National Centre for Universities and Business

CONSULTATION

Input to the Scottish Government call for evidence for the Innovation Strategy

Submission by: National Centre for Universities and Business (NCUB)

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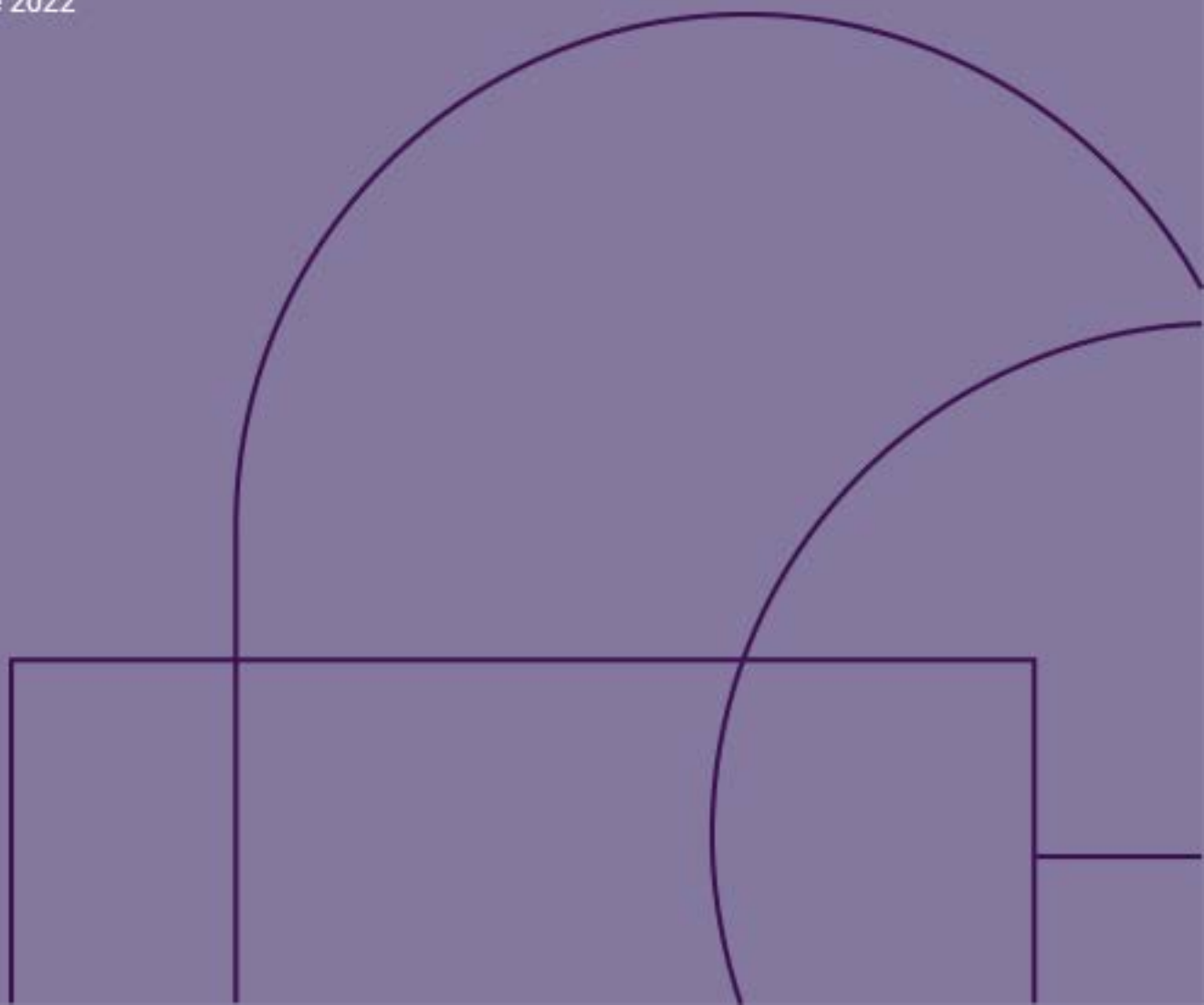

Input to the Scottish Government call for evidence for the Innovation Strategy[1]

Theme 1 – World leading excellence and expertise

1. **What sectors and sub-sectors should Scotland aim to be a world leader in?**

Areas to consider:

a. What are the innovation-rich sectors and sub-sectors where Scotland has existing or emerging competitive strength?
b. How can we support these sectors to compete, collaborate and seek out global opportunities?
c. What are our most exciting and promising areas of research and innovation where we have an opportunity to grow a significant industrial base in Scotland?
d. What are the disruptive global megatrends that we want to harness and capture in Scotland?
e. What steps will we need to take to support our businesses, universities and citizens to be able to engage with those opportunities?
f. Should we prioritise our support for early-stage research to create the discoveries and innovations of the future, or shift the balance of our support towards research translation and commercialisation of today's new ideas?
g. To what extent should we align our support for early-stage research with our economic and societal ambitions?
h. International comparators

In 2016, the National Centre for Universities and Business (NCUB) produced *Growing Value Scotland Taskforce Report: The Innovation Edge – Business Innovation and University Collaboration Scotland (2016)* (https://www.ncub.co.uk/wp-content/uploads/2016/05/NCUB-Growing-Value-Scotland-FULL-REPORT-1-reduced196.pdf). This report identified several innovation-rich sectors and sub-sectors where Scotland had strength. These include the creative and digital sector, the oil and gas sector, the life sciences sector, and the financial services sector.

At that time, emerging opportunities in the creative and digital sector included low carbon technologies, artificial intelligence, gaming, health and wearable technologies. Emerging opportunities in the oil and gas sector included mature basin asset management, cost-effective well construction and small pool development. Within the life science sector, smart / digital health and nutraceuticals were identified as emerging opportunities. While modelling risk and uncertainty and social and customer analytics were identified as emerging opportunities in the financial services sector.

In addition to those sectors identified above, analysis by NCUB for the UK Department for Business, Energy and Industrial Strategy using the online brokerage platform *konfer* (*https://konfer.online/*) has identified research strength (measured in terms of academic outputs) in each of the seven technology families of UK strength and opportunity described in the 2021 UK Innovation Strategy: advanced materials and manufacturing; AI, digital and advanced computing; bioinformatics and genomics;

[1] This response will be submitted via an online form so all references have been included in the body of the text.

engineering biology; electronics, photonics and quantum. Further analysis would be beneficial to understand specific areas of comparative advantage and compatible emerging industrial strength within Scotland.

During the pandemic, NCUB worked with the University Commercial & Innovation Policy Evidence Unit to understand the, 'effects of the Covid-19 pandemic on how universities contribute to innovation' (the full report is available here: https://www.ncub.co.uk/wp-content/uploads/2021/05/NCUB-Covid-Survey-Report-Jan-21-UNIVERSITY-v2.pdf). The report highlights the important role of universities in any recovery from the pandemic and beyond. The report was informed by a survey of universities. They called for greater support from government for 'the enabling system of knowledge exchange infrastructure and support'; 'post-research translation, development and commercialisation activities that helps ideas and technologies progress along the research-to-innovation pathway towards application'; 'delivery of challenge-and outcome-driven programmes'; and 'the building of international collaborations and links.'

Support for early-stage research is crucial to the health of the Scottish research and innovation system. It is valued by businesses as well as universities. NCUB's 2020 R&D Taskforce called for sustainable investment in fundamental research in addition to greater support of funding focused on research translation and commercialisation aligned to commercial missions that reflect economic and social ambitions (the full report is available here: https://www.ncub.co.uk/wp-content/uploads/2020/11/NCUB-RD-Taskforce-Report-2020-Final.pdf).

2. **How do we ensure that our universities, and other research and innovation performing institutions, act as anchors for the economy, playing their fullest role in helping grow businesses at the cutting edge of innovation?**
3.

Areas to consider:

a. How can we improve the connections between academia and industry?
b. How can we further encourage and support the successful commercialisation of university research, including through spinouts and licensing?
c. How can we work with universities and colleges as educators and trainers, as performers of research and knowledge exchange, and as supporters of new business formation to make a transformational change in innovation performance?
d. International comparators

NCUB's 2016 *Growing Value Scotland Taskforce Report: The Innovation Edge – Business Innovation and University Collaboration Scotland* includes the output of interviews by consultants with business, academic and policy leaders on what is required to achieve greater connection between academia and industry. Summary conclusions included:

- **'Engagement with universities was strongly welcomed and traditional issues, such as negotiation around intellectual property, were seen as an inconvenience rather than a fundamental challenge.**
- **Universities could play a more important role in delivering step-change improvement in innovation support. Most of those consulted as part of this exercise believed that universities could do far more to support innovation in Scottish business.**

- **Personal relationships are at the heart of all successful interactions between businesses and universities. Many consultees believed that the key to enhancing university-business interaction lies in empowering those tasked with delivery. Many consultees also believed that there is a need to achieve greater alignment between the incentives for university staff and those facing business.**
- **There was a consensus amongst consultees that university knowledge exchange offices should be better resourced, with stronger capacity to engage at a senior level. Many believed that there is a need for knowledge exchange functions within universities to be more focused on economic development rather than on sales and income generation.**
- **A more holistic approach is required. Those we consulted believe that to achieve a significant increase in the volume of university-business engagement, universities, and policy makers within government and its agencies, will need to take a more holistic approach to innovation support that recognises the full spectrum of university-business interaction. While collaborative R&D is and will remain an important component of this mix, it can only be part of the solution.'**

These conclusions are supported by more recent analysis of survey responses from 3,823 business across the UK (280 of which were based in Scotland) for NCUB by the Centre for Business Research at the University of Cambridge. This analysis is contained in the report *The Changing State of Business-University Interactions in the UK 2005 to 2021 (2022)*. The report found that for initiating and facilitating business-university interactions, 'it is individuals that matter.' Specifically:

- **'Both business and universities play active roles in initiating and facilitating interactions, with mutual actions being the norm.**
- **Within the university sector, it is individual academics and individual professional staff that help start and sustain these relationships, indicating that personal contacts are important mechanisms for university-company interactions.**
- **Few companies appear to devote significant staff time and resource to working with universities.'**

The report is available in full here: https://www.ncub.co.uk/wp-content/uploads/2021/07/5334_NCUB_Changing_State_of_Business-University_Interactions-FINAL.pdf.

Prior to the publication of ***The Changing State of Business-University Interactions,*** **NCUB held a series of roundtables with stakeholders across the UK. The Scottish roundtable included representatives of both businesses and universities. At this event, participants noted the importance of support that enable multiple partners to collaborate. For example, two universities and a business.**

The successful commercialisation of university research, including through spinouts and licensing can have significant economic and social outcomes. The political focus on this is understandable, but narrow. This is only one form or business-university interaction. Additionally, the importance of 'difficulty in reaching agreement on intellectual property', may have been overstated as a constraint to university-business interaction. Other factors, specifically lack of resource within business, appear to be more important barriers to interaction between businesses and universities.

To support, and scale up, connections between universities and business, NCUB developed *konfer* – a smart-matching innovation tool. The platform enables search and discovery of both business and

university expertise across the whole of the UK, and direct connections with potential collaboration partners.

4. **How do we support and grow clusters of excellence to deliver on our vision for innovation?**

Areas to consider:

a. How can we ensure regions across Scotland contribute to and benefit from a more innovative and productive economy?
b. How do we build innovation systems that deliver regional economic priorities and attract talent and investment to the region?
c. How best do we connect companies with Scotland's existing innovation assets and major place-based projects to drive competitive advantage?
d. International comparators

Analysis by SQW, hosted by NCUB, compares university-centred ecosystems in the UK and rest of Europe, including Edinburgh. Key findings across the case studies include, 'the 'fluidity and permeability of the geographical boundaries and of ecosystems'; the importance of leadership and 'senior-level buy-in to commercialisation'; the importance of, and difficulty in, securing finance and funding for early-stage technology companies'; and that the attraction and retention of talent was a 'challenge for many of the ecosystems.' The report identified the following learnings:

- '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.'

The report is available in full here: https://www.ncub.co.uk/wp-content/uploads/2022/05/Comparing-university-centred-ecosystems-in-the-UK-and-the-rest-of-Europe-final-report.pdf.

It is important to note that, for businesses, proximity is only one factor when determining which universities to partner with, and that its importance varies depending on the type of interaction. ***The Changing State of Business-University Interactions in the UK 2005 to 2021*** **found that:**

- **'UK businesses interact with universities on a global scale. Overseas universities were involved in around one-third of licensing interactions and over one-fifth of people-based and problem-solving interactions. For commercialisation interactions, the propensity of companies to use combinations of locations including international collaborators was relatively high.'**