June 2022

Universities Scotland Consultation Response: Scottish Government's Innovation Strategy

Question 1. How do we make Scotland one of the most innovative small economies in the world?

- Where do we want to be in 2032?
- What are the successful features of other small but highly innovative economies that we should emulate in Scotland?
- How do we measure our performance and set targets?
- What are the urgent steps we need to take to achieve this vision?
- What role can Scotland play on the international stage, both in the near future and in 2032?

Universities share the aspiration to make Scotland one of the most innovative small economies in the world. There is already much to celebrate and a foundation from which to build. Below we consider how universities might make a greater contribution, working with government and other actors.

We would like to note that we have sought to respond to each question individually but for many questions we would encourage the Scottish Government to consider the content from across our response, illustrated in our response to question 4 which is relevant to question 6.

Essential ingredients

The National Strategy for Economic Transformation (NSET) notes:

Scotland already has many of the essential ingredients of a successful entrepreneurial nation– world-class colleges and universities producing exceptional people and cutting edge research, an active investment market and respected initiatives and organisations such as CivTech, Converge Challenge, Scottish Edge, Young Enterprise Scotland and Scotland CAN DO. We also have a business start-up rate amongst 18-24 years olds double that of the population as a whole.

To expand on the university contribution, the following ingredients should be key to any Innovation Strategy. Innovative economies around the world are also investing strongly in those same ingredients and, as we explore in response to the questions below, that is a strategic issue for Scotland. There is a need for action to simply sustain these ingredients in the face of competition, as well as to try to enhance them:

- A world-class research base, across a wide breadth of disciplines. The recent Research Excellence Framework (REF)[1] reconfirmed the strengths of the sector's research base with 86% of the research submitted by Scotland's universities has been judged to be world-leading (4*) or internationally excellent (3*) in its quality. The equivalent figure for all UK universities is 84.37%. That excellence is vital, as is its breadth which supports the interdisciplinary identification of innovation in the face of the multifaceted nature of complex problems.
- Over 50,000 university staff and 282,000 students[2] that are key to the flow of innovation-minded talent into organisations across Scotland and into the community of entrepreneurs creating their own businesses. That staff and student community includes 98,900 people from outwith the UK. Those individuals often stay to work or create businesses here or return home to add to Scotland's 'soft power' relationships across the globe, including fostering export and FDI. This is already recognised in a range of Scottish Government strategies and should feature in the promised International Education Strategy.

[1] https://www.ref.ac.uk/
[2] HESA Staff record 2020-21 Full time equivalent excluding 'atypical' staff

- Universities provide directly, or in partnership, the vast majority of business incubator facilities in Scotland[3]. Those facilities are established and sustained through institutions' own entrepreneurial action and resourcing.
- Universities are the creators and hosts of key world-class infrastructure which contributes to the development and growth communities of global and local innovative companies, for instance the Advanced Forming Research Centre[4] and the UK national Supercomputing Service, ARCHER2[5]. Universities are uniquely positioned to leverage the investment for these facilities, often drawing together substantial public and private sector contributions.
- Universities each develop and grow a large and diverse set of relationships across the public, third and private sectors. Each year this leads to more than 21,000 organisations[6] in Scotland working with universities on formal contracts for innovation activity such as R&D, consultancy and bespoke CPD. This is part of a far wider set of relationships and engagement with organisations from the micro to multi-national scale. Universities are uniquely positioned to put in place innovation projects with, as we discuss under our response to other questions, the potential to leverage significant additional resources to support action.
- Finally and noted within the NSET: delivery is key and the role of Universities is paramount for delivering the goals of the NSET and therefore the Innovation Strategy.

Agility and the flexibility to respond to opportunity and change

An aspiration for the coming decade should be a further enablement of key actors such as universities, working entrepreneurially (alone and in partnership and at a local and global level and in all of the contexts noted above) to develop a more innovative economy.

We reflect in responses to other questions how this might be done and the measurable impact that might flow from that.

It is right that, akin to the export and investment plans, the strategy should seek to give a focus for action over the coming decade, for instance the identification of 'key sectors'. Universities are both the catalysts for the creation and growth of such sectors and are a key sector in their own right. As the NSET notes, the sector is a 'foundation for success':

"further and higher education institutions which supply the skills and research base that drive economic transformation and are key economic actors in their own right".

However, that should be balanced with a recognition that:

- Opportunities will arise over time, often in response to tides of global change. A successful country will also be able to seize these where they align with its strengths and / or strategic needs. To illustrate, consideration of innovation in agriculture has been important to Scotland for many years. Our excellent academic institutions and research institutes have contributed to innovation within Scotland and around the world. There has been, and continues to be, a strong focus on achieving net zero, where agriculture has a significant role to play. These things endure but now the world faces a fast-emerging food supply challenge and our universities will play their role in addressing this.
- We should support as many organisations to innovate as there are that would benefit, be they micro-businesses or organisations in sectors outwith those seen as a focus for

[3] https://www.thedatalab.com/wp-content/uploads/2019/05/Scottish-Entrepreneurial-Ecosystem-Guide-V1_March-2018.pdf
[4] https://www.strath.ac.uk/research/advancedformingresearchcentre/
[5] https://www.archer2.ac.uk/
[6] SFC Knowledge Transfer Metrics 2020-21

innovation potential. As discussed below, measures such as postgraduate student placement projects can have significant impact for such organisations and, when aggregated, the impact can be significant.
- The student supply chain is vital to fulfilling the NSET's ambitions of fostering and sustaining an entrepreneurial culture in Scotland, The current activities and future ambitions of the sector's work on entrepreneurial student support is discussed in more depth in question 7.

Therefore, an Innovation Strategy might best be framed to enable such actions and impact over the coming decade rather than seek to prescribe exclusively the specific actions required and the sectors to be focused upon.

Maintaining global competitiveness and contribution

That agile and effective response will continue to be built on the 'essential ingredients' acknowledged in the NSET and the Strategy should include a focus and action on at least maintaining them, often in the face of strong and growing global competition. Innovative economies around the world are investing strongly in those same ingredients and, as we explore below, it is a strategic issue for Scotland to ensure that this foundation is not eroded. Indeed it should aspire to see it enhanced as part of an innovation and broader economic strategy.

Such competitiveness and excellence is also the 'participatory bar' for global partnership, be it for commercial or for broader purposes including Overseas Development Assistance (ODA). It is key to attracting the best researchers and students to Scotland and is a prominent feature in analyses of drivers for FDI[7].

Scotland is in a strong position to ensure that innovation is not exclusively focussed on technology and commercialisation but is directed towards broader societal issues and mechanisms for change across society as a whole. A thriving social enterprise sector and a vision for inclusive growth are key to a thriving social innovation ecosystem. Most importantly, in addition to supporting social entrepreneurship, such an ecosystem should:

- stimulate co-creation between actors and end-users so that communities become actively involved in the design as well as the outcomes of innovations; and
- ensure a robust measurement of societal impact to match purely economic metrics.

Similar initiatives have brought about a sea-change in countries like Ireland which established the Social Innovation fund, ReThink Ireland.[8] Other examples of successful social innovation ecosystems include Canada[9], Korea[10] and Portugal[11].

Measuring performance and setting targets

In answers to questions below we offer a number of metrics where Scotland could either improve its performance significantly or reverse a slippage from a position of strength. We also note other more

[7] See, for example, E&Y Attractiveness Surveys over time: https://www.ey.com/en_uk/attractiveness/22/scotland-leads-the-way-for-fdi-investment
[8] https://rethinkireland.ie/
[9] https://www.sicanada.org/
[10] https://seoulsolution.kr/sites/default/files/notice/Social%20Innovation%20and%20Social%20Transition%20in%20East%20Asia.pdf
[11] https://inovacaosocial.portugal2020.pt/en/about-us/portugal-inovacao-social/

granular measures that could be adopted across government and its agencies under an adjusted approach to innovation policy.

Question 2: How can we better use innovation to help achieve Scotland's broader economic and societal ambitions?

The Strategy must balance any focus of action on specific sectors or regions with:

- supporting a full breadth of actors to respond to opportunities, many of which will require a multidisciplinary / multi-sector response;
- recognising the value of social innovation and of the third sector;
- fostering innovation in micro-organisations across the private and third sectors; and
- balancing the value in 'cluster' development with innovation-driven growth across the geography of Scotland.

As discussed under Question1, these aims – be they complementary or competing - can be achieved by a strategy that enables diverse actors rather than seeking to prescribe detailed action. They can also be pursued by a conscious shift in policy to better harness and support existing drivers of, and support for, innovation. When thinking about the university contribution, a stronger recognition of this across government and its agencies could open up new opportunities for companies, the third sector and public services. This is resonant with recommendations of the 'Muscatelli Report', specifically:

The Scottish Funding Council (SFC) and the Enterprise Agencies should set a target for Scotland to attract investment for innovation activity from external sources such as Innovate UK, in which we are currently underperforming.

Government and its agencies should introduce a mechanism to ensure greater collaboration and coordination in bidding for UK funding streams, preventing actors in Scotland from pursuing conflicting objectives or duplicating efforts.

This approach could be pursued through:

People There has been insufficient focus on the flow of talent into organisations as a driver of innovation. Scotland participates in programmes such as Knowledge Transfer Partnerships and Research Council PhD placement schemes. At their heart is a beneficial innovation project for the host organisation. However, whilst universities work closely with organisations across Scotland to help them and the students involved to benefit from such funded opportunities, they are arguably under-utilised and certainly under-recognised as a driver of innovation. Relatedly, each year universities put in place thousands of project placements for final year undergraduate, Taught Postgraduate students and industry sponsored group student projects within the curriculum. Again, there is insufficient policy focus on these as drivers of innovation, both through the substance of the projects themselves and through the development of a broader relationship between the organisation and the university.

Projects Universities are placed uniquely to pursue and resource innovation projects with organisations across Scotland and beyond. Universities already deliver more than 21,000 formal R&D and consultancy projects each year with organisations across Scotland[12]. However, there is scope to do much more. Enabling universities and their partners to leverage investment should become a

[12] SFC KT Metrics 2020-21

strategic objective under the strategy, with the actions of government and its agencies aligned to that objective.

To illustrate, as set out below, Scotland has traditionally performed poorly in leveraging Innovate UK (IUK) resources.

	2017-18	2018-19	2019-20	2020-21
Share of total Innovate UK funding secured by organisations in Scotland	3.8%	6.0%	4.16%	4.06%

Sources:

https://www.ukri.org/publications/geographical-distribution-of-spend-data-financial-year-2020-to-2021/

https://www.ukri.org/what-we-offer/what-we-have-funded/regional-distribution-of-funding/2018-to-2019-regional-distribution-of-funding/#contents-list

Clearly this is substantially below what we might expect from a population or GDP share across the UK. Resultantly, Scotland secures significantly less IUK funding per business than most other parts of the UK. Even allowing for business type, Scotland also secures less per R&D active business than most other parts of the UK.

Innovate UK spend per business 2020-21	**Innovate UK spend per R&D active business 2020-21**
West Midlands (England) £707	West Midlands (England) £39,943
North East (England) £370	South East (England) £24,744
South East (England) £360	East Midlands (England) £23,245
East Midlands (England) £349	South West (England) £21,596
South West (England) £267	North East (England) £20,673
London £224	East of England £14,461
East of England £206	London £13,599
Wales £191	**Scotland £13,502**
Scotland £181	Wales £13,440
Northern Ireland £150	Northern Ireland £8,165
Yorkshire & the Humber £123	Yorkshire & the Humber £7,928
North West (England) £94	North West (England) £5,544

There is therefore a significant opportunity for Scotland, particularly given the strong, almost 50% growth in the Innovate UK budget over the coming years:

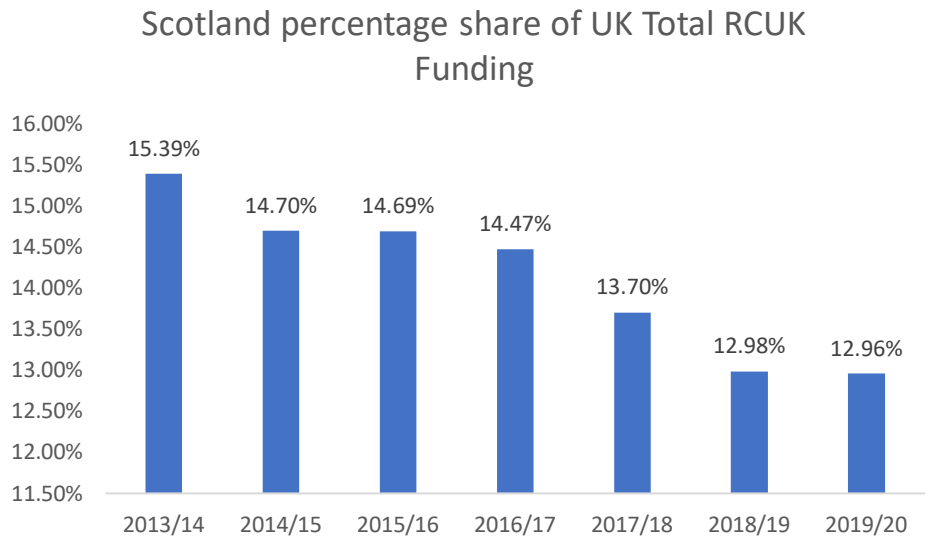
	2022-23	2023-24	2024-25
Innovate UK Budget £m	669	799	970

Source: https://www.ukri.org/wp-content/uploads/2022/05/UKRI-Budget-Allocations-2022-25_FINAL2.pdf

The Innovation Strategy should bring ambition but should reflect on the structure of the Scottish SME ecosystem where the vast majority of innovation carried out in Scotland takes place within HEIs. Though this landscape is predominantly SMEs there are large firms operating in Scotland and universities have an important role in creating, sustaining and growing business communities. Therefore, whilst taking action to maximise leverage support from Innovate UK under its current approach, Scotland should also seek to influence IUK's strategies so that they are more strongly aligned with the structure of Scotland's economy. Such a shift would also enhance alignment with the economy in parts of the UK with a high proportion of SME businesses.

Once again reflecting on the nature of the private sector Scottish market, the size of this market means that it's imperative for Scotland to foster strong international collaboration, including to pull through our inventions. Focusing on the Scottish market for market led innovation would be immensely restrictive.

UK Research Council funding is also a driver of innovation in Scotland. Scotland has traditionally secured a disproportionate share of UK resources, won competitively on the basis of excellence. It is a source of strategic concern that this share has been falling for a number of years.



Source: HESA Research grants and contracts - breakdown by source of income and HESA cost centre

This threatens one the 'key ingredients' identified in the NSET. It is not only the loss of resources that is of strategic concern but the loss of competitive standing and an erosion of the scale of our community of staff and postgraduate students across disciplines that substantially underpin innovative sectors of Scotland's economy. The projects funded by these resources are closely aligned to industrial and societal challenges, with a growing proportion specifically targeted at cross-Council strategic programmes, illustrating the value of multi-disciplinary answers to such challenges. This loss of share is having a direct economic impact now. Analysis by London Economics shows that for every £1 of such resource lost to Scotland we are losing £12.7 million of economic impact. If Scotland can recover its competitive position back to 15.4% of UK share it stands to deliver an

additional economic impact of at least £640 million, a figure that will grow in line with the >8% growth in the Research Councils' budget between 2022-23 and 2024-25.

Reversing this slippage in the coming years will be made all the harder as the SFC's funding for research falls by 1% in real terms[13] between 2022-23 and 2024-25 whilst funding for Research England will increase by 29% in real terms over the same period.

It also worth noting that this decline is being seen in disciplines that are particularly closely aligned to the key sectors in the Scottish Government Export and Investment Plans. In 2015/16 the Scottish share of EPSRC funding was at 12%, since then it has steadily decreased to 11.12%, and BBSRC share has also dropped from 21.9% to 17.4% during this time frame.[14]

Finally it should be noted that it remains the goal of the sector for UK association to Horizon Europe. When (or if) this will happen, it will be a crucial opportunity for leveraging innovation funding into Scotland as Horizon Europe has a particular focus on fostering technological innovations through Pillar III: Innovation Europe. In the event of non-association to Horizon Europe then a UK Government alternative *Plan B* is likely to incorporate innovation, again illustrating the importance of leveraging these opportunities into Scotland.

Place and sector Under Queston 1 we highlighted facilities such as AFRC and incubator spaces as 'key ingredients'. The Strategy should reflect on how universities and their partners can be enabled to develop and grow facilities, broader innovation 'infrastructure' and innovation communities, be they sectoral or geographic. Noting the difficulty for smaller institutions to provide their own infrastructure, therefore needing support for shared incubation resources which could be used by multiple HEIs is a potential option.

The development of key facilities relies on leverage of investment from across the public and private sector and from across the UK and beyond. Universities in Scotland have been successful in leveraging some key investments, eg. AFRC, ARCHER2 and investments under the UK Research Partnership Investment Fund[15] such as the Discovery Centre for Translational & Interdisciplinary Research at University of Dundee and the Institute for Regeneration and Repair[16] at the University of Edinburgh. Whilst figures for capital investment by UK geography are not produced annually by UKRI, when published they suggest that Scotland secures a proportion of the UK total investment (circa. 6%) that is well below a population or GDP share. Whilst this outcome can to some extent by explained by the location of key UK infrastructure in other parts of the UK, the Strategy might reflect on how this figure might be increased and how initiatives for access by industry to facilities might be best supported eg. https://interface-online.org.uk/how-we-can-help/specialist-facilities

'Place' remains a key concept in UK level policy for innovation, including in support for innovation flowing through City Deals, Shared Prosperity Fund and 'Levelling Up'. Universities are important partners in City and Region Deals across Scotland and will be under other future opportunities. These same partnerships can be the platform for broader action and could be supported under an Innovation Strategy. An example of co-ordinated action to leverage funding was seen in the 'Strength in Places' process where Scottish Government and its agencies offered bespoke support to shortlisted bids from Scottish partnerships. UKRI data shows that Scotland was second amongst the

[13] SFC HE Capital profile vs Research England budget announced by UKRI
[14] HESA Research grants and contracts - breakdown by source of income and HESA cost centre

[15] https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/uk-research-partnership-investment-fund/
[16] https://www.ed.ac.uk/regeneration-repair

nations and regions of the UK in success under Strength in Places, with a significant gap to third place[17].

The Strategy should also reflect on the key industry sector and broader economy infrastructure for innovation and how this is developed and sustained. Universities are a key element of this infrastructure however in developing the strategy the fact that universities only recover 68% of their full economic costs[18] of working with industry is a key issue, compounded by the fact that much university knowledge exchange staffing is supported by short-cycle funding that leads to challenges both in terms of capacity and in building and sustaining relationships. Amongst such key infrastructures are the Innovation Centres and Interface.

The SFC review of coherent sustainability noted *we recommend SFC relaunches our flagship knowledge exchange investments, Interface and the Innovation Centres, establishing a new overarching Knowledge Exchange Advisory Board, a more stable investment relationship, and redefined metrics of success*.

This Strategy should reflect on the current importance of the Centres within the landscape and how SFC are moving forward on their review recommendations.

Question 3: How can we measure progress and what metrics and indicators should we use?

- Jobs created in high-value, innovation-rich sectors
- Companies created / supported / scaling
- Levels of private and foreign direct investment
- International comparators

In responding to questions above we have pointed to a number of key metrics which should be included in the Strategy:

- value and proportion of the UK total of competitively won Research Council funding at an aggregate and individual Council level;
- value and proportion of UK total of UKRI capital funding invested in Scotland; and
- value and proportion of UK total of Innovate UK funding.

In addition, the SFC collects data on university knowledge exchange activity under its University Innovation Fund, some of which aligns with the data collected UK-wide by the Higher Education Statistics Agency under its HEBCI survey. These data sources would offer time lines for the number of organisations engaging in innovation projects and for the number of staff and student start-ups from universities.

Moreover, organisations within the 'infrastructure' noted above, for example Innovation Centres and interface will be a rich source of quantitative and qualitative information on innovation activity over time.

[17] See table 5, page 33 https://www.ukri.org/wp-content/uploads/2022/05/UKRI-060522-GeographicalDistributionOfUKRISpend.pdf

[18] See https://www.sfc.ac.uk/governance/institutional-sustainability-governance/institutional-sustainability/university-sustainability/transparent-approach-costing.aspx

Commercial and SDI surveys of FDI activity already offer insight into the volume and focus of investment. They might be developed to give more insight on the FDI process.

The adoption of such metrics across government and its agencies would have benefit.

To date, it is solely the Scottish Funding Council that has maintained a strategic and performance overview of some of this data. However, if universities are to play their part with business fully, the promotion of opportunities, for example through IUK, needs to be an operational priority of other actors such as the Enterprise Bodies with associated metrics to assess progress. For instance, if government agencies more broadly had a more prominent role in supporting universities' contribution, they might include success in leveraging UKRI resources for large projects or student placements within their performance metrics.

Question 4: What sectors and sub-sectors should Scotland aim to be a world leader in?

- What are the innovation-rich sectors and sub-sectors where Scotland has existing or emerging competitive strength?
- How can we support these sectors to compete, collaborate and seek out global opportunities?
- 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?
- What are the disruptive global megatrends that we want to harness and capture in Scotland?
- What steps will we need to take to support our businesses, universities and citizens to be able to engage with those opportunities?
- 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?
- To what extent should we align our support for early-stage research with our economic and societal ambitions?
- International comparators

The Investment and Export plans set out sectors which will be a focus for Scottish Government and its agencies. Clearly, there should be some alignment with these in the Innovation Strategy. There is also an alignment of these sectors with university strengths, both in research and the flow of talent and skills. Key infrastructure, eg Innovation Centres, has been formed aligned with sectors where there is an alignment of research strength with a specific industry area.

As discussed under answers to other questions, the Strategy should consider how universities and their partners can be best enabled to leverage project and capital funding aligned with these sectors.

However, it is important that the Strategy also provides for innovation across the economy, including the third and public sectors and industry sectors outwith the export and investment plans. This will include a breadth of university research strength and will provide for a platform for a response to global disruptions, as illustrated by agriculture in our response to question 1. Breadth is important as a sector approach risks not driving innovation across sectors that are significant in scale if seen in aggregate but that are characterised by micro-businesses, often geographically dispersed. The cultural industries are an example of such a sector.

The results of REF 2021 demonstrate that Scotland carries out world leading research across a wide range of disciplines that have close alignment to Scottish Government priority sectors in its strategies, particularly excelling in:Architecture, Built Environment and Planning; Biological Sciences; and Politics. A full list of 'units of assessment' under which universities have demonstrated 4*

performance, ie. “quality that is world-leading in terms of originality, significance and rigour” can be found at Annex A. We would also point to our response to Question 6 which is relevant to this question.

Question 5: 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?

- How can we improve the connections between academia and industry?
- How can we further encourage and support the successful commercialisation of university research, including through spinouts and licensing?
- 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?
- International comparators

Our answers under other questions offer views on how the Strategy might best enable this role. To reiterate, the Strategy should enable universities to work with their partners to act with agility and imagination to opportunities and needs. That should include a stronger understanding of, and support for, universities’ anchor and catalytic role and the potential for a breadth of university actions to have significant impact on rates of innovation.

Under other questions we have noted that universities deliver the strong majority of Scotland’s incubator spaces. They are also integral to the provision of capacity for early stage companies, for example ‘science parks’.

UIF is Scotland’s core support for the staff and activities in universities which centrally manage and enable industrial partnerships, licensing, spin-out support, R&D contracts. We have campaigned for an increase in UIF for 2021/22 onwards so that institutions’ knowledge exchange activities with business are better enabled and funded at a higher percentage of full economic cost. This would position universities to be able to help Scottish businesses to rebound post-crisis. As a very minimum, restoration of the erosion of this funding since 2014/15 would cost £6 million and enable a step-change in our interaction with business.

Significantly more knowledge exchange funding is available in England for institutions to carry out this key work. In 2021/22 Research England awarded £230m of HEIF funding across 106 eligible institutions (in that year) working out at approx. £2.1m per institution[19]. In Scotland SFC allocated £15.1m of UIF across 19 institutions, working out at £794,736 per HEI. Considering these allocations by relative scale of England and Scotland’s economies, UIF would need to be set at £21m to have the same relative value as HEIF. This investment in HEIF does not come at the expense of QR funding in England.

The Scottish Government should consider whether the current levels of UIF are sufficient to enable institutions to act across the breadth of their knowledge exchange activities, including working with companies to leverage innovation-related investments.

Whilst it should be held in mind that licensing is a very small proportion of universities’ contribution to innovation, it remains important, particularly to innovation in some sectors such as the life

[19] https://www.ukri.org/publications/research-england-funding-allocations-2021-to-2022/

sciences. The sector's commercialisation director community work in close partnership to enhance the process of licensing, including review of contracts and terms.

This Strategy should consider the development of an additional Scottish proof of concept fund. This should foster agility by design, including levels of bureaucracy and risk appetite.

Consideration should also be given to the creation of a Scottish Early Stage Venture Capital Fund. We have seen some improvement in such funding with an increased interest amongst investors however there remains a strategic need to enhance the position. This would be best achieved by seed funding by government.

Question 6: How do we support and grow clusters of excellence to deliver on our vision for innovation?

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

As noted under answers to other questions, the talent and knowledge flowing from universities and the facilities developed to support that are key foundations to 'clusters'. Scotland already has established clusters in fin-tech, life-sciences, informatics, computer games and creative industries. Sustaining and enhancing those strengths is a key strategic consideration, not least given both the evidence of slippage in research strengths and the significant opportunities for leverage of resources and talent over the coming years. This approach to economic growth and job creation is celebrated by the Scottish Government in its NSET. A stronger strategic focus across government and its agencies on enabling universities and other actors to act with agility in pursuit of opportunities should be a significant element of the development of clusters and therefore aligning to the ambitions of the NSET.

We would also note the importance of the international base to many of our university spinouts, which are frequently co-partnered or based across the globe; this distinguishes the University sector and enhances its attractiveness to potential partners from other sectors, something that could be supported even further.

Question 7: What can we do to help businesses innovate today?

- What does a business innovation user journey look like? How could this be improved?
- How can we encourage and support more businesses to innovate?
- What can we do to improve skills and training?
- How can we encourage a culture of entrepreneurship in Scotland?
- How can we ensure that the most innovative businesses can start and scale in Scotland?
- Have we got the right mix of incentives and regulations?
- International comparators

In our response to other questions we have described how universities work with over 21,000 organisations in Scotland on formal contracts for R&D, consultancy, bespoke CPD etc. In addition are the thousands of final year undergraduate and taught postgraduate project placements that offer so many (particularly small & micro) businesses the capacity to consider innovative change. Moreover there are many of these university-driven actions, for example innovation vouchers, that are particularly attuned to the needs of 'cash and time poor' businesses. Universities work with the full breadth of 'innovation journeys', with support tailored to the organisation. That may be the single person 'start-up' that benefits from being part of a broader community hosted by the university or who accesses an innovation voucher through to a multi-national company that is a partner integrated into the operation of world-class facilities and drawing on thinking about the technologies of tomorrow. Universities have many examples of companies that have begun 'innovation journeys' with initial, often informal steps which have progressed to larger, formal innovation projects.

We believe that this contribution can be grown significantly. To do so, an Innovation Strategy should:

- Raise awareness of options for university-driven interventions across the government and agency advice networks and include them in operational metrics, including targets for better leverage of UKRI funding.
- Relatedly, place greater emphasis within government and agency action on supporting the success of major proposals for innovation-related UKRI investment.
- Recognise the key infrastructure for innovation and, whilst maintaining a strong focus on accountability and performance, move such organisations that are built on relationship networks to a more stable funding cycle, preventing unnecessary instability in staff teams and therefore relationships.

Key to growing the university contribution, and to many steps of any 'innovation journey', is talent. This includes:

- The flow of talent from universities into our labour market
- Staff and student talent that drives significant volumes of 'start up' and 'spin out' companies
- As discussed elsewhere in our response, the role of student and researcher placement in companies as direct drivers of innovation (and often de-risking recruitment for small companies).

The development of an entrepreneurial mindset and skills is a prominent feature of the undergraduate and postgraduate experience. The sector has considered how enterprise and entrepreneurship can be woven through curricula[20] and this is complemented by a number of key cross sector initiatives such as Converge Challenge, acknowledged as an 'essential ingredient of a successful entrepreneurial nation' within the NSET.

Stemming from the SFC review of coherent sustainability, SFC have initiated the development of an Entrepreneurial Campus Strategy, *to "generate a larger, more diverse, pool of entrepreneurially minded students and academics, and increase the rates of start-ups being generated from university and college settings".* This Strategy is being co-designed with the sector, where every HEI in Scotland is participating as development and delivery partners for the Strategy. Referenced in the NSET, it needs to be resourced appropriately to realise the ambition of the Programme of Action within NSET: *1. Embed first rate entrepreneurial learning across the education and skills system; 2. Create a*

[20] See https://www.qaa.ac.uk/scotland/development-projects/enterprise-and-entrepreneurship# and https://www.universities-scotland.ac.uk/publications/making-it-happen/ for example

world-class entrepreneurial infrastructure of institutions and programmes providing a high intensity pathway for high growth companies; 3. Attract and retain the very best entrepreneurial talent from at home and abroad; 4. Build an entrepreneurial mindset in every sector of our economy.

Question 8: How can we maximise the funding and investment available to businesses that innovate?

- How do we engage and bring in additional private funding?
- What steps can Scotland take to attract additional international investment, and what role does public funding for innovation play in this?
- How can we engage more effectively with UK, European and international agencies in order to maximise the proportion of funding that gets spent in Scotland?
- Is the financing landscape in Scotland one that helps people start and grow businesses and supports business investment in research and development?
- International comparators

We have set out in our answers to questions 2 and 3 how the significant strategic opportunity for Scotland to better leverage funding and investment, most notably from UKRI could be better pursued. The same approach may be taken to other routes for investment and funding, for example Gates Foundation funding for https://www.galvmed.org/ .

That investment will 'crowd in' further investment. Some projects are conditional on partner investment and, more broadly, the establishment of key facilities and academic strength is a known catalyst to domestic business creation and investment and FDI.

As we note under question 5, we believe that a 'proof of concept' fund would have significant impact.

The availability of growth investment for early stage companies has been a longstanding issue in innovation policy in Scotland and elsewhere. Scotland has seen an improved picture with universities playing their part through the creation of their own investment mechanisms, see for example https://edinburgh-innovations.ed.ac.uk/venture-investment/old-college-capital. However, as noted under our answer to question 5, we believe that there remains a strategic need for a Scottish Early Stage Venture Capital Fund, seeded with public funding.

Question 9: How can we become one of the best places in Europe for the adoption and diffusion of technology?

- Digital adoption
- Diffusion of technology
- Training and skills
- Management and leadership
- International comparators

Question 10: How can we better support businesses to improve their ways of working and be adaptive and responsive to changing markets?

- Process innovation
- Technological adoption and diffusion

- Product-based innovation e.g. business models, product design and speed of iteration
- Peer learning and cooperation
- International comparators

Our responses to other questions have detailed the diverse actions to achieve the adoption and diffusion of technology and adaptation to changing markets.

The flow of talent into organisations with the knowledge and competences to support adoption and diffusion of technology and / or to adapt to changing markets is an essential element of the university contribution.

A connection between organisations and universities through a wide range of formal and informal links to support a connection with technology and adaptation to changed markets. As illustrated more fully at various points in our response, these will include:

- 'open days' and informal networks
- student and staff placements and exchange, often funded with leveraged resources
- a range of funded projects, from introductory 'innovation vouchers' through to major R&D partnerships
- the provision of consultancy advice and bespoke CPD focused on the adoption and implementation of technology; and
- the co-creation and partnership in the operation of world-class facilities, institutes and organisations such as Innovation Centres.

Question 11: What levers do we have in terms of public sector procurement which would encourage greater innovation within key sectors?

- How can we ensure that public sector spend is a driver of innovation?
- How can we influence sectors like construction and health to embrace innovation?
- What can we do on pre-commercial procurement?
- International comparators

Procurement is a long-standing focus of innovation policy. The university contribution can be to support businesses to be better equipped in terms of capacity and knowledge to respond to procurement opportunities. Our answers to other questions set out how a breadth of such support is delivered now and could be enhanced.

Question 12: Do we have the infrastructure and architecture in place to become a world leading innovation ecosystem?

- Do we have the right mix of institutions, assets, programmes and agencies?
- Do they operate with sufficient scale and ambition?
- Do they collaborate sufficiently?
- Is there anything missing from the landscape? Are there overlaps or duplication that we need to address?
- International comparators

In our response to other questions we have reflected on the role of universities in creating and sustaining key facilities, partnerships and capacity for innovation across Scotland. We have also reflected on the wider innovation 'infrastructure' and the need to support such people-based organisations over a longer, more stable horizon.

We have also reflected on the potential to grow this contribution, with government and its agencies offering more focus to supporting partnerships seeking to leverage investment into Scotland. Leverage of UK or international investment might bring more facilities of significant scale and international standing, delivering direct impact and acting as a magnet for FDI.

There is a longstanding concern that the 'innovation landscape' is overly complex and resultantly a source of confusion. Government has a role here in how it shapes the development of the infrastructure, in particular in the framing of funding opportunities. It will be important, for instance, that support for innovation under the Shared Prosperity Fund does not unconsciously create a number of parallel, similar initiatives. This was a feature of some rounds of EU funded programmes. This said, a desire to 'plan' an innovation system risks a planning blight that prevents government from creating a context and support for the agile and impactful partnerships pointed to in our answers to a number of the consultation questions. The success of these should have primacy, whilst continuing to have regard to any risk of duplication or opportunity for a broader collaboration.

ENDS

June 2022

Annex A – List of Units of Assessment where Scotland Achieves 4* Outputs in the Overall Profile, REF 2021

Agriculture, Food and Veterinary Sciences
Allied Health Professions, Dentistry, Nursing and Pharmacy
Anthropology and Development Studies
Archaeology
Architecture, Built Environment and Planning
Area Studies
Art and Design: History, Practice and Theory
Biological Sciences
Business and Management Studies
Chemistry
Classics
Clinical Medicine
Communication, Cultural and Media Studies, Library and Information Management
Computer Science and Informatics
Earth Systems and Environmental Sciences
Economics and Econometrics
Education
Engineering
English Language and Literature
Geography and Environmental Studies
History
Law
Mathematical Sciences
Modern Languages and Linguistics
Music, Drama, Dance, Performing Arts, Film and Screen Studies
Philosophy
Physics
Politics and International Studies
Psychology, Psychiatry and Neuroscience
Public Health, Health Services and Primary Care
Social Work and Social Policy
Sociology
Sport and Exercise Sciences, Leisure and Tourism
Theology and Religious Studies