



Department for Business, Energy & Industrial Strategy

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Our ref: SM/ZC211104

3 November 2021

Dear Chair,

Fifty-Sixth Report of Session 2019-21: Industrial Strategy Challenge Fund (ISCF)

In the report following the Committee (PAC) Hearing on the management of the Industrial Strategy Challenge Fund (ISCF/the Fund) on 04 March, the Committee set out a series of recommendations. The department responded to some of the recommendations in the Treasury Minute which addressed this report and in my letter of 31st July 2021. I am now writing to address the remaining recommendations made by the Committee:

PAC Recommendation: UKRI, working with the Department, should clearly set out, by October 2021, what it expects the Fund to deliver. This should include its impact on jobs and economic impact in the short, medium and long term.

The Department for Business, Energy and Industrial Strategy (BEIS) and UK Research and Innovation (UKRI) are committed to understanding and demonstrating the expected impact of public investment into the Fund. The Fund is expected to deliver economic, environmental and social impact directly. Individual challenges also have a vital role to play in building the wider innovation landscape, influencing the development of new markets, supporting commercialisation and creating business opportunities.

Based on forecasts from across the Fund, the expected **economic impacts** include¹:

- Co-investment from industry and other non-public sources. The ISCF's challenge model means it is well placed to do this and the Fund is forecast to deliver between £3.8bn and £5.6bn of leveraged co-investment - up to double that of the original target for the fund (£2.8bn) and of the fund budget (£2.5bn).
- The creation and retention of jobs within the sectors targeted by the Fund. BEIS and UKRI have questioned whether current forecasts may overstate the overall additional benefit derived at a societal level due to not accounting for factors such as job displacement. To ensure we account for additionality, all challenges are undergoing

¹ Data is presented for the short, medium and long term. The data is cumulative, has not been discounted and all of the forecasts and reported results rely on self-reporting by the challenges.

full independent evaluation, though at this stage of the investment lifecycle it is too early to discern. Initial forecasts are as follows:

- 21,000 jobs created or retained in the short term²;
 - 97,000 jobs created or retained in the medium term³; and
 - In the long term⁴, there is the potential for the number of direct and indirect jobs created or retained to continue to grow as a consequence of change introduced as a result of ISCF-funded innovations⁵.
- As innovation involves long timescales, only seven challenges are currently in a position to forecast the amount of revenue likely to be generated due to ISCF-led interventions. £177m has been invested to date in these seven challenges, out of total committed funding pot of £394m. Although current forecasts do not yet account for whether the revenue generated is truly additional, our work so far suggests that amongst these seven challenges, forecasts are for:
 - £475m of revenue in the short term;
 - £1.9bn in the medium term; and
 - £3.8bn potential revenue in the long term.

The confidence we have in our economic forecasts is strengthened by emerging signs of impact from across the Fund. The Fund has so far supported 1,871 businesses and has leveraged £1.35bn of industry and other non-public co-investment. This is from investment of £1.28bn in the Fund, out of a total committed funding pot of £2.13bn.

Businesses that participate in the ISCF typically do so with an expectation of a commercial return at some point in the future. We also expect involvement in the ISCF to create and/or retain skilled jobs in participating organisations. From surveys of ISCF participants, we can identify the estimated additional revenue businesses expect to earn, and jobs they expect to create or retain, as a result of their involvement in the ISCF. Based on recent analysis of emerging impact undertaken during 2021 and using self-reported data from a set of 344 completed ISCF projects with 695 participant organisations, we can see that:

- An estimated £900m additional net revenue has been generated in participants of completed Challenge Fund projects⁶; and
- Completed projects have reported that they have retained in the region of 2,000 jobs.

These are self-reported estimates and should be interpreted with caution. Since this analysis was conducted the number of completed ISCF projects with a completed outcome survey has increased to 499, therefore we can expect that the scale of emerging impact may have changed during this time. The ongoing independent evaluation of the ISCF will

² Short term is 3-5 years from Business Case approval

³ Medium term is 5-10 years from Business Case approval

⁴ Long term is 10+ years from Business Case approval.

⁵ Long-term forecasts involve higher levels of uncertainty and due to challenges working within the same sectors, could lead to double counting – a long-term estimate has therefore not been provided. To account for this interconnectivity in the short and medium term, a connectivity adjustment has been applied across the challenges. Adjustments have also been made to account for optimism amongst challenges. In line with the NAO recommendation, work is ongoing to further verify these forecasts and the approaches to managing double counting and challenges' optimism.

⁶ This is a self-reported estimate of additional revenue earned by businesses as a direct result of their participation in the ISCF, adjusted to ensure robust data quality and eliminate potential optimism bias.

attempt to quantify the economic impact of the Fund with a higher degree of robustness, consistent with principles laid out in the Treasury Green Book.⁷:

In addition to the economic impact, the Fund expects to deliver a broad range of **environmental and social impacts**.

- The Fund will contribute to net zero objectives via innovation in decarbonisation and reducing emissions.
 - The Industrial Decarbonisation Challenge supports six decarbonisation clusters around the UK. This is forecast to enable capture of 6 MtCO₂e⁸ per year in the medium term, in line with the government's ambitions. This is forecast to rise to 14 MtCO₂e per year in the long term;
 - Contributions to reducing carbon emissions come from a diverse range of sectors. For example, the Prospering from the Energy Revolution Challenge is helping thirteen local areas across the UK to develop innovative and investable smart local energy systems; and
 - Reductions are also forecast by challenges as diverse as Future Flight and the Transforming Food Production Challenge, with forecast reductions across the two challenges of 0.002MtCO₂e per year in the short term; 1.2MtCO₂e per year in the medium term; and potentially 5.8MtCO₂e per year in the long term.
- The Fund is committed to supporting the research and industry skills required to develop and deliver innovation. The Faraday Battery Challenge is supporting 450 scientists in the short term, and the Digital Security by Design Challenge forecasts 15 PhDs will be undertaken in the short term, rising to 30 in the medium term. The Medicines Manufacturing Challenge has created an apprenticeship programme to ensure a skilled workforce is available for the major interventions it is funding. The Challenge currently has 140 apprentices, which is forecasted to rise to 350 in the medium term and 600 in the long term.

Innovation is both risky and the impact derived from it develops in the long term. Our objectives are ambitious and achieving them is complex. Long-term impacts are subject to an increasing number of dependencies, including any changes in the wider policy context, new and emerging markets and sectors, and the way in which existing and emerging sectors adopt and diffuse innovation. Added to this are the uncertainties caused by unforeseen events, such as COVID.

Moving forward, the ISCF has a strong focus on impact, including reviewing emerging signs of success, and is using this to optimise challenge delivery. Mechanisms for routine monitoring and oversight of progress against benefits and impact are developing in line with the broader National Audit Office recommendation, due to be delivered by April 2022. To complement this further, full independent evaluation is undertaken on all challenges, with interim evaluations undertaken to provide early indications of success and point to whether the challenges are on track to deliver expected impacts.

⁸ MtCO₂e is million tonnes of CO₂ equivalent

PAC Recommendation: UKRI should, by October 2021, set out how it will increase SMEs' involvement in the next wave of support from the Fund.

The NAO report notes the Fund has had success in attracting small business involvement (small and micro companies accounted for over 40% of project awards in Waves 1 and 2). Latest figures (September 2021) indicate that the steady state for Waves 1b and 2 is 42-44% of grant participants are micro and small organisations; the figure for Wave 3 is smaller at 35% but is on an upward trend, rising by 5% since October 2020. Were we to focus purely on grants given to businesses (i.e. excluding universities, research organisations etc), small and micro businesses account for 64-66% of grants to businesses for Waves 1b and 2, and 48% for Wave 3, rising by 6% since October 2020. Given the higher levels of co-investment sought in Wave 3, we do not anticipate that we will be funding SMEs to the same levels in Wave 3 as for Waves 1 and 2.

UKRI and Innovate UK agree that more can be done to increase SME engagement in future challenge-led funding. The experience of Wave 3 challenges indicates a tension between seeking significant up-front co-investment and increasing engagement with SMEs who are less likely than large businesses to have large levels of their own funding to match their grant for research and innovation.

Going forward a key learning is to adopt a **more flexible approach to when private investment is realised**, with future business cases tailoring how co-investment targets will be delivered according to the type of likely industry participants and the level of risk relating to the innovation/technology.

Other means of addressing financial constraints on SMEs and thereby increase SME involvement include investor partnerships where investors are given the opportunity to invest in SME companies alongside ISCF grant funding, with the SME benefiting both from the cash investment and the investor's expertise. Five challenges to date have adopted this approach, and this is likely to feature more in future business cases. [Innovation loans](#), where SMEs repay the loan over an extended period, are another means of supporting SMEs to fund innovation close to commercialisation: whilst not currently utilised within ISCF, there is potential for loans to be used in future challenge-led funding.

Other opportunities to attract more SMEs include speeding up the decision-making process for challenges and projects (the subject of another PAC recommendation); continuing to work on our **business outreach** working with the [Knowledge Transfer Network](#) but also with business trade bodies such as the [UK India Business Council](#) and trade sector bodies such as the [Automotive Council](#); and **help to scale**, with all SME companies funded through Innovate UK also offered support through [Innovate EDGE](#).

There is good emerging evidence that SMEs benefit from ISCF funding. Independent evaluation is built into all ISCF challenges, with impact due to be considered within the final evaluation reports, the first of which are due from 2022. The interim evaluation report for the Medicines Manufacturing Challenge (one of the earlier challenges to be approved) states *"the programme has made significant contributions to the growth of SMEs. The most prominent examples are in the fast-growing ATMP [Advanced Therapy Medicinal Products] sector where many of the leading players (e.g. Autolus, Oxford Biomedica, Freeline*

Therapeutics) have expanded rapidly and would now largely be considered large companies.”

PAC Recommendation: The Department and UKRI should, by October 2021, set out: the factors that are inhibiting more widespread participation in the Fund; and the steps they are taking to attract more interest in the Fund from across the UK.

The Industrial Strategy Challenge Fund (ISCF) has invested £2.2bn of public money including investments in every NUTS 2 region and nation of the UK, targeting the major innovation challenges facing the country. The fund aims to respond to the four Grand Challenges of the 2017 Industrial Strategy: Artificial intelligence and big data; clean growth; the future of mobility; and ageing society. The geographic distribution of funding is therefore strongly influenced by the process of the government setting its overarching strategic priorities, which challenges are set up to respond to. As the ISCF has a strong industry-led innovation focus, it is to be expected that the geographic footprint of the sectors targeted is a key factor in determining the overall regional distribution of funding. It is also influenced by the locations of research/innovation organisations or assets that are particularly well placed to exploit the knowledge, capabilities and technologies related to the chosen priorities.

Reviewing a range of evidence from across the challenges and participants points towards four significant drivers of location which account for some of the regional disparities in funding:

- **Existing regional strength within a sector**, such as the Faraday Battery Challenge making a significant strategic investment in the West Midlands through the UK Battery Industrialisation Centre, due to the region’s existing strength within the automotive sector – accounting for approximately a third of all motor industry employees in Great Britain in 2018⁹;
- **Location of major academic/knowledge hubs**, which enable collaboration and allow the sharing of resources in a way that is uniquely valuable in large, multi-institutional clusters, such as the Harwell Campus in Oxfordshire attracting The Faraday Institution for example. In 2018, The Faraday Institution was a founding member of the Energytec Cluster, located at Harwell Campus, alongside UK Atomic Energy Authority and the European Space Agency. The cluster brings together 1,100 employees, 57 organisations and talent from over 60 countries¹⁰;
- **The geographical locations of unique national assets in research and innovation** that have the necessary expertise and capabilities to deliver against the Grand Challenges of the Industrial Strategy, such as the UK Biobank, based in Greater Manchester and part of the Data to Early Diagnosis and Precision Medicine Challenge, and the Transforming Construction Challenge’s Active Building Centre that originated with the SPECIFIC project based at Swansea University¹¹; and
- **The ‘headquarters effect’**, whereby funding is recorded against the location of the recipient company’s registered administrative headquarters, which is sometimes

⁹ [House of Commons Library, Briefing Paper Number 00611, 16 December 2019, ‘The motor industry: statistics and policy’](#)

¹⁰ [ENERGYTEC CLUSTER, Multidisciplinary Innovation in Energy, Environment and Transportation](#)

¹¹ [Active Building Centre awarded £36 million to change the way buildings use energy](#)

different to where the research and development (R&D) investment is ultimately made, distorting the data and complicating understanding related to the geographic distribution of funding. For instance, funding is detailed as being directed to BP's International Centre for Business and Technology, located in Surrey, even though BP is the lead participant on the decarbonisation plans of the Tees Valley and Humber regions as part of the Industrial Decarbonisation Challenge. As lead partner, BP has announced a £1 billion investment in hydrogen production in the Teesside region. Alongside two other international companies, BP will develop a low-carbon hydrogen facility (H2Teesside) to produce one gigawatt of blue hydrogen starting in 2027 and capture and store up to two million tonnes of carbon dioxide a year.¹²

Whilst funding within challenges can be localised, the benefits from the R&D funding can be nationwide. For instance, the Data to Early Diagnosis and Precision Medicine Challenge's investment in five digital pathology and imaging AI Centres of Excellence has been amplified by a further £50m investment from the Department of Health and Social Care. This will expand the impact on the healthcare system to include 63 NHS Trusts in England and support the establishment of two national networks within NHS England (National Bone and Soft Tissue and National Paediatric Pathology). Overall, the completed programme will reach a total patient catchment of 26 million (46% of total population in England).¹³

To ensure that the fund has an impact across the whole nation, UKRI has endeavoured to ensure that potential participants from across the country have been made aware of opportunities to participate in ISCF challenges. Previous success has been based on actively engaging with possible partners in coordination with local leadership organisations across the UK, including Local Enterprise Partnerships, Combined Authorities and equivalent bodies in Scotland, Wales and Northern Ireland – ensuring that opportunities are reaching potential project participants across the whole of the UK. An example is shown by the cultivation of strong local networks through the Audience of the Future and Creative Industries Clusters Challenge, with each of its nine clusters throughout the UK, such as in Leeds and Dundee, including two research organisations, three to four large companies, over 100 SMEs, working alongside local leadership bodies, economic agencies and sector organisations.¹⁴ Another example is the Medicines Manufacturing Challenge working in close partnership with Scottish Enterprise (SE) to co-fund the Medicines Manufacturing Innovation Centre (MMIC) in Renfrewshire. UKRI provided £13m of funding, which together with £15m from SE provided a funding basis that was matched with industry to bring the MMIC to Scotland.¹⁵ UKRI will continue to learn from and build upon such successes.

When selecting future challenge-led programmes, UKRI will carefully consider the regional implications of large strategic decisions, such as thematic or sector focus, as part of wider work to consider levelling up one of UKRI's priorities. The future direction of the fund, including whether challenge-led funding should have a more explicit objective to drive stronger impacts across the whole of the UK, is dependent on outcomes from Spending Review 2021.

¹² [bp plans UK's largest hydrogen project](#)

¹³ [Funding boost for artificial intelligence in NHS to speed up diagnosis of deadly diseases](#)

¹⁴ ISCF Steering Board, 26th May 2021, 'ISCF Challenge Case Studies'

¹⁵ [UK's first national medicines manufacturing centre breaks ground](#)

Investment in research, development and innovation can play a critical part in levelling up by boosting business productivity, resulting in higher wages for workers, and spreading investment across the UK. The government will ensure that an increased share of the record increase in government spending on research, development and innovation over the SR is invested outside London, the South East and the East of England¹⁶. The government will set out plans for doing this in the forthcoming Levelling Up White Paper.

PAC Recommendation: The Department, HM Treasury and UKRI should set out by October 2021 how they intend to speed up the time taken to approve challenges and projects.

While it is vital that there are checks to ensure funded ISCF Challenges offer the best value for public money, more can be done to speed up the approval process and eliminate unnecessary bureaucracy. Since the publication of the report, the Department has been working closely with UKRI and HM Treasury to explore ways of implementing the Committee's recommendation.

The Innovation Strategy, published in July 2021, set out the Government's ambition for Innovation Missions to address national priorities and to be supported, where appropriate, by competitive innovation funding – including challenge-led approaches. To address the recommendation to improve speed with more efficient decision-making, UKRI will reform the delivery and governance of Challenge-led funding for UKRI in a way that will enable efficient delivery for UKRI and Innovate UK.

Some early progress has been made to reduce the complexity and time taken for Challenge approvals. For example, we have agreed to raise UKRI's commercial delegation from £10 million to £25 million. Challenges undertaking commercial procurement under this new delegation limit will no longer need to submit cases to Cabinet Office.

In addition to the delegation and business case process, there are established improvement programmes already underway within UKRI to improve business operations and customer experience. Work is taking place with a focus on modernising UKRI systems, including a modern shared back-office functionality, new digital funding service, rationalising a huge array of funding mechanisms, automating processes and focusing on UKRI's administrative operational efficiency.

To that end, we know UKRI is currently working hard to simplify the UKRI funding landscape through delivery of a new UKRI Funding Service which is tailored to meet the needs of the applicants.

Innovate UK has also already made changes to speed up the time to approve new innovation projects and provide a better customer experience by:

- Improving the guidance and support provided to businesses through the application process and project set-up with a dedicated project set-up team to walk them through the process and publishing accessible applicant briefing videos to explain the processes;
- Implementing a chat bot to help applicants;

¹⁶ As defined by [NUTS1](#) regions, ONS

- Improving operational efficiency through enhancing and leveraging technology and data; and process improvements such as implementing capacity planning to manage resource to match workload and an updated scheme of delegations to support quick and clear decision making;
- Embedding lessons learned from the COVID funding response competitions to streamline processes, which has resulted in a reduction in both ineligible applications and the volume of queries received, along with shorter response waiting times.

I hope these responses to your recommendations demonstrate that the department and UKRI have reflected on your report and intend to take your recommendations into account in future work on the ISCF and challenge funding more generally.

Sarah Munby

A handwritten signature in black ink, reading "S. Munby". The signature is written in a cursive, flowing style. Below the signature, there is a faint, light blue rectangular stamp or watermark, which is mostly illegible but appears to contain some text and a logo.