avoid, as far as possible, putting too much emphasis or reliance on individual metrics. To do this, five key criteria were used, as follows:

- **HE research intensity and reputation** – based on Research Intensity data and University and Business School rankings
- **HE scale** – based on the number of students and staff
- **Enterprise and early-stage finance** – based on Crunchbase data on seed stage investment
- **Shared specialisms** – based on desk research of literature and websites

- **Context/scale** – based on population and GVA data.

A.11 UK and European matches were determined through two routes: potential matches identified from the quantitative data analysis, with an additional layer on shared specialisms; and potential matches based on our desk review of specialisms, subsequently filtered using the quantitative data. A series of recommended matches were shared with the client, and these were also tested and validated with the project group and wider contacts before the start of the case study research.

## Case study research

A.12 Once appropriate and relevant matches had been selected, five case studies were conducted to provide primary qualitative evidence and feedback. Each case study focused on one UK city and two or three European matches. The case studies were designed to help:

- interpret and contextualise the quantitative data
- add further local intelligence that cannot be easily obtained from the indicators
- identify useful areas of learning.

A.13 The case studies involved further desk research, an initial conversation with a representative from the UK ecosystem followed by joint interviews with a small number of representatives from the UK and European ecosystems. In total, representatives from eight of the 11 matched European ecosystems were consulted with. These interviews were semi-structured and, given resources available and the time-limited nature of the interviews, were focused on a small set of key issues drawing on: contextualisation of the indicators; key features of the respective ecosystems (especially the role of the universities); key priorities and challenges; and areas of alignment and potential mutual learning.

## Caveats and limitations

A.14 Given the focused nature of this study, it is subject to several caveats and limitations. First, this research was intended to be exploratory, rather than comprehensive. The matching process was undertaken pragmatically and designed to accommodate the limitations of the available and comparable data. There are many aspects of ecosystems that have not been considered as part of this study and only a small number of qualitative interviews have informed it. Further comparative work could be undertaken to investigate potential matches in more detail and consult a wider range of actors in each ecosystem.

A.15 Second, the accuracy of the data gathered is limited by the availability of comparable data in both the UK and Europe at the right geographic level and timeframe. For example, on several indicators, European data was available for only a subset of the universities in each ecosystem or NUTS regions. In addition, the genuine comparability of the data depends on how each indicator has been defined by data sources in the UK and Europe. Whilst this was considered

when identifying possible data sources, in some cases detailed definitions for variables were not readily available.

Third, considerations of scale and geography pose challenges for the effectiveness of comparisons. Whilst closer alignment on scale was found than in the previous UK-US study, the scale and breadth of ecosystems was variable, and it was particularly challenging to match London due to the size of its population and high number of key institutions. In addition, the geographic definition of a place and its ecosystem can be variable and subject to judgment; definitions may also not be in line with the definitions used to collect data.

SQW

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## About us

### SQW Group

SQW and Oxford Innovation are part of SQW Group.
**www.sqwgroup.com**

### SQW

SQW is a leading provider of research, analysis and advice on sustainable economic and social development for public, private and voluntary sector organisations across the UK and internationally. Core services include appraisal, economic impact assessment, and evaluation; demand assessment, feasibility and business planning; economic, social and environmental research and analysis; organisation and partnership development; policy development, strategy, and action planning. In 2019, BBP Regeneration became part of SQW, bringing to the business a RICS-accredited land and property team.
**www.sqw.co.uk**

### Oxford Innovation

Oxford Innovation is a leading operator of business and innovation centres that provide office and laboratory space to companies throughout the UK. The company also provides innovation services to entrepreneurs, including business planning advice, coaching and mentoring. Oxford Innovation also manages investment networks that link investors with entrepreneurs seeking funding from £20,000 to £2m.
**www.oxin.co.uk**