

Science and Technology Committee (Commons)

Inquiry: The role of technology, research and innovation in the Covid-19 recovery

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

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Background on the National Centre for Universities and Business

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.

To note

NCUB has been asked by 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.

To support the work of the Taskforce, NCUB is collecting evidence that informs our response to this consultation, including:

- Interviews with universities and businesses working through the crisis
- Four Advisory Groups focussed on:
 - Successes and learning from the crisis
 - Supporting the whole innovation system
 - Research talent, capability and culture
 - attracting business R&D investment to the UK
- A UCI/ NCUB survey of universities 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.
- Analysis of data, including the impact of previous crises (including the 2007 financial crisis) on R&D and innovation.

As the work of the Taskforce continues, further evidence will be gathered and considered.

This evidence could be shared in more detail with the Committee.

What role can technology, research and innovation play in supporting the UK's economic recovery from COVID-19 and how can it best be supported in this?

The response to the Covid-19 pandemic has demonstrated how important technology, research and innovation is to our society, our health and our economy. The 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.**

In the medium to long-term, the UK has an important opportunity to rebalance its 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.

As the engine of the UK's innovative UK economy, through technology, research and innovation **universities will**:

- d) **Retain and strengthen their position as global leaders** in research, attracting investment as well as talented staff and students from around the world
- e) **Achieve impact and positive change**, through greater interaction and collaboration with businesses, charities, governments and others.
- f) **Create opportunity**, for their students, staff and local communities

As the driver of the UK's innovative UK economy, **businesses will**:

- g) **Create export-led, knowledge-intensive growth** by creating and enhancing products, services and processes, producing efficiencies, opportunities and commercial success.
- h) **Secure advantage in the global market**, by building on the strength of the UK's world leading research and universities, and attracting new talent.
- i) **Enhance customer engagement and impact**, by streamlining processes and creating products and services that meet customers' evolving needs.

[Research](#) from the McKinsey Institute suggests that companies that innovate are more resilient in a crisis, more likely to expand into new markets during disruptions and more likely to be able to hold on to staff and grow in difficult trading conditions. 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.

We comment more on this below.

Does the current or post-COVID situation lead to any particular opportunities or challenges for economic growth driven by technology, research and innovation?

Assessing the challenges for economic growth driven by technology, research and innovation requires an in-depth look at the impact that the crisis has had on R&D intensive businesses. In the UK, over half (54% of £18.7 billion) of total UK-performed R&D activity is funded by business. This means that there are significant expectations as well as a heavy reliance on a small number of companies that currently invest in R&D. The challenge is that we know little about how the Covid-19 pandemic has affected business innovation-focused activities, research and partnerships with universities. Policy makers need to be able to anticipate and put in place effective programmes of support to stimulate R&D investment.

Over the summer, NCUB undertook a series of interviews to understand the impact of Covid19 on business' investment in R&D. Our interviews revealed several challenges but also opportunities that could present new ways of shaping the UK R&D system and driving growth. The greatest challenges we identified were:

- (1) Businesses affected by revenue loss will need to make critical decisions about spending priorities, including R&D spending
- (2) Number of university-business collaborations could decline
- (3) Human capital could be lost

1) Businesses affected by revenue loss will need to make decisions about spending priorities, including R&D spending

R&D activity is often financed through the sales and profits of a company. Therefore, **lack of funding and cashflow issues in the immediate crisis has led, in some cases, to a decision 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's likely that even the effects of Covid19 will be felt in stages: immediate impacts resulting from the health crisis and lockdown, then a likely recession and, in the longer term, an increased likelihood of austerity measures.

Our discussions revealed that the Autumn could potentially mark the start of the second 'crisis': the recession and when businesses begin the hard decision-making around R&D restructures. Company boards are focusing on managing cash flow and R&D budgets are at

risk in cost-saving measures being proposed. And while impact across different sectors will vary, longer term impacts are expected to hit other parts of industries as smaller companies further down the supply chain continue to develop recovery plans, especially in sectors where demand and sales may remain low.

It is worth mentioning here the impact on innovative startups and spinouts. **As many of these companies are growth-focused and heavily reliant on equity, they have largely been unsuccessful in securing any Government aid. Fears of recession will mean that investors are changing their behaviours, reducing investment** and preserving funds rather than looking for new opportunities. As startups rely on equity or customer orders to remain viable and with limited cash reserves, many startup companies will be unable to continue with product development and progress their business plans. This could impact startup companies' ability to plan and focus longer term.

2) Number of university-business collaborations could decline

Almost all of the businesses we spoke to said they invest in R&D because it is essential to their long term business objectives. Partnerships with universities are vital to business' ability to innovate as they represent opportunities for growth and efficiencies. Therefore, ensuring the sustainability and success of UK university-business partnerships is crucial to industry R&D and innovation activities. Our discussions revealed that in some cases, companies were already on a journey to reinvent or rejuvenate their technology, efficiency and innovation strategies. The expertise required to meet priority areas around new product development or efficiencies can sometimes only be found outside of the organisation. Businesses said they depend on university partnerships to help them think differently. Many R&D intensive companies have spent years building close and strategic partnerships with universities. Therefore, **although they are facing cost pressures, it is too early to tell whether they will walk away from these strategic relationships.**

Longer term however, the businesses we spoke to are focused on working with universities with whom they have worked before, and with whom their partnerships are strategic and 'easy'. This trend was highlighted within the [NCUB/ UKIRC 2009 business motivations survey](#), which reported that businesses tend to gravitate to universities with whom they have a prior history and 'mutual trust'. One business said that although they currently work with more than 30 universities, **strategic decisions in the future will mean that they will need to be more selective about their partnerships and it is unlikely that they will pick up more.** Businesses said they will be looking to build up critical mass with one to two partners, looking particularly at where they can leverage additional funding by working in partnership with research councils and others.

3) Human capital could be lost

There is a huge challenge to support the whole R&D system to ensure that the vital skills pipeline is maintained and actively nurtured. Short term options to delay projects or frontloaded funding have been helpful to allow companies to offer extensions to researchers but companies said they are worried about the longer term. **If budgets are squeezed,**

projects are unlikely to be renewed and post-doctorate sponsorships discontinued, resulting in talented researchers being drawn to countries and funding programs where support and longer term stability is available.

Taking an innovative idea from initial thinking to product launch can take up to 10 years; therefore, maintaining the right people with the right experience, expertise and knowledge, will be essential to continuing their future R&D and innovation capacity. **The prevalence of short-term contracts in academia and financial challenges facing universities and companies are increasing the risk of erosion of talent as these people will no longer be in university posts after their current contracts end.** The UK has long relied on its excellent research capability, but if that talent is lost, it will mean starting from scratch and could result in R&D businesses following where the talent moves.

Opportunities

The impact of Covid has and will continue to have a huge impact on the economy, resulting in private sector R&D investment likely contracting at a time when the UK Government is trying to find ways for it to increase considerably. Therefore, finding opportunities to enhance and drive innovation will be vital to ensuring that the UK can retain and continue to attract world-class, competitive research talent and infrastructure at this time of uncertainty.

Digitalisation is a key part of the new world that Covid has introduced for many companies and improving and investing in digital technology, for example by facilitating remote working can help businesses but can also promote industry-university collaboration. Where there is Government funding and direction often in the form of moonshots, businesses and researchers alike will invest.

The outbreak has also demonstrated the rapid innovation and scale up that both businesses and universities were able to deploy to address the very urgent needs resulting from the crisis. From manufacturing of new breathing aids, vaccines, to design and production of NHS PPE, the results have been impressive. **Throughout the crisis, UK Government public funding was able to move with the same agility offering new and agile funding schemes through Innovation UK, UKRI and other Government bodies to fund research and innovation.** These opportunities have signified lessons to learn in how we can support and sustain this agility in non-emergency situations. This will require coordination and collaboration, uncomplicated regulation, open research and data with agile release of IP and rapid open funding schemes, and uptake of innovation at pace.

To support activities in crisis – adopting digital technology to match universities and businesses through the National Centre’s online brokerage tool – konfer. We collated various Covid19 challenges and funding calls and smart matched them to both universities and businesses. We shared targeted notifications with 153 UK universities and targeted businesses in our business directory of over 27,000 UK companies. For more background on konfer and Covid19 Challenge work – click [here](#).

How have research and innovation in UK universities, businesses and other settings been affected by the COVID-19 pandemic, and how might they be affected by any lasting changes post-COVID?

In August 2020, the Policy Evidence Unit for University Commercialisation and Innovation (UCI) at the University of Cambridge and NCUB jointly 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 survey generated 49 responses covering all regions and nations of the UK, and most types of universities. These findings represent preliminary analysis of responses. A full report will be produced by UCI/NCUB in due course which captures the full results and insights.

Our early findings reveal much of what we reported above- **that the impacts may be too early to tell but that there may be longer term impacts as businesses begin to make strategic decisions about their R&D budgets.** We will be repeating this survey at different points in the next two years to further monitor impact and will shortly be conducting a similar survey with businesses.

Level of activity:

- **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.
- Indeed, as we outlined above, strategic partnerships may not suffer but ad-hoc collaborations may. Activities with strategic partners of universities are much less affected than those with non-strategic partners. **Levels of innovation-focused activities between universities and SMEs are particularly badly affected,** with almost 60% of universities identifying a decrease. Interestingly almost a quarter reported an increase in the level of activities with SMEs during Lockdown. This would warrant further research.

Nature of changes and reasons for change:

- The survey investigated the nature of changes to projects for those universities that had experienced decreases in activities. **It found that most reported *project deadlines or milestones being extended, and project start dates being delayed.* Many also reported *partners seeking to renegotiate financial and other terms of project***

contracts, the scale/scope of projects being reduced, and projects being refocused in order to address shorter-term partner needs. Just over four in ten also reported projects being cancelled.

- The survey also examined universities perceptions of why external partners were reducing activity. It suggests that the primary reasons were largely financial, including: **financial resources within the partner no longer being available or resources not being sufficient to fund collaborations/projects with the university.** *Limited access to necessary facilities, equipment or raw materials making it difficult for project work to continue* was also cited by just over half of universities reporting a decrease in overall innovation-focused activities.

Challenges to delivering innovation-focused projects and activities with external partners

- The survey explored the abilities of universities to ensure the necessary resources and support were available to deliver innovation-focused projects with external partners during Lockdown. Preliminary results show that the biggest challenge by far was the **ability of projects to access necessary facilities, equipment and raw materials (including data).** Almost seven in ten respondents found it harder to cover *financial costs of projects/activities (e.g. if paused)*, while almost six in ten found it harder to *ensure project staff were able to dedicate sufficient time to tasks.*

Effects on funding availability for innovation-focused projects during Lockdown

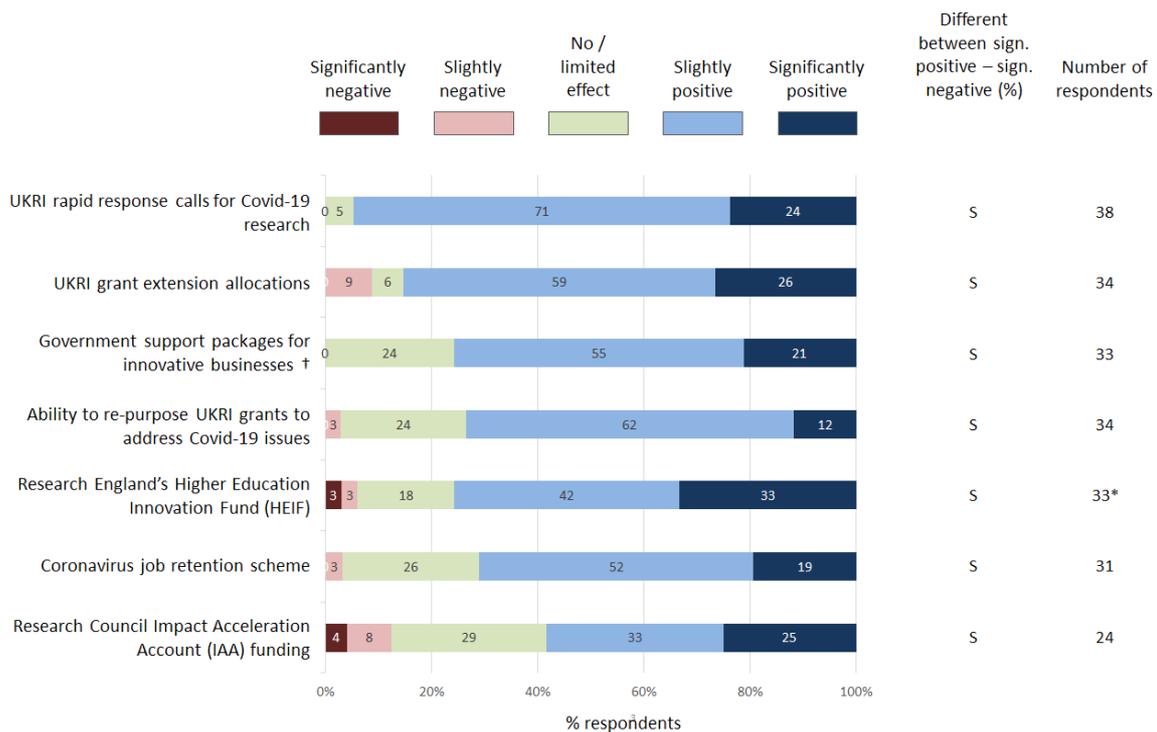
- In exploring the availability of funding for innovation-focused projects and activities we deliberately distinguished between the availability of funding for specific projects (focused on R&D, innovation and commercialisation) and the services and support for initiating and delivering these projects. We also distinguished between funding for Covid-related activities and non-Covid related activities. Additionally we explored the availability of funding for creating and maintaining the physical or virtual infrastructure that underpins these activities and for the building of the capabilities of academics and support staff to engage.
- We found that while many respondents noted that for specific Covid-related projects activities was available or had increased (particularly from public sources but also from industry), the real challenge was for non-Covid related activities. **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.

How effective have measures adopted by the Government to support research and innovation, such as the support packages for innovative firms and university researchers, and the ‘Ministerial University Research and Knowledge Exchange Sustainability Taskforce’, been?

NCUB welcomes the initiatives taken by HM Treasury to support business and universities through the immediate impact of the crisis. Whilst some measures, such as the Future Fund and university support measures, were targeted directly at support for research and innovation, wider measures to support businesses and employees through the crisis (such as the Coronavirus Job Retention Scheme and business support grant funds) had an equally important part to play in stabilising the main actors in the R&D and innovation ecosystem.

The UCI/NCUB survey of universities referenced above asked respondents to rate the effects of different Government schemes on universities’ abilities to initiate, support and deliver innovation-focused activities with external partners during the Lockdown and into the early stages of the economic recovery (to the end of 2020). The results are shown in Figure 1.

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.** For universities in England, a third of respondents believed that Research England’s Higher Education Innovation Fund (HEIF) had a significantly positive effect with a further 42% claiming it had slightly positive effects.



The measures taken by the Treasury to support R&D and innovation activity have been welcomed and have had a positive impact. However, the Committee and policy makers are rightly asking whether they go far enough.

The measures taken do not resolve the longer-term sustainability issues with the current funding model for research in universities. Our university members report that growth in Quality Related (QR) funding, and devolved equivalents, has not kept pace with growth in grant funding from all sources (that includes government grants, but also investment in university research by charities and business). NCUB welcomes the formation of the “Ministerial University Research and Knowledge Exchange Sustainability Taskforce”, but this committee must be ambitious and work at pace in order to put research funding on a more sustainable footing.

The Government must also be prepared to respond effectively to any further waves of Covid19. The stability measures taken by the Government are shortly coming to an end. Further waves of Covid-19 could significantly impact business revenues, driving down their ability to invest in R&D and innovation. They could also impact universities’ financial sustainability and viability. If support is withdrawn prematurely or not reinstated when needed, UK R&D and innovation would be harmed.

The full impact of Covid-19 on R&D and innovation is unlikely to materialise immediately. Many R&D and innovation activities planned before the crisis are likely to have continued or extended. However, as we outline above the uncertainty caused by the crisis may hinder decisions to invest in the future. Our UCI/NCUB universities survey, for example, showed that levels of innovation-focused activities between universities and SMEs have been particularly badly affected, with almost 60% of universities identifying a decrease. This is an indication

that impacts on SMEs further down the supply chain may experience budget and revenue constraints in the longer term. Equally, universities do not yet know the full impact of the crisis on student enrolments. The Government must keep the long-run impact of the crisis under careful review, and plan appropriate measures (in consultation with businesses and universities) to protect UK R&D and innovation.

In the context of the Government's 'Research and Development Roadmap', what shorter-term measures can best support UK research and innovation in recovering from the disruption of the COVID-19 pandemic and adapting to the post-COVID environment?

To help UK research and innovation recover from the disruption of the Covid-19 pandemic, NCUB recommends the following.

(1) Maintain the Government's commitment to increase spending on R&D and innovation

The Covid-19 crisis has had a significant impact on the UK's economy, the consequences of which are likely to impact the UK and the Government's public spending plans for many years to come. In this context especially, **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.

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

UK R&D and innovation is supported, funded and performed by a web of actors and enablers. 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).

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.** It is also critical

that government spending on incentives and support to encourage R&D investment by business are at least maintained in the upcoming Comprehensive Spending Review.

(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.

(4) Recognise foreign owned multi-national firms as a central actor in the UK's innovation system and as a catalyst for upgrading in global value chains

Over half (53%) of business-based R&D was funded and performed by foreign-owned firms and has increased from 40% in 2007 and 27% in 1993. 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.

(5) Support universities as critical builders of national and regional R&D capability

Universities play a fundamental role in the UK's R&D and innovation system. They are the main drivers of national basic research, they generate and commercialise knowledge, grow skills and talent, support entrepreneurship and businesses large and small. However, Covid-19 has had an unprecedented impact on parts of the university system and on certain universities in particular, with many universities having to rapidly change their operations and facing a likely drop in international student numbers. Our university members report that growth in Quality Related (QR) funding, and devolved equivalents, has not kept pace with growth in grant funding from all sources (that includes government grants, but also investment in university research by charities and business). **This has led to a funding shortfall that must be addressed.**

The decision to allow all students who achieved the required grades to be offered a place at their first choice university must be welcomed. However the late movement of students between institutions will have unintended consequences for the university sector. There is an **urgent need for financial support to ensure the financial stability of institutions suffering from a loss of students and to offer further support to maintain and build capacity where needed.** Failure to support universities through this crisis could prevent employers in all parts of the country from maintaining their R&D capabilities, which would be to the detriment of regional and national economic growth.