ROYAL ACADEMY OF ENGINEERING

Financing growth in innovative firms

HM Treasury

Submission from the Royal Academy of Engineering

September 2017

About the Royal Academy of Engineering

As the UK's national academy for engineering, we bring together the most successful and talented engineers for a shared purpose: to advance and promote excellence in engineering.

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Introduction

The Royal Academy of Engineering welcomes the opportunity to submit evidence to HM Treasury's *Financing growth in innovative firms* consultation. The Academy's response has been informed by the expertise of its Fellowship, which represents the nation's best practising engineers, including leading researchers, innovators, entrepreneurs, and investors.

Q1 Do a material number of firms in the UK lack the long-term finance that they need to scale up successfully?
Q2 Where is the gap most acute by type of firm, stage of firm development and amount invested?

Long-term investments, where quick returns are not expected by investors, are of particular importance to the engineering sector. Such funding enables companies to embark on ambitious projects, often to address complex challenges, and help to address the scale-up challenge. In addition, a shortage of long-term patient capital has been identified by many experts as a barrier to the ability of UK companies to innovate.[1] A recent survey of the UK engineering community showed that just under half of respondents recorded 'poor' or 'very poor', when asked how well patient capital investment currently supports the growth of UK engineering businesses.[2] The survey also indicated that the performance of patient capital investment was a particular concern for the North East, East Midlands, South West and Scotland, where a greater number of respondents selected 'poor' or 'very poor'.

In general, the investment structure in the UK is perceived to be quite short-term in nature, with many funds structured so that returns on investments are expected in seven to ten years. In addition, there is an expectation that companies will progress through multiple, different funding stages as they grow. At the transition between each stage, there is often an opportunity for investors to see a return on their investment as part of the refinancing process. It could therefore be perceived that there is an incentive for fund managers to support refinancing, potentially to the detriment of the company. Furthermore, the refinancing and transition process can be quite challenging and destabilising for the company and its investors, as a result of changes in board membership, company strategy and other factors.

The Academy welcomes the acknowledgement in the consultation document that wider aspects of the entrepreneurial ecosystem, including access to talent, technology transfer offices (TTOs), procurement policy and management skills need to be considered alongside supply, deployment and demand for patient capital, when looking at how companies can grow to scale. As noted in the consultation, these wider aspects of the entrepreneurial ecosystem are being considered by other elements of the government's industrial strategy. The Academy's

[1] Access to finance for innovative SMEs since the financial crisis, Lee, Sameen & Cowling, Big Innovation Centre, 2015; Investing for Prosperity, Aghion et al., LSE Growth Commission, 2013; and Bridging the valley of death; improving the commercialisation of research, House of Commons Science and Technology Committee, 2013.
[2] Engineering an economy that works for all, industrial strategy Green Paper response, Royal Academy of Engineering and Engineering the Future, April 2017

recommendations concerning these wider aspects of the entrepreneurial ecosystem can be found in the engineering profession's response to the industrial strategy Green Paper *Engineering an economy that works for all*.[3]

The consultation document concludes that a large minority of demand for equity investment comes from university spin-outs. While the Academy welcomes the focus on spin-outs, recognising that spin-out companies are often innovative firms led by ambitious entrepreneurs who want to build large-scale businesses, it is important to acknowledge that they make up a very small proportion of UK businesses. In 2014/15, 142 new university spin-outs were created, compared to a total of 608,110 new businesses created in the UK in 2015.[4] Furthermore, spin-outs are only one mechanism through which the ideas generated in universities can be commercialised; licensing and collaboration are also important.

There is a perception that industry silos will decrease over time as more enabling technologies and capabilities that underpin numerous sectors emerge. For example, advances in manufacturing can result in significant improvements in productivity across a wide range of other sectors, and will also be critical to the development of emerging industries such as synthetic biology and newer frontiers of quantum technologies. Similarly, digital technologies will have far-reaching and pervasive impacts across all of industry. Patient capital is likely to have an increasingly important role to play in helping enabling technologies and capabilities to be tested and adopted by different sectors.

Q7 Which programmes (investment programmes, tax reliefs and tax-incentivised investment schemes) have most effectively supported the investment of patient capital to date?
Q8 Are there areas where the cost effectiveness of current tax reliefs could be improved, for example reducing lower risk 'capital preservation' investments in the venture capital schemes.
Q9 Are there other ways the venture capital schemes could support investment in patient capital, in the context of State aid restrictions and evidence on cost effectiveness?

The tax advantaged venture capital schemes, the Seed Enterprise Investment Scheme (SEIS) and the Enterprise Investment Scheme (EIS) are well regarded by the engineering community and are considered to have made significant contributions to improving access to equity investments. The engineering community strongly supports the continuity of EIS, SEIS and Venture Capital Trusts (VCT), especially as stability and longevity of support is important to enable investors and businesses to make long-term decisions. However, consideration should be given to revisiting the limits on the amounts that can be invested by EIS and SEIS with a view to raising the limits. In addition, to further maximise the impact of EIS and SEIS, government should undertake targeted regional promotion of the schemes to both potential investors and eligible companies.

The engineering community recognises the risk outlined in the consultation document that the upfront Income Tax relief provided through SEIS and EIS may encourage a subset of investors and fund managers to use them for 'capital preservation' investments. However, it does not

[3] Engineering an economy that works for all, industrial strategy Green Paper response, Royal Academy of Engineering and Engineering the Future, April 2017
[4] Higher Education – Business and Community Interaction survey, 2014-15, 2016; Centre for Entrepreneurship and Start Up Britain, 2016

appear that there is sufficiently robust data about the use of the schemes to accurately determine how the risk balances against the benefits. The Academy believes that efforts should be made to better evaluate the schemes before any changes are considered.

The Academy recommends that government should, in addition to continuing SEIS and EIS, look to develop additional tax incentives that incentivise long-term investments, for example by focusing rewards on revenue generation.

As the consultation document outlines, the British Business Bank (BBB) has made significant investments in a number of growth finance funds and lenders in the UK scale-up sector through the Enterprise Capital Funds and Venture Capital Catalyst. Government should continue and increase its collaborative working with existing financial institutions, as is already done by the BBB, to expand the portfolio of incentives to increase long-term investment by the private sector.

The creation of the independent British Growth Fund (BGF) in 2011 to provide long-term growth capital, and its expansion into venture capital with the launch of BGF Ventures in 2015, has made a significant impact on patient capital provision in the UK. Rearticulating the aspiration and narrative, much of which was perceived to come from government, that led to the creation of the independent BGF would be welcomed in order to further boost investor confidence.

Q15 When considering how to replace EIF investment if the EIF were no longer an investor in the UK, to what extent should the government seek to replicate the EIF's current activities in (a) venture capital and (b) private equity?

From 2011 to 2015, the European Investment Fund (EIF) supported 144 venture capital and private equity funds in the UK and had a total of €2.3 billion in commitments in the UK, leveraging a further €13.8 billion of additional funds.[5] If the UK is unable to continue to maintain a relationship with the EIF, it will be crucial to ensure that no gaps are created in the UK's equity investment landscape by its absence.

Other sources of EU funding also support UK businesses, particularly SMEs. Large UK firms received around £350 million from the previous EU research and innovation framework programme, FP7, which ran from 2007 to 2013.[6] In comparison, UK SMEs received around £660 million, accounting for around 17% of UK BERD carried out by SMEs. The European Research and Development Fund (ERDF), part of the European Structural and Investment Funds (ESIF), also supports SMEs through one of its key priority areas 'competitiveness for SMEs'. Over the period 2014 to 2020, the planned EU spend for the UK of ERDF for 'competitiveness of SMEs' is €1.9 billion.[7] These sources of funding have played a crucial role in helping innovative UK SMEs grow to the stage where they require equity investment.

[5] EIF in the United Kingdom Fact Sheet, European Investment Fund

[6] The role of EU funding in UK research and innovation, Technopolis, commissioned by the Royal Academy of Engineering, Academy of Medical Sciences, British Academy and the Royal Society, 2017

[7] Data from European Structural and Investment Funds Data, https://cohesiondata.ec.europa.eu/countries/UK accessed 12 April 2017

Q25 What further steps, if any, should government take to increase investment into university spin-outs specifically?

While the UK clearly has many strengths in the commercialisation and translation of academic research, the overall perception in the UK engineering community is that there is still room for improvement. The Royal Academy of Engineering, in partnership with the Academy of Medical Sciences, the Royal Society and the Wellcome Trust has recently published *Transforming UK translation*.[8] The document sets out commitments that the organisations collectively make to improve the UK's ability to commercialise and translate ideas and discoveries form its world-leading research base.

Spin-outs are one mechanism through which the ideas generated in universities can be commercialised. The Academy has current experience of practices around spinning out through its Enterprise Hub and highly relevant expertise within its Fellowship, including serial entrepreneurs and investors. The Academy's Enterprise Hub, founded in 2013, is a national resource for the UK's most promising engineering entrepreneurs. The Hub makes awards to exemplars of excellence in engineering innovation who will be the founders and leaders of tomorrow's high-tech companies. Enterprise Fellowships support outstanding entrepreneurial engineers, studying or working at a UK university, to prove the utility of an innovation by spinning out a business based on that innovation. The Hub provides £60,000 for post-doctoral academics wishing to spin-out from a university, or £50,000 for recent graduates wishing to establish a startup without any formal involvement of a university. In addition, the Enterprise Fellow becomes a member of the Enterprise Hub where they receive an intensive bespoke package of training and mentoring, and access to the Hub's network.

Equity

The allocation of equity during the formation of spin-outs is a complex and contentious issue. The Academy's experience aligns with the observation in the consultation document that founders of firms appear to be motivated over the long-term by the autonomy of being an entrepreneur, and that the founders' shareholdings have a direct link to levels of autonomy. There is a widespread perception from the academic founders, mentors and investors surveyed previously by the Academy, that granting the academic founders significant equity stakes was essential to incentivise them to drive the company forward.

Evidence received by the Academy's Enterprise Hub shows that academic founders can be demotivated, frustrated and demoralised by universities (and investment vehicles with exclusive deals) taking what they perceive to be disproportionately high equity stakes.[9] Furthermore, it can restrict the ability of academic founders to deploy shares as they wish, for example to reward those who have contributed to the success of the spin-out. Investors, who are pivotal to the growth of the majority of spin-outs, can also be put off by universities taking a large shareholding, tending to believe that founders who are incentivised by owning a significant stake are more likely to deliver value for them.

A survey of the Academy's Enterprise Fellows showed that the initial equity stakes requested by the university ranged from 20% to 66.6%; apart from two exceptional cases where the university stake proposed was 0% (in both cases the university received licensing and/or

[8] Transforming UK translation, Academy of Medical Sciences, Royal Academy of Engineering, the Royal Society and the Wellcome Trust, 2017

[9] Royal Academy of Engineering's submission to the House of Commons Science and Technology Committee Managing intellectual property and technology transfer inquiry, 2016

royalties).[10] Excluding these outlier cases, the average shareholding initially requested by the university was 46.3%.[11] Following some negotiations, the share that was then subsequently held by the university in the agreement varied from 20%-50%, with an average of 36.3%.[12] However, in some cases the universities' initially proposed stakes were immediately diluted out by investors upon agreement to spin-out.

The size of the stake held by the university has a bearing on the amount of equity available for the academic founder. The Academy found that the average amount of equity secured by the academic founders to share was 54%.[13] In all the cases there were multiple academic founders sharing this stake at various levels – from 1.5% to 80%. The average shareholding for the Enterprise Fellow, who would be the lead academic founder, was 31%.[14]

It is entirely reasonable that universities seek shareholdings in spin-outs in return for providing core assets, incubation services and promoting the spin-out. However, the Academy believes that the amount and nature of support provided by the university should be reflected in the stakes it seeks.

One approach is to allow academic founders to decide whether they wish to access commercialisation support from their university, often via the TTO, or from an external provider, with the equity stake adjusted accordingly. If the founder does not wish to secure commercialisation support (such as incubation services) from the TTO, the equity stake taken by the university will simply reflect the support provided by the university that enabled the IP to be generated and protected. This 'two- tier' system enables academic founders with the appropriate skills and motivation to select forms of support and investment best suited to their company.[15] By increasing demand for external entrepreneurial support services, it may increase provision in the market, as well as introducing competition. Some universities are already employing similar systems including the University of Cambridge and Imperial College London's recently announced Founders Choice scheme.[16]

The announcement in the industrial strategy Green Paper that government will commission research on commercialisation of intellectual property, including the varying sizes of equity stakes taken, was welcomed by the Academy.

Investment vehicles specialising in technology transfer

Effective and successful research commercialisation requires sufficient and appropriate (pre-) seed stage funding, which can help to fund 'proof-of-concept' activities and bridge the 'valley of death' between the development of a prototype and a product or service that is an investable proposition. There is a perception that the provision of such funds has been relatively limited in the UK historically, but that the situation has improved in recent years, especially for high-growth technology companies.[17] The improved funding environment, as acknowledged in the consultation document, can be in part attributed to the creation of

[10] Royal Academy of Engineering's submission to the House of Commons Science and Technology Committee Managing intellectual property and technology transfer inquiry, 2016
[11] 19 respondents
[12] 18 respondents, excluding the two 0% outliers.
[13] 17 responses, excluding the cases where the university did not want an initial stake and those still under negotiation
[14] 16 responses, excluding the cases where the university stake was 0%
[15] Royal Academy of Engineering's submission to the House of Commons Science and Technology Committee Managing intellectual property and technology transfer inquiry, 2016; Engineering an economy that works for all, industrial strategy green paper response, Royal Academy of Engineering and Engineering the Future, April 2017
[16] Founders Choice – Building an Entrepreneurial ecosystem, Dr Robert Sansom FREng 2017; Founder Choice, Imperial Innovations, 2017
[17] The Deal 2015/16; Royal Academy of Engineering Access to Finance submission, 2016; Patient Capital, A new way of funding the commercialization of early-stage UK science, Tony Hickson, 2016

investment vehicles that specialise in funding and supporting early-stage high risk companies that spin-out of universities, many of which are listed. Such funds include IP Group PLC and Touchstone Innovations PLC.

For investment vehicles specialising in technology transfer to access a steady supply of IP in which they can invest they may establish partnerships with universities. The nature of these partnerships varies, from deals whereby the investment vehicle has the exclusive right to commercialise all IP from a university, through to non-exclusive deals whereby a university may show its deal-flow to a specific investment vehicle.[18] Depending on the details of the partnership with a university, the investment vehicle may hold a significant equity stake in a spin-out in which it has not invested nor provided any clear support for. For example, it appears that the University of Bath has an arrangement with IP Group PLC, whereby IP Group receives at least a 5% equity stake in spin-out companies where IP Group has not made an investment nor where it is actively involved in the opportunity.[19]

The attractiveness of exclusive arrangements to universities is clear, with universities having access to a ready source of investment. Establishing an evidence base to demonstrate whether such arrangements deliver best value for academic founders and the UK public purse, which funds much of the research undertaken in universities, would be worthwhile.

Although the increase in listed investment vehicles specialising in technology transfer has created a welcome market of investors for universities to choose from, the existence of exclusive deals restricts academic founders from accessing such a market. Such restriction in the choice of initial investors for a spin-out may mean a spin-out misses out on investment and support that is more appropriate for their company. For example, a spin-out may benefit more from an investor with specific knowledge of the market sector in which the spin-out wishes to operate rather than from a generic investment vehicle.

Q26. What further steps should be taken to increase investor capability in the public markets to invest effectively in firms requiring patient capital to grow to scale?

As observed in the consultation document, the availability of research on quoted growing innovative technology based firms remains low. Therefore, investors do not always have access to the information that would increase their knowledge about technology firms and potentially give them confidence to invest in these firms. To increase the information provision about young, innovative high growth technology companies, consideration should be given to the creation of a new index, which represents the types of companies the UK wishes to grow to scale. However, efforts should be made to understand why there has been a decreasing number of firms choosing to be within the 'TechMARK' set of indices.

The comparative lack of demand by UK high growth innovative technology companies for floating on a public market, which is typically regarded as an activity a highly successful company should undertake, should also be understood and addressed. The Academy has heard that floating on a public market is not necessarily the most appropriate or appealing proposition for high-growth technology companies. Given that many high-growth technology companies are funded through equity investments, those investors often wish to retain their stakes, yet flotation on the London Stock Exchange requires a minimum float of 25%. Despite

[18] Patient Capital, A new way of funding the commercialization of early-stage UK science, Tony Hickson, 2016
[19] www.ipgroupplc.com/media/ip-group-news/2006/2006-09-08, accessed 18 September 2017

the introduction of the Higher Growth Segment in 2013, which requires only a minimum free float of 10%, and is intended to assist companies with the longer term aspiration of joining the market, there has not been substantial uptake. Floatation on the US NASDAQ stock exchange is frequently considered to be a more favourable option by technology companies, as it is perceived that the valuation is more sophisticated.