

Spending Review submission 2020

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

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The National Centre for Universities and Business' 2020 Spending Review submission

September 2020



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Overview

The period covered by this Spending Review will be immensely challenging. As the Government continues to respond to the immediate challenges caused by the Covid-19 pandemic, it must simultaneously prepare the country for longer-term economic and social recovery in the context of a new normal. This submission by the National Centre for Universities Business (NCUB) sets out recommendations in relation to research and innovation as well as skills and talent based on ongoing engagement with business and university leaders.

About the National Centre for Universities and Business

NCUB is a strategic leadership network that provides a collective voice on the future of collaboration between universities and business. Driven by data, shaped by ideas – NCUB seeks to inform, influence and shape the future of collaboration. Our members share a commitment to working together to tackle some of the UK's biggest challenges. From adapting our education and training systems to developing the talent needed in the future, to transforming lives and opportunities through research and innovation.

Summary of recommendations

Urgent action is needed to save a generation of talent

Youth employment has plummeted, with the number of employees aged 16-24 in the UK on payrolls in August down around 156,000 compared to March 2020. Measures taken and announced to help young people into meaningful employment do not go far enough. To save a generation of talent:

- Temporarily abolish National Insurance Contributions for young people under the age of 25
- introduce a 50% wage subsidy for people under the age of 25 undertaking an apprenticeship
- Amend the apprenticeship Levy so it can be used to cover the real cost of an apprenticeship to businesses.

Research and innovation is fundamental to recovery

The response to the Covid-19 pandemic has demonstrated how important technology, research and innovation is to our society, our health and our economy. Recovery will depend on the ability of our businesses and universities to invent, research and innovate. To support the role of technology, research and innovation in economic recovery, it is critical that measures are taken to help R&D performers and investors recover from the disruption of the pandemic:

- Maintain the Government's commitment to increase spending on R&D and innovation to 3% of GDP in the long-term
- Monitor the enabling drivers of UK R&D and innovation to ensure that capacity and capability is not lost
- Take measures to help PhD graduates into meaningful employment or training that utilizes their high level skills

Seize the opportunity to rebalance the UK's economy

The R&D roadmap is ambitious, and demonstrates a clear desire to refocus the UK's economy towards more research intensive, innovative activities to raise living standards, solve global challenges, and build resilient and sustainable economic growth. To realise the ambitions of an R&D intensive, innovative economy:

- Take a whole of Government approach to economic transition
- Develop a UK-wide research intensive FDI strategy
- Develop sustainable research and innovation funding models
- Encourage private sector investment in R&D, considering:
 - Making the annual investment allowance unlimited for businesses to encourage business investment in tangible capital that enhances their performance and stimulates demand for state of the art and cutting edge machinery, technologies and equipment.
 - Encouraging pension schemes to invest in assets with long-term investment horizons
 - Creating a pro-innovation regulatory environment as we leave the EU - this may include considering how the role of University Enterprise Zones may be enhanced as lower-regulation and lower-tax zones that can be used by universities and businesses in collaboration to allow for greater risk-taking. It may also include considering how the concept of freeports may be extended to support innovative activity and university-business interaction in regions.
 - Considering the role of Government in pulling through research to development and finally market stage through procurement
 - Creating a proportionate approach to any future State Aid rules

The labour market is transforming and we must respond

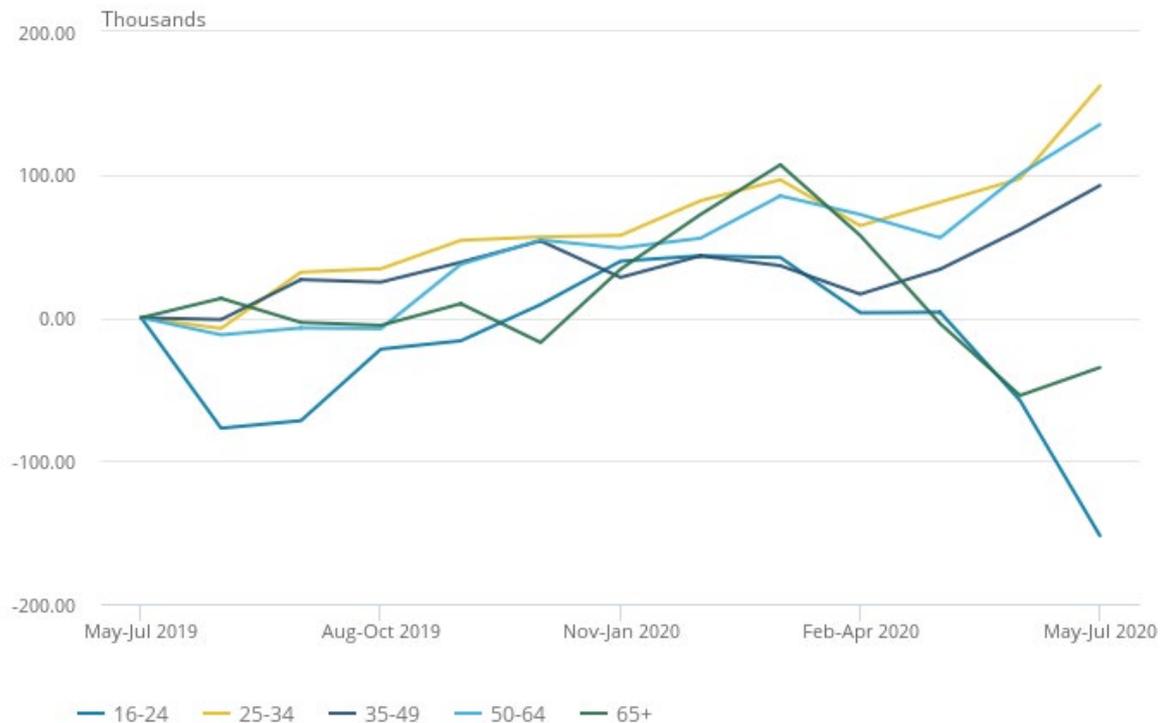
A more research and knowledge intensive economy will need a knowledgeable, well trained and well supported workforce. New technologies have led to significant skills shifts since at least the Industrial Revolution, and it seems like the adoption of automation and artificial intelligence, coupled with the impact of Covid-19 on operations, is only going to accelerate the pace of shifts. To generate the talent our economy needs:

- Establish an independent body to analyse current and future skills needs of the UK
- Attract, train and retrain diverse, talented people and teams
- Waive the student debt of graduates in occupations with significant skills shortages
- Introduce more flexible, modular higher education funding and lift Equivalent and Lower Qualifications (ELQ) restrictions
- Introduce greater flexibilities to the Apprenticeship Levy

Urgent action is needed to save a generation of talent

As the UK faces a second wave of Covid-19, we face another acute crisis in the labour market. Youth employment has plummeted, with the number of employees aged 16-24 in the UK on payrolls in August down around 156,000 compared to March 2020. Policy interventions following the 2007-08 financial crisis came too late, with many young people experiencing long-term wage detriment that lasts to this day. Without support, young people will face unemployment or lower wages, and employers will lose out on the innovative, talented workforce they need to recover.

Figure 1: UK change in employment level by age (16 years and over), seasonally adjusted, between May to July 2019 and May to July 2020



Source: Office for National Statistics – Labour Force Survey

Whilst NCUB strongly welcomed the introduction of new measures to boost employment in the last Budget, including the Kickstart scheme, the latest [business polling](#) suggests fewer than one in twenty businesses intend to take part in the scheme, most likely due to bureaucratic complexity. More measures must be taken to support young people and improve their opportunities.

(1) Temporarily abolish National Insurance Contributions for young people under the age of 25

Young people are over represented in some of the sectors most affected by Covid-19 such as accommodation and food services and arts, entertainment and recreation. To help young people into employment and help employers to retain talent and valuable entry level jobs, the Government should temporarily abolish National Insurance Contributions for young people under the age of 25. Employers should no longer have to pay secondary Class 1 (employer) National Insurance contributions (NICs) on earnings up to the Upper Earnings Limit (UEL), for employees under the age of 25. This enhances existing exemptions that apply to young people under the age of 21.

(2) Introduce a 50% wage subsidy for people under the age of 25 undertaking an apprenticeship or work placement

The latest data from the Department for Education shows that apprenticeship starts have also plummeted by 68% for those under the age of 19 since lockdown. Those under 25 accounted for under a third of apprenticeship starts in May this year. At a time when young people may be relying even more on training and education, this is an incredibly worrying fall in opportunities.

The Government has pledged a £2,000 bonus to employers who take on apprentices and placement students aged under 25, which represents approximately 13 percent of the first year of a young apprentice's wages. This is unlikely to be sufficient to change an employer's decision on whether to hire an apprentice. To support those businesses that are continuing to hire apprentices at this unprecedented time of uncertainty, the Government should introduce a 50% wage subsidy for people under the age of 25 undertaking an apprenticeship or work placement.

Research and innovation is fundamental to recovery

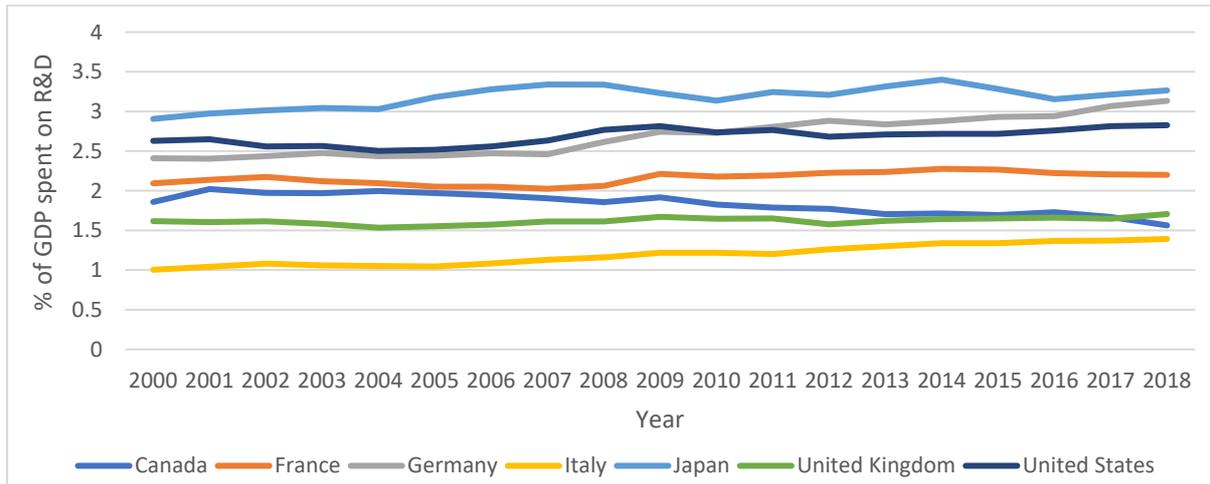
The response to the Covid-19 pandemic has demonstrated how important technology, research and innovation is to our society, our health and our economy. Recovery will depend on the ability of our businesses and universities to invent, research and innovate. Universities and businesses, individually and collectively, play a central part in the generation, dissemination and commercialisation of knowledge, driving prosperity and opportunity.

The Covid-19 pandemic is likely to have a long-term impact on the needs of society and customer demand. UK businesses will have to adapt to these changes in order to stay competitive in a global market, this requires developing and adopting new products, services and approaches. To support the role of technology, research and innovation in economic recovery, **it is critical that measures are taken to help R&D performers and investors recover from the disruption of the pandemic.** Equally, ambitious policies and measures need to extend beyond the immediacy of the crisis in order to realise the bigger prize - an innovative, more research intensive economy.

(1) Maintain the Government's commitment to increase spending on R&D and innovation to 3% of GDP in the long-term

The UK has consistently spent less on R&D as a percentage of GDP than the OECD average and the UK's main competitors. **NCUB estimates that this equates to a cumulative deficit in R&D spending over ten years compared to the OECD average of £44 billion.**

Figure 2: GERD as % of GDP, 2000-2018



Source: OECD

The Government has set an important target to bring UK R&D spend to the equivalent of 2.4% of GDP by 2027 and 3% in the longer term, which is closer in line with its competitors. To achieve this target, the Government committed to doubling public spend on R&D to £22bn by 2024-25. The R&D roadmap published in July 2020 made clear that this does not simply represent an uplift in public funding, but rather an aspiration to fundamentally refocus the UK's economy on more research-intensive and innovative activity. This would allow the UK to:

- a. **raise living standards**, by creating more and better jobs and opportunities for people and driving discoveries that improve health, wellbeing and the environment.
- b. **solve global challenges**, from decarbonising our economies and building resilience to the impacts of climate change, to tackling food insecurity, global health issues, and structural inequalities.
- c. **build resilient and sustainable economic growth**, through greater productivity, a more balanced economy and greater global competitiveness.

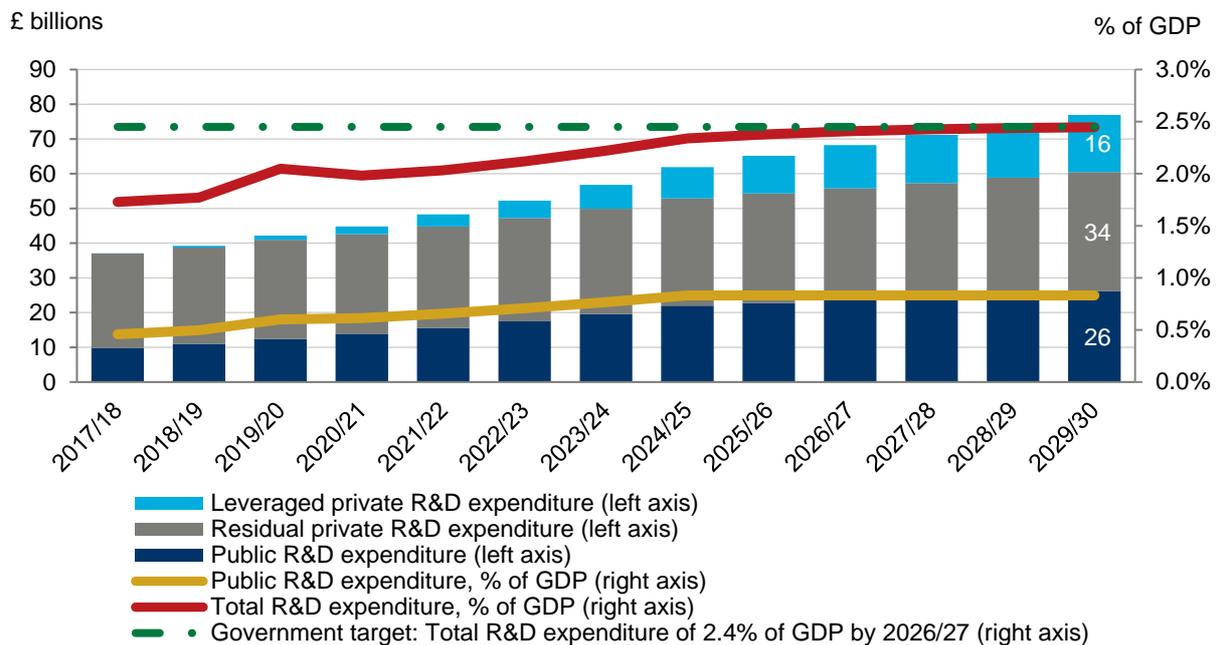
It is essential that the Government states and demonstrates that it remains committed to increasing public investment in R&D in order to achieve the target for UK R&D spend to reach 2.4% of GDP by 2027, and 3% in the longer-term. This provides much needed certainty to R&D performers and will help give businesses and other R&D

spenders the confidence to invest more in R&D themselves, even in the context of the uncertainty caused by Covid-19.

Greater public spending on R&D is associated with greater private spending on R&D. The increase in private R&D investment which results from each additional unit of public R&D investment is known as the “leverage rate”. In March 2020, BEIS published a study by Oxford Economics that each £1 of public R&D stimulates between £0.41 and £0.74 of private R&D within the same year. The long-run leverage rate was estimated to be between 1.01 and 1.32, suggesting that each £1 of public R&D eventually stimulates between £1.96 and £2.34 of private R&D.

Analysis by Oxford Economics for NCUB estimates that, assuming the leverage rate remains at current levels, **increasing public spend on R&D to £22bn by 2024-25, will encourage the private sector to spend £9bn more in R&D in 2024-25**. The increased public spending, leveraged private spending and residual private spending, puts the UK on course to achieve the Government’s target and more globally competitive R&D spending rates (see figure 3).

Figure 3: Public and private R&D spending projections



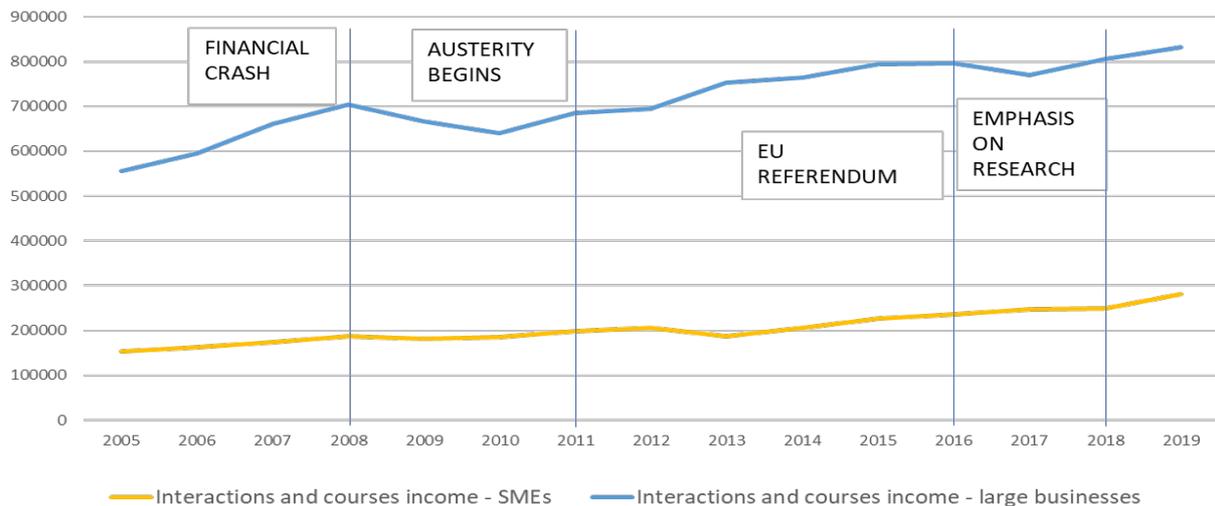
Source: Oxford Economics

Greatly increasing UK R&D spend also creates important opportunities to consider not just the scale of investment but also the shape.

(2) Monitor the enabling drivers of UK R&D and innovation to ensure that capacity and capability is not lost

There is significant evidence to suggest that R&D and innovation activity in firms may fall in times of uncertainty. Figure 4 shows a fall in the number of interactions of large businesses and SME's with universities following the financial crisis and the EU referendum.

Figure 4: University interactions with large businesses and SMEs, 2005-2019



Source: HEBCIS

R&D activity is often financed through the sales and profits of a company. Therefore, lack of funding and cashflow issues in the immediate Covid-19 crisis has led, in some cases, to decisions amongst firms to deprioritise R&D investment or, in some cases, stop it completely. The impact of Covid19 on businesses of course varies across industries and it is likely that even the effects of Covid19 will be felt in stages.

Covid-19 has had a widespread impact on industries' finances and operations (whether they are large multinationals or parts of their supply chains), on customer demands and behaviour, on support services and training offered, as well as on interaction between people. **The Government must recognise the web of actors and enablers that make up the R&D and innovation system, and provide targeted support as issues arise.** This ranges from basic research in universities and institutes, to direct subsidies and support for R&D in firms, to support for creating linkages between various actors in the system (such as cluster policies to stimulate collaboration between firms; research centres, to increase links between firms and higher education institutions; education policies to support firms' absorptive capacities; support for high-growth innovative firms; and support for the commercialisation of public research).

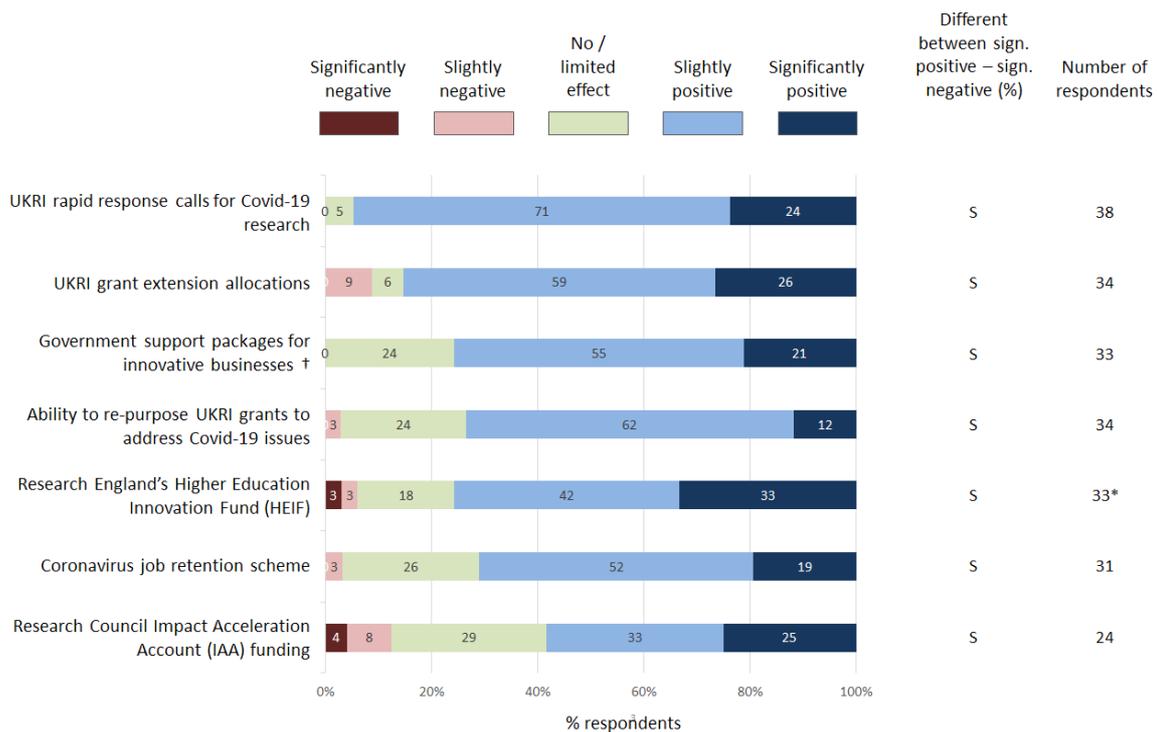
NCUB is working closely with UKRI and the Policy Evidence Unit for University Commercialisation and Innovation (UCI) at the University of Cambridge to monitor the impact of Covid-19 on innovation activity by universities and business. Overall, we find that it may be too early to tell the real impact of the Covid-19 crisis on innovation activities. However, we expect the impacts to start to materialise soon as businesses begin to make strategic decisions about the future of their R&D budgets. Foreign Direct Investment in R&D may be particularly affected if firms choose to divest from the UK and towards countries with fewer Covid-19 restriction measures.

In August 2020, NCUB in collaboration with the UCI at the University of Cambridge developed and ran a survey to explore the effects of the Covid-19 pandemic on the levels of innovation-focused activities universities have with external partners and their abilities to continue to engage in such activities through the crisis and into the economic recovery. Our initial round of survey generated 49 responses covering all regions and nations of the UK, and most types of universities. A full report will be produced by UCI/NCUB in due course which captures the full results and insights, but our initial analysis finds:

- Almost half of university respondents reported a decrease in the level of innovation-focused activities and projects across all of their partnerships and engagements with external partners during the Lockdown compared with the situation pre-Covid. Just over a fifth reported an increase. Experiences appear to be affected by the types of sectors universities engage with, with activities with aerospace particularly badly affected, while those in healthcare and the life sciences staying about the same or increasing compared with pre-Covid.
- Levels of innovation-focused activities between universities and SMEs are particularly badly affected, with almost 60% of universities identifying a decrease.
- Almost a half of respondents reported a decrease in industry or charitable funding for non-Covid related projects or activities. Looking forward to the end of the year 2020, half of respondents believed that funding from these sources for specific projects and activities would continue to decrease.

The preliminary analysis suggests that UKRI's rapid response calls for Covid-19 research was viewed by most as having positive effects on universities' abilities to continue to deliver their innovation focused project and activities; with three quarters also noting positive effects of UKRI allowing grant extension allocations. Three quarters of respondents also noted positive effects from the UK Government's support packages for innovative businesses.

Figure 5: Universities' views on the effects of the Government's support packages



Source: UCI/ NCUB

The positive feedback on these schemes demonstrates **the important role that public support and funding plays at this time of crisis**. As R&D and innovation is a long-term venture, the Government must continue to carefully monitor trends and consider targeted measures to support and incentivise innovative activity.

(3) Take measures now to avoid losing a generation of researchers and innovators

There are fewer vacancies at the moment for PhD graduates seeking employment in academia or industry. Whilst there has been an important focus on the impact of Covid-19 on employment generally, there is equally a need to consider research and innovation talent pipelines too, which face particular and significant challenges. **The Government must take measures to help PhD graduates into meaningful employment or training that utilizes their high level skills**. This may be through funded research and innovation placements in industry or academia.

Seize the opportunity to rebalance the UK's economy

The R&D roadmap is ambitious, and demonstrates a clear desire to refocus the UK's economy towards more research intensive, innovative activities. Doing so will help **the UK**:

- a. **raise living standards**, by creating more and better jobs and opportunities for people and driving discoveries that improve health, wellbeing and the environment.
- b. **solve global challenges**, from decarbonising our economies and building resilience to the impacts of climate change, to tackling food insecurity, global health issues, and structural inequalities.
- c. **build resilient and sustainable economic growth**, through greater productivity, a more balanced economy and greater global competitiveness.

NCUB has been asked by David Sweeney, of UK Research and Innovation, to form a [taskforce](#) comprised of business and university leaders to collectively provide UK Research and Innovation with evidence and insights on the progress of universities and businesses in working through their stability toward greater contribution to the nation's recovery, and advise on how we should tackle key challenges as set out in the Research and Development Roadmap in relation to university-business linkages. **Findings and recommendations from the Taskforce will be published by the end of October.**

As the work of the Taskforce continues, further evidence will be gathered and considered, and recommendations are being prepared. This evidence could be shared in more detail with HMT.

(1) Take a whole of Government approach to economic transition

The Government's vision for the future of R&D and innovation in the UK is bold and ambitious. However, fundamentally transforming our economy is going to require rethinking many of its building blocks. The measures needed to rebalance our economy will transcend the individual purviews of UKRI and individual Government Departments – spanning all the key facets of fiscal, trade, education and regulatory policy.

Creating a more R&D intensive, innovative economy will need national coordination, rather than individual tweaks around the edges. This will require a coordinating entity responsible for delivering economic transition. NCUB's R&D taskforce is considering possible mechanisms that may allow this, including the opportunities of a temporary Government Department (taking the recent example of DExEU) and the US model of interagency working groups.

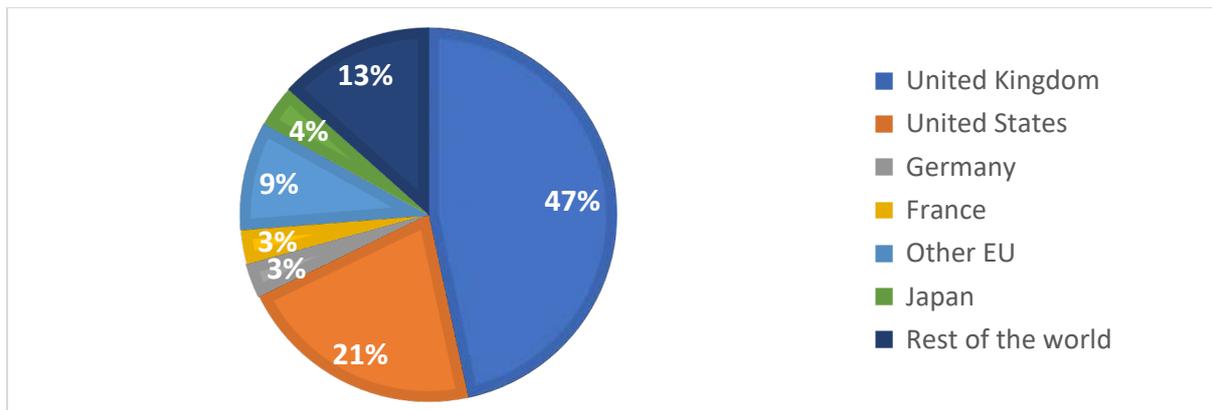
Importantly, a whole Government approach must grapple with two important issues:

- The UK needs to face up to global competition in R&D and start behaving as a competitor in the global R&D and innovation market to drive an innovative economy
- The UK needs to address the unresolved challenge of balancing regional parity against national performance

(2) Develop a UK-wide research intensive FDI strategy

Over half (53%) of business-based R&D in the UK was funded and performed by foreign-owned firms and has increased from 40% in 2007 and 27% in 1993. Analysis of data from 2015 suggests that the UK has a higher level of FDI in R&D than any other country in the G7. This indicates that attracting research intensive FDI is a strength for the UK, but also demonstrates the UK's heavy reliance on investment from foreign-owned firms, which may face disruption as a result of Covid-19 and the UK's withdrawal from the EU.

Figure 6: Ownership of UK businesses performing R&D, 2018



Source: ONS

The impact of the Covid-19 crisis on Foreign Direct Investment in R&D is not well understood, but given the UK's reliance on investments made by foreign-owned firms, **there is an urgent need for more evidence gathering. If foreign-owned firms choose to divest from the UK, this would have a severely detrimental impact on the UK's current research and innovation performance** and on its ability to realise its long-term ambitions. As UK research and technology plays a critical part in responding to the Covid-19 crisis, there is an important opportunity to showcase the UK's strengths in R&D and innovation overseas, and to promote the UK as an attractive destination for R&D even during the crisis.

Equally, as the UK seeks to negotiate new trade agreements there is a need to develop a **UK-wide research intensive FDI strategy**. This should consider both national innovation policy (including fiscal and financial incentives, human capital development and research infrastructure policies), as well as inward investment promotion, which may include setting clear targets for knowledge intensive FDI, R&D investment services for foreign investment, and promoting the UK as an R&D location.

To further raise the UK's global profile and collaboration, NCUB recommends establishing an international version of the highly successful UK Research Partnership Investment Fund. The scheme's unique feature is the doublematch funding required from non-public investors. To date, UKRPIF projects have secured commitments of over £2 billion of co-investment from industry partners, charitable organisations and philanthropic donors. Similar competitions should be ran with sizeable rewards for the universities or research institutes that attract large amounts of foreign direct investment in R&D to the UK.

The UK must **maintain close research relationships with other countries** and welcomes the Government's commitment to seek association to European Framework Programmes, as well as its commitment to a replacement programme should association not be achieved. As the UK leaves the EU, there will be opportunities to strengthen the UK's strategic engagement with other major research nations too.

(3) Develop sustainable research and innovation funding models

Research universities' primary goal is generating and disseminating knowledge. Investment in universities represents a long-term investment in the UK's research capabilities and will bring long-term returns. Universities' critical contribution to the research and innovation system relies on a long-term and sustainable funding system. While the work of the Ministerial University Research and Knowledge Exchange Sustainability Taskforce is going, NCUB recommends the following:

- Maintain the principles of the UK's highly efficient Dual Support System, but increase and regularly review the proportion Quality Related (QR) funding (and devolved equivalents), so it is appropriately balanced with growth in grant funding from all sources (that includes government grants, but also investment in university research by charities and business).
- Remove the cap and lower the threshold on Higher Education Innovation Funding (HEIF) to support university-industry collaboration

- Retain continuation of flexible government support for world-class basic research in all disciplines to allow researchers from a wide range of backgrounds and with their own global academic networks to steer productive research agendas.
- Keep the financial sustainability of universities as an integral part of the research system must be kept under careful review, particularly as the consequences of the Covid-19 pandemic become clearer. The scale and diversity of the university sector must be maintained to drive forward the ambitions of the roadmap and level up the economy.

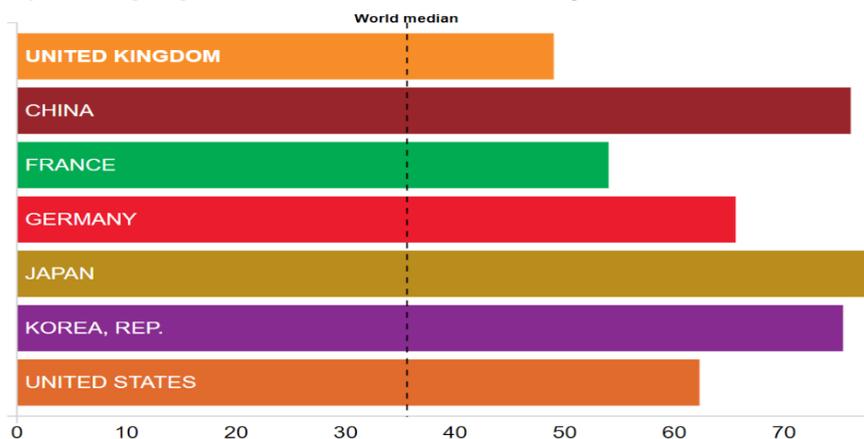
The Government should also **identify gaps in the current funding environment**. NCUB members and others tell us that near-to-market ‘technology-pull’ is better funded within the research funding landscape than early-stage, high-risk, potentially high-impact venture capital. Limiting research funding to late stage research or research that is likely to achieve excellence with near-guaranteed outcomes can stifle curiosity and innovative thinking. There is a gap in the research and innovation funding landscape for researchers to access longer-term funding.

The proposed UK ARPA may go some way in breaching this gap by providing research funding allocations (spanning at least 10 years) that give researchers the freedom and resources to unlock their ideas from concept stage through to commercialisation. The ARPA should be mission orientated and focussed on specific themes of strategic priority. Involving industry and academics in determining strategic priorities will be critical. Equally, UK ARPA needs to be well-funded or it risks failing and must sit outside of traditional political funding cycles. Consideration must also be given to specialisms like ‘deep tech’ research or AI that has a longer research incubation period, but where the UK has strengths.

(4) Encourage private sector investment in R&D and innovation

R&D and innovation will create significant long-term benefits for firms and the UK. However, more should be done in the UK to encourage business investment and riskier ventures. This requires taking full account of the range of factors that affect the operating environment of R&D performing industries (including large corporates and start-ups) and their contribution to the impact agenda. This includes human, physical and financial capital, regulation, fiscal policy, infrastructure and trade policy. Whilst a significant proportion of UK GERG is financed by business, it is a lower proportion than in many of the UK’s competitors, suggesting there is room for improvement.

Figure 7: proportion of GERD financed by business, 2018



Source: Worldbank

In refocussing the economy towards more R&D intensive activity, businesses are not just beneficiaries of the research and innovation system, but they are an integral part of it in a way that is not fully explored in the R&D roadmap. The roadmap speaks to the role of public R&D performers more than to the role of private R&D funders and performers. Schemes and initiatives should be developed that support the diffusion and adoption of research and development through the supply and value chain of some of our world leading businesses. The catalytic effect of encouraging R&D could be transformational in developing more innovative, more productive and more resilient businesses across different sectors.

NCUB's R&D Taskforce is considering measures that can be taken to stimulate business R&D investment and there are a range of possibilities to consider:

- **Make the annual investment allowance unlimited for businesses** to encourage business investment in tangible capital that enhances their performance and stimulates demand for state of the art and cutting edge machinery, technologies and equipment.
- **Encourage pension schemes to invest in assets with long-term investment horizons**
- **Create a pro-innovation regulatory environment as we leave the EU** -this may include considering how the role of University Enterprise Zones may be enhanced as lower-regulation and lower-tax zones that can be used by universities and businesses in collaboration to allow for greater risk-taking. It may also include considering how the concept of freeports may be extended to support innovative activity and university-business interaction in regions.
- Consider the role of Government in **pulling through research to development and finally market stage through procurement**
- **Create a proportionate approach to any future State Aid rules**

The labour market is transforming and we must respond

A more research and knowledge intensive economy will need a knowledgeable, well trained and well supported workforce. New technologies have led to significant skills shifts since at least the Industrial Revolution, and it seems like the adoption of automation and artificial intelligence, coupled with the impact of Covid-19 on operations, is only going to accelerate the pace of shifts. Delivering a productive, knowledge-intensive economy will require more than scientists and researchers but also engineers, technicians as well entrepreneurs and innovation managers and leaders. Ensuring that this meets the need of industry as well as academia will be important and encouraging greater mobility will be critical.

All technological skills, both advanced and basic, are expected to see substantial growth in demand, whilst demand for physical and manual skills is expected to fall. Demand for social and emotional skills is also expected to rise as skills that machines are far from mastering. McKinsey estimates that a rise in demand for entrepreneurship and initiative taking will be the fastest growing, with a 32% rise in demand forecasted in Europe by 2030. There is also expected to be a rise in demand for higher cognitive skills, such as creativity, critical thinking, decision making and complex information processing. A general lack of data literacy and numeracy amongst the UK's workforce is viewed as a barrier to technology and data enabled innovation and innovation adoption.

(1) Establish an independent body to analyse current and future skills needs of the UK

Since the closure of the UK Commission for Employment and Skills (UKCES) in 2017, **the UK has lacked a national body dedicated to gathering labour market intelligence to guide decision making on further and higher education policy.** The Migration Advisory Committee (MAC), which advises the government in immigration policy, has played an important role in determining the short to medium term skills needs and shortages of the UK. However, it does not have a remit to forecast the longer-term skills needs of the economy and cannot make recommendations related to domestic training and education.

The Government should **establish an independent body to analyse current and future skills needs of the UK.** This body should:

- Evaluate the short, medium and long-term skills and competency needs of the UK, working with the MAC to identify short-term occupation shortages as well as forecasting possible future occupation shortages
- Generate intelligence and insight from employers on education-leavers preparedness for work
- Drive collaboration between government, universities and business in discussing the challenges of the current labour market, strategically assessing the skills needs of the future, and identifying possible education and training solutions
- Work closely with Skills Advisory Panels and devolved government to establish the skill needs of local areas and how central government can work with local government to make sure we have the workforce for a successful economy.
- Advise Government, business and education providers on skills and talent policies based on evidence and insight

Trying to generate a common view on what skills and competencies people should develop and courses they should take during their degree will always risk some reductionism. Universities need to respond appropriately to ever changing student and employer demand, as well as balancing nurturing soft skills, creativity and independent learning against specific technical and competency skills. **More feedback should be collected, on a national and local level, from graduate employers to help assess the preparedness of graduates for employment.**

(2) Waive the student debt of graduates in occupations with significant skills shortages

For many years, employers have been reporting large numbers of hard-to-fill vacancies at professional level across a wide breadth of areas, from nursing to teaching, to engineering and software development. **The Covid-19 crisis is likely to exacerbate existing skills shortages and hinder long-term recovery.**

Skill shortages in STEM fields have been widely identified and long-standing, and several surveys of C-suite executives have highlighted Advanced IT and programmes skills as the most important skills needed in the short-term. According to [STEM Learning](#), there is a shortfall of 173,000 skilled workers in STEM careers and 89% of STEM businesses struggle to recruit. The survey also found that new STEM roles expected to double in next 10 years. One of the central problems to attracting more people into STEM careers is the so-called 'leaky pipeline.' Maths remains the most popular A-Level subject and sciences have grown in popularity. However, figures from 2016 showed that just 24% of the 75,000 students that graduated with a STEM degree

had a job in a STEM field and almost three-quarters of female graduates left the sector altogether.

Governments have considered policies to address the UK's professional level skills shortages, but these measures have not gone far enough. Recently, the Government has suggested introducing differential fees in order to incentivise students to pursue certain degrees in line with economic or societal needs. Universities and students have warned that differential fees would have considerable unintended consequences, including constraining student choice, reversing progress on social mobility and unintentionally generating new skills shortages.

Differential fees to address skills shortages is an impractical approach in an age where technologies are evolving quickly, and the skills and competencies required by employers are transforming rapidly. **To address the UK's professional level skills shortages, the Government should develop a clear process of waiving the student debt of graduates in occupations with significant skills shortages.**

This will not simply incentivise students to undertake degrees that may prepare them for a skill-shortage occupation, but will also help employers to attract graduates to those occupations and retain them in the longer-term.

(3) Introduce more flexible, modular higher education funding and lift Equivalent and Lower Qualifications (ELQ) restrictions

The Covid-19 crisis is likely to accelerate changes to an already rapidly evolving labour market. The UK urgently needs to prepare for automation and the fourth industrial revolution. In order to do so, there is an urgent need to develop clear policies and funding to support retraining and upskilling into sectors that are predicted to grow in the next decades.

To help people retrain and pursue new careers, the Government should provide targeted support for part-time provision and flexible adult learning. In particular, in introducing more flexible modular higher education funding and lifting ELQ restrictions. This recognises that adult learners may need to pursue new qualifications and training in order to pursue professional careers in a new occupation or sector.

(4) Amend the apprenticeship Levy so it can be used to cover the real cost of an apprenticeship to businesses

The apprenticeship levy cannot be used by businesses to cover all costs related to hiring an apprentice, excluding fundamental costs like hiring charges.

The apprenticeship levy was introduced to create new apprenticeship opportunities and provide more employer led pathways towards education and training. In practice, many Apprenticeship Levy payers are primarily using their levy to upskill existing employees rather than taking on new, young apprentices. Both possible functions of the levy – to train and educate young people and to retrain and upskill existing employees – are valuable and should be encouraged. **Flexibilities should be introduced that allow employers to more easily use part of their apprenticeship levy to fund appropriate training for existing employees.** This would allow business' to use their levy for important retraining purposes, but would also protect part of the levy to create new apprenticeship opportunities for young people.

(5) Attract, train and retrain diverse, talented people and teams

Rebalancing the UK's economy towards more knowledge and research intensive activities will require changes to the balance of the UK's workforce. R&D will be driven by people with the knowledge, capabilities and ambition to drive research and innovation activities in both academia and industry. Raising our ambitions for UK science, research and innovation, will require a step change in the way in which we inspire and enable talented people from all backgrounds and experiences to be part of these sectors. This will require more than simple an extension of existing talent pipelines and development routes. It must be the best in the world for attracting, training and retraining diverse, talented people and teams.

Maximising the impact of research and driving innovation relies on an effective flow of knowledge. Ultimately, this requires people to connect with each other through collaboration. Talented researchers and innovators need opportunities to migrate both geographically and between positions in academia, industry and government. NCUB recommends that:

- Government policy encourages the flow of researchers across national borders and sectors. NCUB is researching barriers to flows between academic, industry and government careers, and is well placed to advise the government as it develops policies on mobility.
- Innovative approaches to networking and collaboration through digital channels are further explored, encouraged and exploited. This includes further expansion of the role of digital brokerage tools, such as NCUB's innovative Konfer platform.