



**Research  
England**

# **Research England: Universities delivering the Industrial Strategy**

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# Research England: Universities delivering the Industrial Strategy

Higher education sector overview of the plans of universities to use additional Higher Education Innovation Funding (HEIF) allocations

## Executive Summary

- 1. Purpose of report:** This report summarises uses of Industrial Strategy (IS) uplift allocations through Higher Education Innovation Funding (HEIF) and IS related developments in universities, based on evidence from plans for HEIF submitted to Research England.
- 2. Evidence:** Universities submitted plans in Spring 2018. These were intended to flow from long-term institutional knowledge exchange (KE) strategies that had been approved prior to any announcement on the IS. Universities had limited time to draw up plans in context of a number of funding and policy announcements, including finalisation of the IS by Government. Plans are therefore focussed primarily on inputs not impacts. Many universities noted that they intended to develop their plans for use of HEIF further in light of experience of the rollout of the IS, particularly the opportunities to tap into follow on funds for large scale R&D projects and sources of support for their business partners. Data is limited to references to KE expenditure items, and we will collect detailed expenditure breakdowns in Spring 2019 and may update this paper. HEIF is very often used to leverage other funds and hence influences larger scale expenditures, reflected in this report in case studies on co-investments of various sorts.
- 3. Commercialisation:** The uses of the IS uplift focus particularly on commercialisation, which we define as technology transfer and all forms of working with businesses. We believe that the IS uplift has been used appropriately to support the commercialisation system and its various processes. This includes support for the specific inter-actions between the university and individual businesses, and with the various partnerships and centres – local, industrial, technological and international – that form the commercialisation system. The use of the IS uplift by individual universities though will vary, reflecting that specific approaches to commercialisation reflect institutional characteristics and environments.

4. **Use of Industrial Strategy uplift by main expenditure categories and change over time:** Use of the IS uplift appears to have been focussed more on projects expenditures, compared to past, core HEIF uses. This likely reflects that there was a non-recurrent IS allocation in 2017-18, and that many universities are still experimenting with their IS approaches. There seems significant expenditures on additional KE professional capacity, with some expenditures on academic costs and major KE centres. There are some dynamic adapters who have put in place rapid plans to seize other opportunities unfolding from the IS, such as the IS Challenge Fund (ISCF). Some smaller specialist institutions have taken innovative, new directions, particularly linking creativity and technology. Many universities have though initially focussed on existing strengths, and are experimenting and will review plans over next years.
5. **KE professional capacity:** Universities are investing in new IS dedicated posts and teams with responsibilities that include leadership and strategy and partnership and bid development. This includes capacity to disseminate IS intelligence, such as between national and local innovation communities. There is also significant investment to build up professional capacity in critical IS related areas, notably technology transfer and corporate R&D partnering. There is widespread enhancement of commercialisation capacity across the HE sector, including in HEIs with less track record in this area. Approaches vary according to the maturity and scale of commercialisation activity in the particular institution, with a range from putting in place technology transfer expertise for the first time, through to specialist staffing for access to finance or technology acceleration. Capacity focussed on place features in many plans of all types of universities, focussed on either developing proximate connections in an entrepreneurial ecosystem, or delivering the anchor role, the purposive pursuit of local and community benefits for the university's place. Many plans feature posts to further activities of UK Research and Innovation (UKRI) and its Councils, such as support for Knowledge Transfer Partnerships (KTPs).
6. **Project expenditures:** Uses of the IS uplift for projects are similarly focussed on commercialisation, including significant use for partnering events and networks and pump-priming of projects that academics are developing with industrial partners. There is also significant projects expenditures on scoping of institutional developments that can deliver IS, for example, planning incubators, skills analyses or R&D marketing studies. The IS uplift is often used in combination with national and local sources, including with funds of other UKRI councils and to further local industrial strategies, across R&D, enterprise and skills. There is significant use of the IS uplift for non-staff (as well as staff) technology transfer costs, such as costs of intellectual property exploitation, new company formation, acceleration and access to finance.

7. **Academics and centres:** There is some experimentation in new academic posts and secondments, as well as training and development in entrepreneurship. There is also expenditures of all types on a great range of R&D and innovation centres, clusters and the like, across many different technologies.
8. **Embedding Industrial Strategy in HE strategies:** Awareness of the IS, its policies and priorities, is reasonably embedded across HEIF plans, beyond the specific IS uplift section, with plans addressing both the Ideas and People chapters.
9. **Industrial Strategy strategic stakeholders/place:** There is evidence of awareness, alignment and co-investment of the IS uplift with UKRI priorities. There has been particularly significant increase in awareness of the role of Innovate UK, with awareness rising from around 20% of the HE sector in 2012 HEIF evidence, to around three-quarters of the sector making reference now. Connections with local partners and developments are the most common feature though in plans, and across a diversity of HEIs. Generally, the local dimension is important in uses of IS uplift funds and wider HEIF plans because of the acceleration in commercialisation that can be achieved through close proximity – the entrepreneurial eco-system, as well as the important anchor role of universities.
10. **Industrial Strategy sectors:** Large, multi-disciplinary universities give only high-level information on priority sectors due to text limits to the plan template. Smaller HEIs have referenced their key technology focus areas. References to health related and digital and artificial intelligence (AI) sectors are most prevalent.
11. **Collaboration:** Collaborations between HEIs feature widely in plans, and are of various forms, including local, industrial and technological linkages and HE-HE good practice sharing. Our Connecting Capability Fund (CCF) programme is an important vehicle, featured in plans, for driving good practice in commercialisation.
12. **Conclusions and observations:** Overall, uses of the IS uplift all appear highly relevant to the priorities of the IS Ideas chapter. Research England is assured by the evidence provided that funds have been used for purposes intended and that universities are focussing appropriately on IS delivery. Place related partnering of various sorts to deliver IS is particularly important, and across a great range of universities. There is also evidence of good awareness and partnering with the various councils and programmes of UKRI. We have some concerns that capacity constraints may emerge over next years in specialist areas of commercialisation support, and that we must remain focussed on supporting the HE sector in good practice developments. We see some potential gaps in activity, for example, in international links and mobility. We do expect to see further, more rapid and more

widespread progress in IS delivery, including evidence of impacts from funding, in the next round of strategies and plans that we will seek from HEIs in 2019-20.

## Background

13. The Government provided an additional £40 million from 2017-18 from the National Productivity Investment Fund (NPIF) to support university knowledge exchange (KE) to deliver the Industrial Strategy (IS). We allocated this through Higher Education Innovation Funding (HEIF) as £25 million recurrent, and £15 million non-recurrent, formula funding. A further £25 million from NPIF was allocated as recurrent formula HEIF from 2018-19 (so moving to £50 million per annum total IS uplift). All these funds were provided to deliver the priorities set out in the Ideas chapter to the Industrial Strategy White Paper (termed the “IS uplift” throughout this paper)
14. HEIF is allocated selectively to higher education institutions (HEIs) according to performance criteria, and hence allocations vary. IS uplift allocations for individual HEIs for 2017-18 varied between £285,000 and £27,133 for the non-recurrent element, and between £475,000 and £17,687 recurrent. In 2018-19, recurrent allocations varied between £973,750 and £67,127, with similar levels likely in following years.
15. We also allocate £160 million annually of core HEIF funds drawn from research and higher education budgets for all forms of knowledge exchange (KE), and for 2017-18 only an additional £15 million non-recurrent formula was allocated from the Connecting Capability Fund (CCF). The CCF funds were provided to support university-university collaboration in commercialisation.
16. We ask HEIs in receipt of HEIF periodically to provide us with long-term knowledge exchange strategies<sup>1</sup>, which we approve as the basis of HEIF allocations over the period of the strategy. We approved strategies for 2016-17 to 2020-21 in Spring 2017.
17. In the light of the additional funds provided by Government and additional accountability requirements, we asked HEIs in receipt of HEIF allocations to

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<sup>1</sup><https://webarchive.nationalarchives.gov.uk/20180319120255/http://s.hefce.ac.uk/s/search.html?collection=knowledge-exchange-strategies>

provide us with a Plan for HEIF<sup>2</sup>. The Plan should provide details on how the various HEIF elements (core allocations, including their use for teaching priorities, CCF formula and IS uplift) have been used in 2017-18, and how recurrent elements will be used over the remainder of the funding period (for 2018-19, 2019-20 and 2020-21).

18. One hundred and three HEIs submitted plans<sup>3</sup>. All HEIs in receipt of a HEIF allocation received an IS uplift and hence their uses of funds are summarised in this paper.
19. We assessed plans to ensure that different elements of funding were used for purposes intended and that these were robust as basis of future funding, alongside previously approved strategies. We have now approved all these plans as the basis for allocations from 2019-20.
20. We committed to publish a sector-wide summary report - this report - on the uses made by universities of their additional IS allocations.
21. This report summarises uses made of IS uplift allocations, draws wider conclusions on the approaches being taken by HEIs to support delivery of the IS, including synergies with activities and programmes of other UKRI councils, and draws some conclusions toward our long-term policies and good practice developments. Case studies throughout are taken from institutional plans for HEIF, which are not being published. Our current timetable is to approve another round of long-term KE strategies, with plans for HEIF integrated, in Spring 2019, as basis for funding from 2020-21 onwards. Those documents, which will be published, will provide us with further evidence on development of strategic approaches to deliver IS, including emerging impacts.

## Structure and limits of the evidence

22. There was a complicated timeline leading into development of HEIF plans and through into their delivery:

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<sup>2</sup> <https://re.ukri.org/news-events-publications/publications/knowledge-exchange-higher-education-innovation-fund-institutional-strategies-and-plans/>

<sup>3</sup> Details of HEI 2017-18 and 2018-19 HEIF and IS uplift allocations are at <https://re.ukri.org/knowledge-exchange/the-higher-education-innovation-fund-heif/>

- a. Universities submitted KE strategies to us in October 2016.
  - b. The Government published an Industrial Strategy green paper in January 2017<sup>4</sup>.
  - c. We announced additional IS uplift allocations in July 2017, for use from August 2017.
  - d. The Government published its Industrial Strategy White Paper<sup>5</sup> in November 2017.
  - e. We announced a further IS uplift from 2018-19 in April 2018.
  - f. There have been a range of announcements from UKRI over 2018 of other additional IS funding schemes, such as the Industrial Strategy Challenge Fund (ISCF). These other announcements have significant implications for KE activities in universities. They provide opportunities for HEIs to scale up KE activities funded by HEIF into major R&D developments. They also may provide support to business and investor partners to engage with universities and to commercialise research outputs, increasing demand for KE.
23. HEIs were therefore preparing their plans for HEIF in Spring 2018 in the context of a rapidly changing funding environment, with many opportunities opening up, but with less than a year's experience of actually using their additional IS funding. The implication of this, discussed later in this report, is that many universities identified their initial plans for IS delivery, but noted that they would review and develop these further over the plan period.
24. We did not ask HEIs to update their long-terms strategies as part of this exercise, though there was opportunity for HEIs to do so if they wished. Our assumption was that KE strategies are based around enduring KE strengths (built on research and

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<sup>4</sup> [https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting\\_documents/buildingourindustrialstrategygreenpaper.pdf](https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf)

<sup>5</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf)



teaching capabilities) and external partnerships of universities, and hence we did not expect that strategies would necessarily need to be updated to reflect the IS.

25. Data is collected routinely in KE strategies and in annual monitoring on the uses of HEIF by expenditure category. We have largely structured evidence in this report using these categories. **Table A** provides details of these expenditure categories, along with the latest - 2016-17 - breakdown of HEIF core funds used for all forms of knowledge exchange. Expenditure breakdown data which we will collect in early 2019 in our annual monitoring process will include use of IS uplift and CCF formula funds.

**Table A**

<b>Latest breakdown of HEIF expenditure (2016-17) by expenditure category</b>	
<b>Investment in dedicated KE staff:</b> costs of employing and supporting staff involved directly in KE (KE, technology transfer, corporate partnerships, enterprise etc offices).	£89.4m (56%)
<b>Investment in academic staff:</b> training and mobility of academics and buying the time of academics for KE activity, as well as leadership in KE	£26.8m (17%)
<b>Expenditure towards other costs:</b> all forms of projects including institutional developments (scoping studies, proof of concept, seed funding and pump-priming) and academic KE pump-priming.	£43.7m (27%)
<b>Total</b>	£160m

26. We also collect data routinely on HEIF expenditure by KE infrastructure type. IS uplift allocations are primarily focussed on commercialisation and hence we have used finer category breakdowns than our usual infrastructure categories in this report. We have added a type of “centres” to our usual categories for instances where HEIs use funds across multiple expenditure categories on a major development, for example a centre, hub or campus. <sup>6</sup>

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<sup>6</sup> Our routine infrastructure categories are: facilitating the research exploitation process; technology transfer; skills and human capital development; community & public engagement; knowledge sharing and diffusion; enterprise and entrepreneurship; exploiting the physical assets of the HEI.

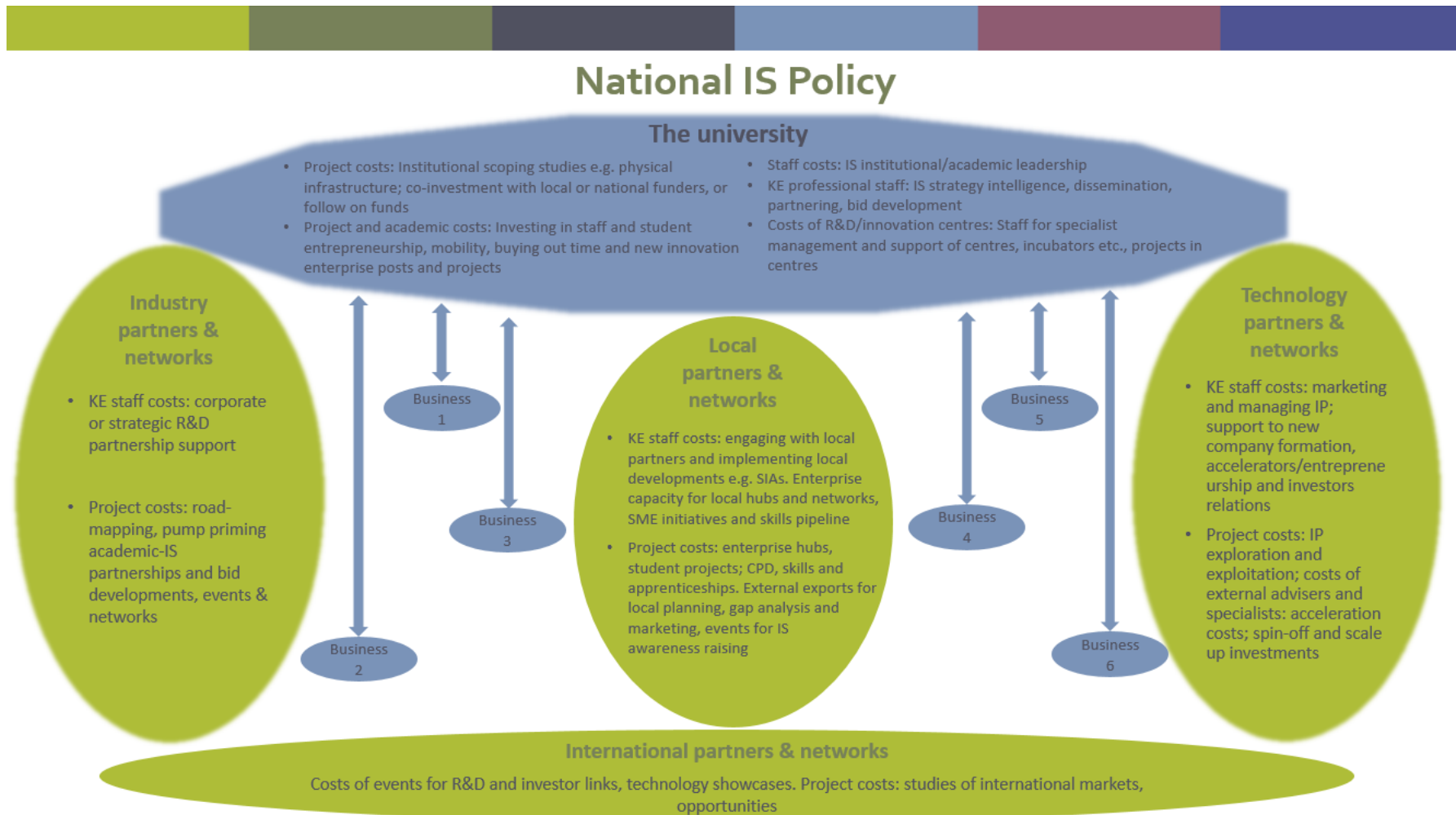
27. In the plan templates, universities were asked to provide free text answers to a number of questions about the uses of the various allocation elements of HEIF. HEIs were not asked to provide detailed expenditure breakdowns of their allocations. We may publish an updated version of this report with 2017-18 HEIF expenditure breakdowns once this is collected next spring (paragraph 25).
28. We provide data in **diagrams** and **tables** in this report on the numbers of HEIs making reference in their plans to various uses of their IS uplift, to broader IS priorities and to key IS partners/funders. There were set word limits for responses and hence some HEIs may not have made such references, even where relevant to them, due to space constraints. Numbers we present are then likely to be under-estimates of total activities.
29. In some tables below, we record all specific instances of an expenditure type (for example, of multiple types of KE professional posts, such as technology transfer or corporate partnering posts). HEIs may then record more than one result and hence numbers do not sum to number of HEIs.
30. Evidence does not provide details on specific numbers of staff funded, and references may be to part-time or IS uplift part-funded capacity. Data on uses of IS uplifts for project or academic costs do not provide evidence on magnitudes. Therefore the evidence in this paper is suggestive of levels and range of activities in certain categories, rather than of detailed financial commitments. The flexibility of HEIF means it is valued by universities to use as leverage for other sources of funding, and this is illustrated in uses of the IS uplift described in this report and in case studies. The IS uplift is therefore likely to have enabled a large scale and range of KE developments, supported from multiple sources.
31. Given this report analyses recently allocated funding, evidence is primarily focussed on inputs, that is how the IS uplift is being used, and not impacts. Where HEIs have focussed funds on increasing existing activities, some impact information is given in case studies. Impacts of the IS uplift will be explored in our wider evaluation of HEIF planned for 2020.

## Uses of HEIF Industrial Strategy uplift

### Use of the uplift for the commercialisation system

32. Uses of HEIF IS uplift allocations have been largely focussed on commercialisation activities. We define commercialisation as technology transfer (the exploitation of university IP through licensing or formation of spin-off companies) and all forms of working with business, particularly R&D partnerships. We can characterise the activities funded from the IS uplift – set out in **Diagram 1** - as delivering the various processes necessary to the commercialisation system. These processes include: the development of commercialisation infrastructure (such as professional KE capacity), systems and capabilities within the university, and in major centres; the inter-actions with specific businesses; and the partnerships and networks – local, technological, industrial and national – that enable the inter-actions and help source the other necessary components to commercialisation (for example, access to finance).
33. Overall we can say that the IS uplift appears to have been used appropriately to support the commercialisation system. However, commercialisation approaches of individual institutions do and should vary, reflecting their institutional characteristics, such as discipline or technological strengths, as well as the environment of the university, notably features of its place. We will consider the appropriateness of the expenditures of individual universities as part of our assessment of the next round of institutional strategies and our HEIF evaluation

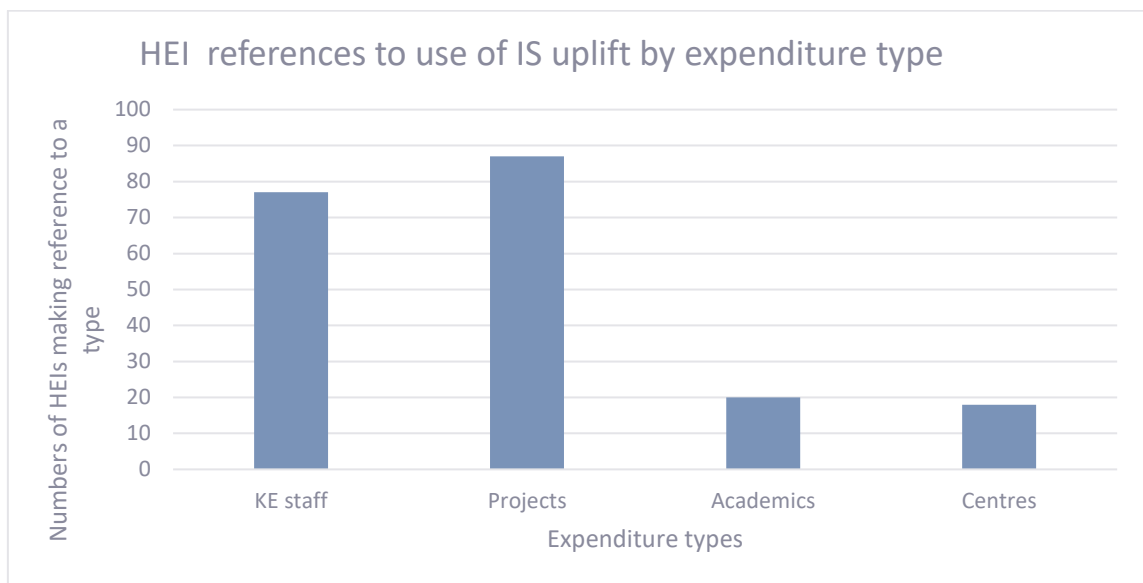
Diagram 1 Uses of IS uplift for commercialisation



## Breakdown by expenditure type

34. **Diagram 2** presents the numbers of HEIs recording that they used their IS uplift to invest in: 77 in additional KE professional capacity; 87 in additional projects; 20 in academic posts/time; and 18 in centres. HEIs may use the IS uplift for more than one type of KE expenditure and hence all uses in **Diagram 2** sum to greater than the number of HEIs submitting plans. Data does not provide evidence on the scale of funds used for different categories. We provide further information on each category in following sections.

**Diagram 2**



35. The IS uplift included a non-recurrent element in 2017-18 which likely explains the higher proportion of references to expenditures on projects in plans, compared with actual expenditures on projects in 2016-17 (**Table A**). Additional IS uplift and CCF allocations were published fairly late in the normal HE funding cycle, which might also have led to more short-term, that is projects, expenditures. The rapid pace of change in the IS funding context might also have influenced HEI to focus on shorter term investments until they could fully assess opportunities.

36. We asked HEIs to describe likely changes they would make in their use of their recurrent IS uplift over the plan period. There were a number of approaches to change over time:

- a. Some larger, multi-disciplinary, research universities had already put in place ambitious plans to seize wider opportunities to deliver the IS, for

example planning for ISCF waves and Strength in Places Fund. These universities are planning to continue these approaches over the period.

### **University of Liverpool – a rapid, strategic response to Industrial Strategy opportunities**

We have used our [IS uplift] allocation of HEIF to support work within these [priority IS themes] areas through the following:

- Putting in place a dedicated team comprising 2 Industrial Strategy Project managers, an IP manager, a part time administrator and Head of team to strategically and operationally support researchers in engaging with industry, public bodies and local government. Specifically, the role of the team is to inform and involve the academic community in the Industrial strategy agenda, to explain and convey government and industry priorities and support opportunities for collaboration and accessing funding.
- Establishing an Industrial Strategy Steering Group comprising key academic champions in each of the priority areas above, senior faculty management and staff with expertise in business development, research policy and marketing and communications. This group aims to input into the development of the government's Industrial Strategy, gather intelligence to allow tactical responses to opportunities arising from the IS, support bid development and to provide oversight and direction of our IS-related activity.
- Setting up a pump-priming fund to support interactions with external partners leading to larger IS-related projects. So far we have used over £350k to support 23 pump priming projects with multinationals SMEs and public organisations and programmes (e.g. Unilever, Applied Photophysics Ltd, Aimes, Alder Hey NHS Trust).
- Supporting IS related events and training: the University had a strong presence at the International Business Festival 2018 with 2 stands and University speakers included in the programme. We also hosted a university-wide Impact week, providing development and training for our academics in which more than 400 individuals took part in 31 sessions over 5 days

We have already had notable successes in securing projects within ISCF areas (totalling over £8M): in robotics where we are a partner in three of the four ISCF Hubs, in big data, from the Faraday challenge and 2 EPSRC innovation fellowships. Sensor City, has also been awarded a £3.5m grant to investigate the opportunities of 5G community Wi-Fi in health and social care.

- b. Many smaller and specialist HEIs, such as arts specialists, had been encouraged by the IS focus and additional funding to embark on new directions. These new avenues include investing for the first time in intellectual property (IP) exploitation and investing more in technology developments, particularly uses of immersive, digital and artificial intelligence (AI) technologies.

### **Royal College of Music – new directions in creative fields with technology**

The three year TELMI (Technology Enhanced Learning for Musical Instruments) project will finish in February 2019. The project's aim, led by Pompeu Fabra University, with the University of Genoa and UK technology partner HighSkillz was to develop assistive, self-learning, augmented feedback and social-awareness prototypes complementary to traditional musical performance and teaching. The [College's] Centre for Performance Science (CPS) team used the violin as a case study to research how musicians gain expertise and learn skills efficiently and effectively using traditional violin instruction and the latest motion capture systems.

Highskillz brought in digital learning platforms and gamification expertise to develop an intuitive user interface to guide and motivate beginners and provide high-level feedback to expert players, incorporating a social learning system that helps musicians learn from their peers. The [IS uplift] allocation is being used to buy in technology transfer expertise including advice about models for RCM start-ups (this is the first one), and IP advice. [There is a spin-out opportunity] for an app...which will benefit both the general public and expert players, whilst attracting investment and talent into the RCM.

### **Goldsmith's University of London – exploiting creativity and technology**

The Enterprise Officer [funded from IS uplift] will support our academic community to develop their R&D partnerships, building capacity through cross-departmental collaborations with a view to both accessing ISCF opportunities through UKRI and leveraging commissioned research. [This builds on] our academic strengths and partnerships in the areas of immersive technologies which bring together VR/AR/MR and Artificial Intelligence (AI). This expertise sits not only in our Computing department but across Psychology, Music, Design and Media & Communications.

In 2017-18 it is notable that the most significant contract research project is in the area of AI and we believe we can build on this demand.

Additionally, this post will support the growth our regional engagement.. Lewisham Council's recent (November 2017) CDIT strategy situates Goldsmiths' as key to economic growth of the borough, with a particular focus on digital technologies.

- c. There are though many HEIs taking more staged approaches to IS delivery and opportunities. Many HEIs have started by focussing on their established strengths (see St Mary's Twickenham below). These HEIs are then tending to use additional funds to amplify existing strengths, and also starting to experiment with some new developments. Many HEIs then said that they expected to review their plans over the next years and vary use of the IS uplift to focus on activities that are being most successful. This is not surprising given difficulties of timing we discuss in paragraph 22.

### **St Mary's Twickenham – playing to Industrial Strategy strength, with multi-university collaboration**

On the Grand Challenges, our main focus is on Ageing. We are currently piloting a programme in partnership with Age UK working with older men and technology that runs alongside our existing programme with Age UK, which focuses on older men and nutrition. These programmes are funded by HEIF [IS uplift], as was a recent pilot programme working with students and older people in a cross-generational programme of skills-sharing, designed to identify how different generations can learn from each other in the most effective way, creating links within communities and across generations to have longer positive effects.

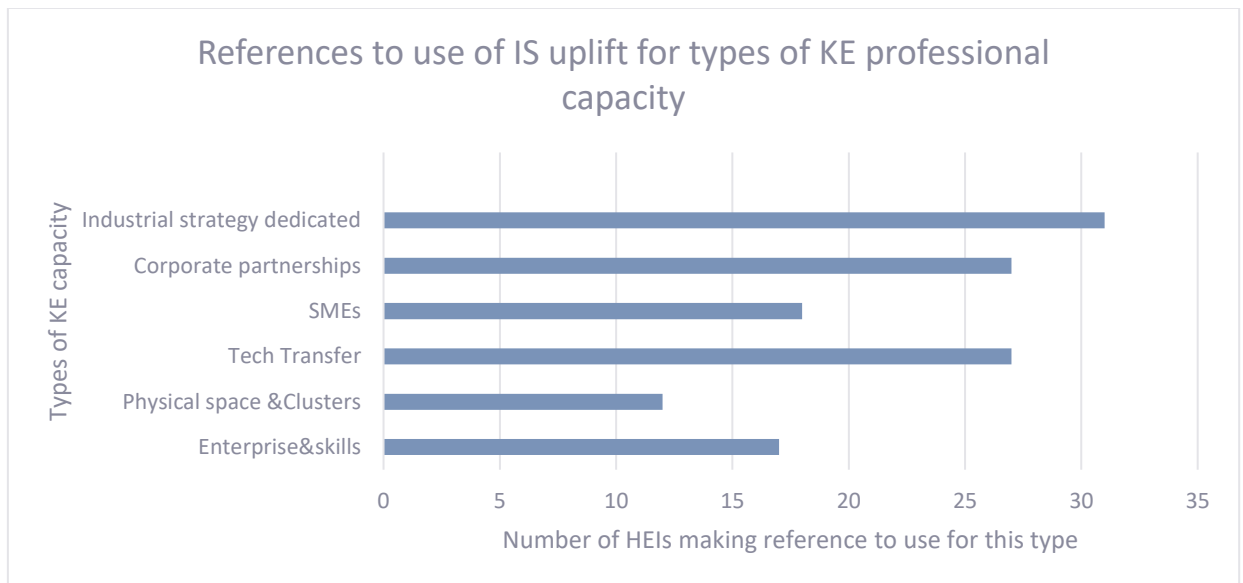
Academic staff are collaborating with other universities in the South East on a larger project focusing on ageing, and we have been using HEIF to buy out the teaching time of staff to work on this collaboration. We are part of an EOI for the Grand Challenge on Ageing with nine other universities and we are hoping that this will be successful and enable larger scale collaboration to take place.

## **KE professional capacity**

37. For 77 out of 103 HEIs, IS uplift plans include commitment to additional or new KE professional capacity. Details of the types of additional KE capacity are provided at **Annex A** and a high-level breakdown is given in **Diagram 3** below. HEIs may use the IS uplift for more than one type of KE capacity and hence all uses in **Diagram 3** sum to greater than the number of HEIs using IS for posts.



Diagram 3



38. Plans show considerable investment in added KE capacity to focus specifically on the Industrial Strategy. There is great variety in the numbers and levels of posts put in place by different HEIs, including senior appointments (Director-level and academic leads) and restructuring of existing teams or creation of new strategic or central teams. The roles and responsibilities of additional staffing range from policy, strategy and intelligence about the roll out of the IS, identifying relevant academic strengths and HE collaborators, sourcing industry and external partners, bid development and disseminating IS intelligence more widely (for example into Local Industrial Strategy developments and to local business partners).

### **The University of Wolverhampton – KE capacity to support local and regional R&D and further multi-university collaboration**

[use of IS uplift includes]: Four Research Development Executives each aligned to a challenge within the Industrial Strategy to grow collaborative research engagement with and for Industry

This development directly aligns to the policy for connecting capability and will support the economic offer that is possible through The Midlands Engine and Midlands Enterprise Universities to improve productivity.

### **Guildhall School of Music & Drama– student enterprise driving links between creativity and technology**

Guildhall Live Events offers artistic visual design, video projection, and augmented reality experiences ranging from intimate indoor displays to large-scale outdoor spectacles. Students deliver commercial event work as part of their course work (including assessment). This feeds directly into the Audiences of the Future [IS] challenge as it develops immersive technology events that collaborate with commercial and cultural organisations to offer a wide variety of events; for example, last Christmas saw a nine-week residency at Waddesdon Manor, bringing massive audiences to their Christmas market event (circa 180,000) through a video projection installation which brought their famous art collection to life.

The service now has a raft of repeat clients (including City of London and Waddesdon Manor), emerging commercial client interest, and a major exhibition with a prominent museum scheduled for spring 2019. Annual audience numbers for the past three years have exceeded 200,000 annually. [using IS uplift], we supported this project through provision of an Account Director...to lead the development of this business unit and ..investment in structure set-up (alongside an investment from School resources).

39. Plans show significant increase in technology transfer capacity across the sector to support intellectual property (IP) exploitation and a wide range of spin-off, start-up and scale up activities. There is a range of scales and track records in technology transfer capacity across the HE sector, with large-scale and long-standing capacity in big research universities with significant intellectual property (IP) pipeline, through to new capacity for technology commercialisation activity in HEIs with no or little previous experience. The approaches then to use of IS uplift for technology transfer for staff, or project costs (discussed in paragraph 44), vary significantly across the sector, from adding sophisticated new elements to mature approaches, improving existing approaches or initiating activity.

### **University of Arts London – technology support to creative businesses**

[IS uplift has been used for] Increasing the specialist capacity required to further develop/exploit its sector leadership position in the field of fashion technology innovation (to include a technology development manager and business innovation manager). This will enable UAL to extend industry and HE partnerships in this field, and develop and deliver increased numbers of industry and grant-funded R&D projects (including KTPs), by providing fashion businesses with expert knowledge and capacity

to better exploit emerging technologies to identify/create new market opportunities, increase productivity and reduce costs.

40. Other trends that we have identified in plans:

- a. Increasingly sophisticated approaches to developing and sustaining strategic and corporate partnerships with business.

#### **London South Bank University – corporate partners**

LSBU has a partnership with The Welding Institute (TWI) where there are now three Innovation centres. These represent a long-term strategic partnership between London South Bank University and TWI that aims to develop financially sustainable shared research and technology facilities at TWI's base in Granta Park in Cambridge. ....additional HEIF funding has allowed the creation of a new role of Senior Business Development Manager. This role will involve the implementation of a process based on the triple helix model and the post holder will have responsibility for enabling these world class research and technology centres to link the University's academic knowledge base with TWI's industry partners, bringing together expertise, application knowhow and market knowledge to drive advances across a range of specialist engineering sectors in line with commercial needs.

- b. Support for enterprise activities that contribute to commercialisation.

#### **London School of Economics and Political Science – student enterprise as an enabler of social sciences commercialisation**

The School's 2017-18 [IS uplift] allocation [provided] support for LSE Generate which was created to inspire and support entrepreneurial potential amongst LSE students and alumni. The programme supports around 1000 students and alumni annually, but there is increasing demand for its services. In line with the School's CCF aspirations [ASPECT project], the programme's new mission focusses on building and spinning out socially responsible business, and the School will allocate funds to augment professional services to launch the new programme and meet this increased demand in the UK and globally. Funds will also support the LSE Generate flagship funding competition which awards money and mentoring packages to promising student ideas and support newly established pre-accelerators launching in 2019.

41. A great range and number of universities are investing in various types of posts to develop and support local links. Place is important both because proximate

connections are very effective to stimulate entrepreneurial outcomes (as example, in building local investor communities), and because universities take seriously their roles as local “anchors”, through purposive pursuit of local and community benefits for their place. KE professional capacity to support the anchoring role includes IS specific roles, posts to support partnerships with Local Enterprise Partnerships (LEPs) and Local and Combined Authorities, and capacity to develop and implement Local Industrial Strategies, Science and Innovation Audits, Growth Hubs and other SME initiatives. Support to physical infrastructures such as incubators has an important place dimension and contributes to both entrepreneurship and anchoring. HEIs are also supporting wider cluster developments of various kinds (also described in paragraph 54 on centres).

### **Brunel University – delivering a Science and Innovation Audit**

Brunel led the Wave 3 Science and Innovation Audit in Sustainable Airports. The report has been completed and will be published later in 2018. To capitalise on the report and its recommendations and to ensure the findings are taken forward, we will recruit [using IS uplift] an Innovation Manager to work with the Audit consortium partners, including Heathrow Airport Ltd, Morgan Sindall, BRE, SEGRO and other companies, LEPs and regional business and trade organisations to maximise the opportunities for the Heathrow region. This new position will take a leading role in (1) connecting Brunel’s capabilities with the 400 businesses that operate the airport and supporting initiatives to develop and translate technologies for faster adoption into the airport supply chain (2) driving the development of a regional airport innovation eco-system to support greater productivity and growth around the Heathrow economy.

### **Canterbury Christ Church University – local industrial R&D**

Our Life Sciences Industry Liaison Lab at Discovery Park in Sandwich has a dual aim to both support the life sciences talent pipeline, and to provide specialist and bespoke R&D to the large and expanding community of life science SMEs based at Discovery Park. In respect of the latter, [IS uplift] funding that supports our Department for Enterprise, Employability & Research Development’s Funding Unit has supported the negotiation and facilitation of multiple R&D contracts to the value of over £500,000, focusing on diverse R&D innovations such as the freezing and transportation of swine embryos and the use of animal venom as an anti-carcinogen.

### **Nottingham Trent University – local technology infrastructure**

With the support of [the IS uplift], our PLECS team initiates and manages strategic partnership activity based on sector focused business development plans. An example of this is the plan to engage with Small Medium Enterprises and Large Enterprises who operate within the healthcare, life sciences, med-tech and pharma industries. This work is developing our pipeline of collaborative research and commercial interests and it links to the creation of a new dual site Medical Technologies Innovation Facility (MTIF), due to open in August 2020, which is aimed at accelerating the development of a broad range of medical technologies. D2N2 LEP has provided a £10m Local Growth Fund 3 investment to support this development.

42. Plans also demonstrate that IS funds have been used for various types of posts that support the delivery of other UKRI programmes. Posts to support Knowledge Transfer Partnerships (KTPs) are widespread, as well as capacity to link with Innovate UK's KT Network (KTN), Catapults and Investment Accelerator and also KE support for Research Council programmes.

### **University of East London – supporting Knowledge Transfer Partnerships**

Planned use of [IS uplift] funding for 2017-2021 is as follows:

Setup the infrastructure to support and scale up the development of KE at UEL, and specifically to build a portfolio of Knowledge Transfer Partnership (KTP) projects with industry focusing on:

- SMEs and helping them to find paths to innovation that drive productivity by turning new ideas into products and services
- Extending collaboration with existing industrial partners at local, national and international levels
- Capitalise on our research strengths in 3 of the 4 grand challenges (Artificial Intelligence (AI)/data, Clean energy, Health)
- Overcome internal and external barriers to KTP development including access to skills/associate recruitment, staff workload, commercial awareness of academic staff, and capacity of businesses to innovate.
- Foster the local ecosystems that can support innovation and sustained growth

### University of Bristol – supporting Innovate UK Investment Accelerator

The [Innovate UK] Investment Accelerator pilot has been of great interest to our spinout companies, filling a funding gap in the ecosystem and encouraging the creation of new companies to capture value from our research base. [Using IS uplift] We have added additional resource within our commercialisation team, working with companies and private investors to secure early stage funding and help make the pilot a success.

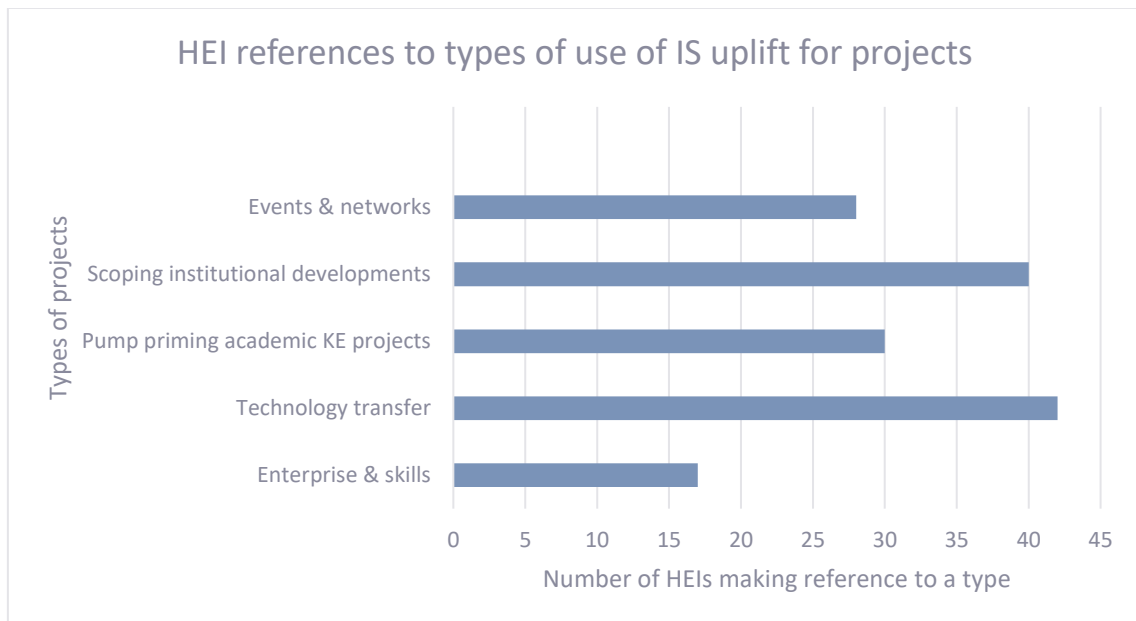
### Newcastle University – furthering Research Council impacts

The EPSRC Centre for Energy Systems Integration (CESI) is...a virtual research consortium between multiple Universities and industrial partners... we have used HEIF to provide business development support for a major new academia-industry collaboration that has arisen from CESI, the InTEGReL campus. HEIF funding for staff, meetings/networking and feasibility evaluation is facilitating the relationship between utilities companies, a global corporate and multiple SMEs, to build and expand a grouping that will jointly run a new collaborative research facility at InTEGReL in Gateshead.

## Projects

43. For 87 of 103 HEIs, plans report use of the IS uplift for project costs. **Diagram 4** provides a breakdown of the types of project expenditures and **Annex B** provides further detailed information on these types. HEIs may use the IS uplift for more than one type of project and hence all uses in **Diagram 4** sum to greater than number of HEIs using IS for projects.

Diagram 4



44. A significant feature of project expenditures is increased and more widespread investment in technology transfer projects costs, including proof of concept and seed funding, technology audits and demonstrators, formal IP costs and support and investment into spin-outs and through to scale ups. There is also increased interest and support for various forms of incubation and acceleration for spin-offs and start-ups, as well as for approaches to tap into various forms of private investment. There is attention in many plans to the development of the entrepreneurial eco-system described in the McMillan review of technology transfer<sup>7</sup>. Universities with different scales and maturity of technology transfer activity use the IS uplift differently, from starter technology audits through to complex investments into spin-off and scale-up companies.

### University of Nottingham – scaling up spin offs

In 2017-18, the additional [IS uplift] allocations have enabled the University to make investments into three of our spin-out companies, at a significantly larger scale than we have previously been able to. These are companies that we believe have particularly exciting commercial potential, and these strong investments

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<https://webarchive.nationalarchives.gov.uk/20180319114438/http://www.hefce.ac.uk/pubs/rereports/year/2016/ketech/>

increase their ability to exploit this. Two of the three investments form part of our Invention Fund – a 5-year commitment to invest up to £5m on university spin-outs.

### **University of Hertfordshire – a more strategic approach to spinning off**

A key role for universities within the Industrial Strategy is Innovation and Technology Transfer, which was already a focus of our existing spend on academic staff – for example through Proof of Concept (PoC)... a review of our annual support for academics through PoC showed it..overly favoured early-stage (low Technology Readiness Level) projects; and that the average time from invention disclosure to funding decision was long owing to a lack of devolved responsibility from our Ventures Board. [Using IS uplift]

- We increased annual Proof of Concept (PoC) funding, spanning a wider range of project sizes, start dates and TRLs, but focussed on areas in alignment with the Industrial Strategy. Allocation of funding is agreed by the existing Proof of Concept Panel and signed off by the PVC.
- We allocated additional annual funding for spin-outs, for example in 2017-18:
  - £60K equity investment in spinout Fluid Pharma Ltd, pro-rata to £240K second-round funding won via Innovate UK's pilot Investment Accelerator competition.
  - £20K to buy academic time to prepare for the Innovate UK / DCMS Cyber Security Academic Start-ups Accelerator (the UH TAME cyber threat assessment proposition having now progressed to the final accelerator stage, with £130K awarded).

45. Many HEIs have also used increased funds in the short run to scope institutional KE developments (academic projects are discussed separately in paragraph 46a) that can further IS delivery. This includes use of external experts for planning and marketing of physical infrastructures, such as tech labs or facilities, and for wider marketing exercises, such as analyses of skills gaps or of international markets for R&D or technologies. Universities are also commissioning external experts to advise on internal policy and systems improvements, to improve resilience for larger scale IS developments and to cope with more complex legal and technical arrangements.



### University of Derby – scoping a science park

In 2017/18 the University also committed to work in partnership with Derby City Council to develop a vision for Derby's first Science Park on Infinity Park, adjacent to Rolls Royce. [IS uplift] funds will support the development of the case and then detailed plans over the period to 20/21. This development will be a major addition to the KE ecosystem in Derbyshire and the proposed themes for the Science Park are consistent with Industrial Strategy Grand Challenges.

### Harper Adams University – agri-tech demonstrators

Harper Adams will be focussing expenditure of the [IS uplift] component of our allocation on facilitating creation of demonstrator projects that will show how innovative agri-tech ideas can be applied in real-world settings through use of the University farm; to fund innovation accelerators that explore and accelerate the commercial potential of new technologies in conjunction with industry sponsors; and through the further support of industry networks to create new hubs that will bring together businesses, farmers and academics to collaborate on research and knowledge exchange projects. Our objective is to assist the adoption of technology and best practice in farming, animal welfare, environmental management and new international trading opportunities in the post-EU environment, consistent with the Clean Growth Grand Challenge in the Industrial Strategy. There is likely to be an increasing emphasis on these issues during and beyond the transition period for UK farming that will be established in the Government's forthcoming Agriculture Bill. The University will have a critical role to play in supporting the UK agricultural sector as it adapts to the new policy environment and addresses the need for greater productivity and lower environmental impact in the production of the UK's food supplies and in the management of our natural landscape and land resources.

#### 46. Other features of project expenditures from the IS uplift:

- a. It is common in many plans to use some of the IS uplift for pump-priming and seed funding for academics and researchers to identify their IS offers and to seek and test out industrial and technological partners. Uses in most HEIs are particularly focussed on developing specific IS offers – identifying academic and industry partnership strengths – toward tapping into larger sources of funding for R&D with industry, such as ISCF.
- b. A number of HEIs have used IS uplifts for enterprise and skills developments, for example mini IS challenge funds for students working

with local SMEs, but usually in the context of a larger research and innovation programme.

### **University of Surrey – Innovation Vouchers**

[Activities funded from 17-18 IS uplift] The aim of these schemes was/is to boost the engagement between business and academia, building ongoing relationships:

Surrey Incubation SME Voucher Scheme – The scheme supported 17 collaborative projects across 3 faculties and 12 schools or departments with UK-based SMEs. A wide range of positive impacts and outcomes have been achieved across these varied projects. A number of projects created new data sets for the research teams that have allowed further programmes of research to be defined and bid for. One example is in the bid for the creation of a new diagnostic test for TB treatment. The SMEs have been able to further their understanding of how to optimise their product/services and increase their competitiveness. One example of this is the optimisation of the build of a 3D printed filter membrane. The projects have created an understanding of the value of research intelligence in a growing SME and this has resulted in two companies funding a PhD, two taking on a student placement/intern, one is planning a KTP and one bringing the Professor into their Executive Board.

5GIC SME Voucher Scheme – A total of 7 projects were supported. Participants became 5G's first 7 SME Technology Partners. <https://www.surrey.ac.uk/news/5gic-provides-boost-regional-small-and-medium-sized-enterprises-smes>

47. Many HEIs have used IS uplifts for a great diversity of events and networks. There is particular focus on internal and external IS related events which engage academics in IS themes, raise awareness in local business communities and devise and strengthen academic-industry partnering. Though not common, there are also examples of international events.

### **University of Kent – spreading the IS message, locally, with business and in the university**

In the 2017-2018 we took a focused approach to understanding the alignment of the University, Region and the Industrial Strategy. As part of this process we held a total of seven external events and internal workshops (Sandpits) as well as numerous meetings with academics and external stakeholders. We have engaged with over 50 businesses in the region to raise the profile of the Industrial Strategy setting out the benefits for businesses and the region and submitted two Industrial Strategy Challenge Fund Expressions of Interest. We have built on existing collaborations with

an emphasis on targeting those businesses within the region who have the potential to develop new, larger, resilient collaborations....

Considerable work over this period of time has been in raising the profile of the Industrial Strategy internally within the University. In addition we have matched academic expertise to the Calls and ensured the academic community have the opportunity to attend the Call workshops and have the chance to 'pitch' their research excellence.

### **University of Cambridge – roadmapping to support long-term strategic partnerships with industry**

[IS uplift] funds have been allocated to run roadmapping workshops with several strategic industrial partners, to develop long-term visions and plans for how our relationships with strategic partners might evolve. We have identified around twenty strategic partners for the University, covering a range of sectors and industries. Formal governance arrangements, including steering committees and regular progress reviews have been established to oversee these strategic partners. Every strategic partner has a dedicated [knowledge transfer facilitator] KTF who is involved in managing and developing the relationship.

### **University of Manchester – attracting international R&D partners**

A portion of the [IS uplift] allocation was spent on holding two international events in Singapore and Japan to address the fourth challenge of ensuring the UK remains a world leader in global science and innovation collaboration. Both these countries spend a higher proportion of GDP on R&D and we targeted companies that had existing UK interests. UoM is a world leader in advanced materials, which was one of the topics of presentation, and we were able to demonstrate our cutting edge research as well as a range of commercialised products that resulted from our research. The other topic chosen was cancer/digital health which was of great interest particularly to Japan who face a greater ageing society challenge. Going forward we will utilise HEIF funding to continue to grow our international links to encourage collaboration.

This built upon existing activity funded from the main HEIF allocation: a new focus for the [Business Engagement] team is growing international links with China. In 2017-2018 we signed agreements and/or secured investment in UK infrastructure with at least 8 Chinese companies. This appetite for collaboration has resulted in additional funding for resources dedicated to growing Chinese partnerships from 2018 onwards.

48. Cross cutting all types of projects expenditure, HEIs have used IS uplifts to co-invest with other local and national sources. This includes cross UKRI working, using HEIF IS uplifts to develop partnerships and proposals that feed into Research Council and Innovate UK competitions, co-investment of the IS uplift with RC and Innovate UK funds, or follow on, continuation or exploitation from RC or Innovate UK schemes, including securing national-local synergies. HEIF is often being used to enable cross- or multi-disciplinary and user-focussed developments where RC support is more narrowly focussed. HEIs are also using HEIF to match European Structural and Investment Funds (ESIF) and European Regional Development Fund (ERDF) in local projects.

### **University of Warwick – furthering Research Council investments into the region**

Warwick has established a strong reputation, and diverse links within the UK Data Science and Artificial Intelligence (AI) sectors, especially as a founder member of the Alan Turing Institute (ATI). Whilst national in scope, the University has identified the opportunity for the region to capitalise on relationships mediated through the ATI. In this context a Turing Innovation Manager will be supported [from IS uplift] to widen the reach of Data Science and AI expertise and opportunities into the Midlands, especially with regard to companies and regional organisations. This is intended to not only respond to a sub-national agenda, but also to support raising R&D expenditure and the exploitation of new opportunities afforded by AI and Data Science.

### **University of York – synergies using HEIF and funding from multiple Research Councils**

We used [IS uplift] to provide pump-priming and proof of concept funds for translational and collaborative research, CPD and other knowledge exchange activities. Where possible, we gained significant leverage from our HEIF funding by matching against other sources of funding, notably Impact Accelerator Accounts from EPSRC and ESRC all aimed at commercialisation of research.

HEIF funding and follow on EPSRC-IAA funding allowed the echo product, a production tool for eSport tournaments, to be developed which in turn helped support a successful bid for £5.4m AHRC Creative Industries Cluster award.

### **University of Nottingham – HEIF used to match with Research Council funding**

We are also using some of the recurrent funds as match funding against our MRC Confidence in Concept fund. This increases our capacity for early stage translation of biomedical innovation projects, and hence for applying for further funding through the MRC's Development Pathway Funding Scheme.

### **University of Bath – using HEIF to enable wider developments than Research Council funding**

Industrial Strategy Acceleration Fund (ISAF): We have established this fund to support activities that engage with external organisations and industry, and promote the development of research projects and impact activities aligned to the Industrial Strategy Challenge Fund. The fund has run alongside our EPSRC Impact Acceleration Account (IAA) to support projects that are ineligible for IAA funding. The fund has been used for academics to engage in activities such as: network building; market research; user/beneficiary workshops; publicity materials including websites; people exchanges/secondments; prototype development to secure industrial investment; activities to enable gathering of evidence of impact.

### **Nottingham Trent University – using HEIF to co-invest with local sources, in university-university collaboration**

Using additional [IS uplift] support, we have worked with local SMEs and other University partners to design a new match funded ERDF programme “Productivity through Innovation”. This has been developed to specifically respond to the Government's Industrial Strategy and it is planned that it will commence in Spring 2019. Through the creation and implementation of a new productivity-based diagnostic tool, the Universities will support SMEs through management and leadership development, collaborative R&D linked to productivity innovation, and with graduate placements linking graduate talent to new product and service development.

49. There is also widespread use of IS uplift across various types of project expenditures for place activities, such as experts to develop local industrial strategies or Science and Innovation Audits.

### University of Cambridge – furthering the local eco-system/cluster

Cambridge cluster has been valued in the Government’s Industrial Strategy, and the University is devoted to its development. Cambridge cluster industrial consultation workshops have been held, funded by [IS uplift], to identify local businesses’ needs for engagement, relationship development and knowledge transfer. Three initiatives have come out of three consultation workshops and interviews with sixty key stakeholders: (i) developing the Cambridge Cluster; (ii) Shifting from Start-up to Scale-up; and (iii) wider regional engagement. The University will continue to fund activities to develop Cambridge ecosystem and cluster.

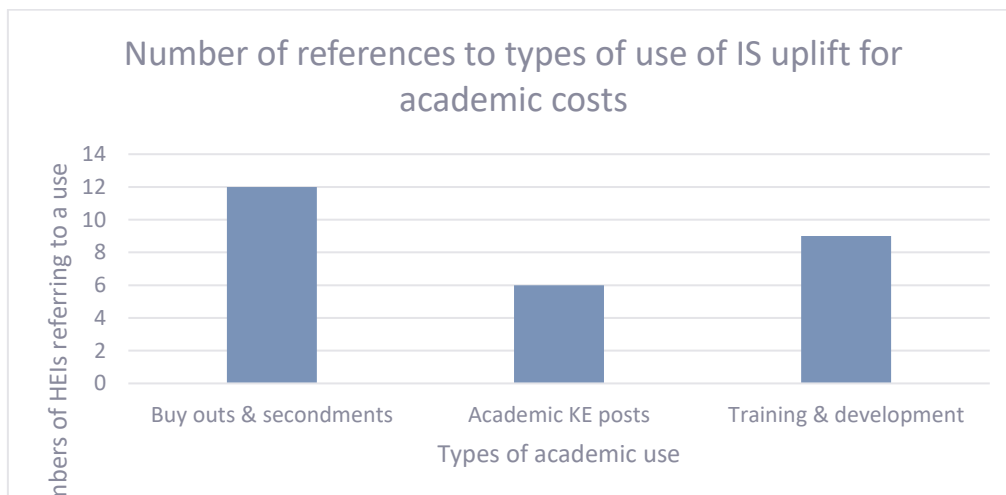
### University of Keele – universities collaborating to support Local Industrial Strategies

More locally, together with Staffordshire University, Keele are working with the Stoke on-Trent and Staffordshire Local Economic Partnership on a major work stream leading to the development of a local industrial strategy in 2019. We propose to use some of our [IS uplift] allocation from within HEIF (via its resourcing of roles) to support this programme of work.

## Academic costs and centres

50. In plans of 20 (out of 103) HEIs, IS uplifts are being used to support direct academic costs (use of IS uplift for academic projects is described at paragraph 46a). These uses are broken down in **Diagram 5** and further information given at **Annex C**.

**Diagram 5**



51. IS uplifts are being used to buy out academic time to focus on IS related activities or outputs (for example, time in a spin-off company) and for various forms of secondment and mobility.

### **University of Bristol – two-way mobility**

Our Vice Chancellor has appointed an advisor, formerly a very senior manager at HP, experienced in the IT and cyber security sector, adding strategic strength and depth to partnership working, and contributing to our ability to respond to the industrial strategy and to Innovate UK responsive grant competitions. A further appointee, with senior management and technology background in advanced engineering will join in August. These posts are funded by HEIF and complement a third post in life sciences, funded through other channels.

A senior staff member has been seconded to [West of England Combined Authority] WECA to work on the Local industrial strategy, building on the university's role in developing the Science and Innovation Audit.

### **University of East Anglia - mobility**

To leverage further investment in R&D from industry we have established a competitive fund to support academic secondment to business allowing academics from early career to established investigators to share their knowledge and passion for research with businesses. A smaller fund has also been set up to support the secondment of individuals from industry to work at UEA either undertaking a specific project or being given a period of time to build networks with academics and understand how their business can benefit from stronger relationships in R&D.

52. There is also some limited experimentation in using IS uplifts for new types of academic posts:

### **University of Birmingham – new types of post to deliver IS**

[IS uplift will be used to] Embed 2 new “application engineers” (ie individuals who operate at TRL 4-7) in our large and complex multi-party research projects etc (eg quantum technologies) to accelerate the translation of outputs from research programmes into practical devices and prototypes that UK industry will understand.

### University of Hertfordshire - IS academic leads

We appointed new Commercial Academic Leads in Schools with the greatest potential to deliver in line with the Industrial Strategy. Three full-time academic staff now support the delivery of KE activity STEM schools, supplementing the strategic role played by the existing Associate Deans (Commercial). The Commercial Academic Leads help Schools address Industrial Strategy Challenges through active engagement with the KTN and similar networks.

53. IS uplifts are also used for training and development of academics and researchers, for example in enterprise and entrepreneurship:

### University of East Anglia – HE-HE collaboration in acceleration

Improving our ability to turn exciting ideas into commercial products and services. [Using IS uplift] We have set up a competitive process for academics looking to take an increased role in commercial innovation activities to apply to attend the Ignite programme at the Judge Business School [University of Cambridge].

### Imperial College – acceleration and postgraduate IS development

[IS uplift has]

Pump-primed a postgraduate/postdoctoral Accelerator Programme (Techcelerate) in two areas of interest: MedTech (this was a precursor to the [CCF funded] MedTech SuperConnector bid) and Artificial Intelligence.

Provided central support for postgraduate training and placements relevant to the Industrial Strategy.

## Major centres

54. For 18 out of 103 HEIs, plans report that IS uplifts are being used across multiple expenditure categories for a major centre of importance to the university and its partners. This includes covering costs of planning and marketing of centres, specialist KE staffing and costs of pump-priming and co-investment in projects in the centre. Further details on these centres are given in **Annex C** and include research and innovation institutes and centres and SME focussed hubs, across many different technologies.



### **Royal Holloway, University of London – cyber centre**

Already established, the Institute for Cyber Security Innovation has delivered new projects with industry funders such as GSK and Huawei, and brokered a growing range of consultancy and training services generating over £300k in new contracts. This Institute will be developed into a regional centre with a new bespoke building (build due to commence 2019) for innovation activity to be supported by the College and Enterprise M3 LEP. This Institute will sit alongside a new incubation facility to enhance our support for both staff and student enterprise and also the Research and Enterprise Department. HEIF funding will be used to provide the professional expertise to underpin the Institute and support targeted projects and initiatives.

### **University of the Arts, London – developing a cluster**

[IS uplift has been used for] Providing the core staffing necessary to take the partnership development of the East London Fashion Cluster – now renamed “Fashion District” (a creative industries cluster specifically identified in the Bazalgette Review) - to the next stage of maturity. This has resulted in delivery of a partnership Business Plan with five distinct work streams, and a successful partnership bid for £2.6M in Good Growth Funding. The Fashion District has also launched its first innovation Challenge competition, funded by Climate-KIC’s London City Challenge and has achieved success in its £5.4M application to the AHRC/ISCF Creative Clusters call, with a proposal based on the Fashion District and its specialist regional supply chains.

### **University of Northampton – Transport institute and Catapult links**

[IS uplift] will be used to support the Institute of Logistics, Infrastructure, Supply and Transport to take advantage of its competitive advantages in the area of new methods of travel and transport, including the deployment of new technology and apprenticeship programmes for the logistics sector. The Institute is working in partnership with the Transport Catapult on the development of load-smoothing and load-sharing technologies and this will be a key area of innovation over the next three years.

### **University of Portsmouth – supporting local Space cluster through university-university and Catapult collaboration**

We are using this funding [IS uplift] to support an emerging Space Sector cluster - hosting the South Coast Centre for Excellence for the Satellite Application Catapult

and a UK Space Agency Incubation programme. [IS uplift specifically supports] the cost of an Innovation Director..., as well as funding for additional research staff to enhance the capabilities that already exist within the partnership

Recently, we have enhanced our activities in this sector through the Horizons5G project (<https://horizons5g.com>); a business-led partnership between us, Surrey, Airbus, Avanti, BT, Roke and Methera Global which is located in one of the innovation centres. This partnership will be actively applying for funding from Innovate UK and ISCF in order to undertake R&D in support the convergence of 5G and the space sector opportunities. Such on-campus activity provides innovation opportunities for our postgraduate students, e.g. our data-science doctoral training centre (<https://www.discnet.org.uk>)..

## Overall strategic approach

### IS throughout the Plan

55. In addition to scrutinising the uses of IS uplift allocations, we also appraised HEIF plans overall to identify the extent to which HEIs were aware of IS policies and priorities and embedding these more broadly, including in their use of core HEIF allocations. We highlight again that we asked HEIs to provide us with plans in the context of their previously approved strategies, which were developed before publication of even the Industrial Strategy green paper.
56. In a few cases, HEIs asked to update their strategies as part of the HEIF plan process, sometimes in the light of the IS, but also because of internal changes, such as change of the Head of the institution.
57. In 47 out of 103 plans, the HEI was making some strategic changes beyond use of the specific IS uplift allocation to deliver the Ideas Chapter of the Industrial Strategy, in many cases including use of their main HEIF allocation. The University of Oxford was an example of a university taking a very proactive approach throughout their plan to IS delivery:

#### **University of Oxford – a proactive approach to IS delivery throughout the Plan**

Our business development and allied teams are aligning significant aspects of their activity towards the Industrial Strategy, including in:

- Undertaking an audit of the University's engagement with the Industrial Strategy to date (17/18).

- Allocating 2 FTE additional staff to our Business Development teams to help scale our engagement with the Industrial Strategy.
- Working to centralise support for our academic community to learn about, influence and engage with programmes through the Industrial Strategy. For example supporting the development of five Eols for ISCF wave 3.
- Developing consortia and supporting partnering activity to bid in to ISCF wave 2 programmes including Next Generation Services, Digital Pathology, imaging and AI Centres, and Prospering from the Energy revolution to name a few (17/18).
- Development of new academic-business partnerships in smart cities, ageing, agri-food tech, energy, urban mobility, drug discovery, satellite applications and other pertinent themes (17/18-19/20).
- Strengthening business engagement across the University and raising awareness of our expertise, including in 18/19 and 19/20 planned technology showcases, workshops and executive roundtables in themes of relevance to the Industrial Strategy, building on 17/18 activity, including theme days in artificial intelligence and biomedical imaging, and a high-level roundtable in big data for healthcare, to names a few examples.
- BD managers have provided practical support for the EOI for the grand challenge in ageing, iTAC, (submitted April) and a full bid application to the current digital pathology call as part of our developing strategic partnership with GE
- Network building: Under the AI and healthy ageing pillars the AIM day in medical imaging was designed to simulate new partnerships and to solidify and build on existing relationships
- In support of the IS Ageing pillar – we are planning an industry-academic ageing research day in Oxford over the next year and will invite a number of companies with activity in this space

Our BD managers are also helping the academic leads with the delivery of the UK SPINE CCF fund which is building an academic drug development consortium around Ageing that could support the ICSF call.

58. We also asked in relation to the teaching element to HEIF main allocations about addressing priorities of the People Chapter of the Industrial Strategy, and 56 out of 103 HEIs made reference to this chapter. This may have been higher than the Ideas Chapter because the topic is relevant to research and teaching HEIs, because HEIs felt that they needed to stress the importance of the teaching element or because responses on the Ideas Chapter were focussed on the IS uplift section to plans.

## Key IS partners

59. We also analysed plans for references to funders and other stakeholders that are playing critical IS roles. We found:

- a. 71 out of 103 HEIs made reference to Innovate UK or to its partner organisations (Catapults and KTN) or major programmes (such as KTPs). This demonstrates significant maturing of relationships between Innovate UK and the HE sector. We last analysed HEI alignment with Innovate UK (then Technology Strategy Board - TSB) in 2012 when only 20 HEIs referenced TSB.
- b. 33 out of 103 HEIs referenced individual Research Councils or the Research Councils collectively. This is likely a lower result than for Innovate UK because Innovate UK has a wide range of funding vehicles, including KTPs, where research and teaching intensive HEIs will have strengths. Research Councils' funds and activities are more focussed on research intensive universities.
- c. 79 out of 103 HEIs mentioned local partners or local developments and initiatives. This included Local and Combined Authorities and Local Enterprise Partnerships, but also references to major local programmes and developments, such as Science Innovation Audits and local Growth Hubs. Not only were references to local partners and developments most prevalent across HEIs, but they also featured in plans of a very wide range of research and teaching intensive HEIs. This likely reflects the importance of the place agenda to commercialisation (because proximate connections are particularly valuable as part of an entrepreneurial eco-system), and to the local anchor role of universities.

### **Buckinghamshire New University – local R&D and growth hub**

[IS uplift] Funds were used to further foster a local ecosystem of research, innovation and commercialisation in the digital and healthcare sector through the planning and partial roll-out of the Bucks Digital Hub, the Bucks Health and Social Care Innovation Hub and the Bucks Life Sciences Innovation Centre. (The full roll-out will be completed in 2018/2019.) The hubs will be an effective test bed for R&D by harnessing the academic skillset and facilities of the University with the commercial focus of the private sector alongside the care pathway expertise of the NHS, the Academic Health Science network and local government. The University's ecosystem will also include Bucks Business First, which is moving onto campus, meaning their business advice will co-locate with the University's own KE.

- d. 20 out of 103 HEIs referenced all three – local, Innovate UK and Research Councils – partners.
- e. 10 HEIs made no reference to any of these partners. This was largely small, specialist HEIs with very focussed IS delivery priorities.

## Sectors

60. We also analysed plans for the references to specific IS challenges and sector priorities. Many large multi-disciplinary research universities talked in general terms about IS priorities and did not give details of the many sectors that they address, due to text constraints. Of HEIs that did reference specific sectors (largely smaller HEIs), most common reference was to health/ageing/medtech (26 HEIs), followed by AI (17 HEIs) and clean/green tech (17 HEIs), digital and data (12 HEIs) and creative sectors (9 HEIs).

## Collaboration between universities

61. We have not examined plans in detail for levels of HE-HE collaboration which is addressed in published institutional strategies. IS uplifts have been used for many collaborations between HEIs (highlighted in some case studies in this report). There was also specific funding for collaboration between universities on commercialisation from the CCF. The CCF section of plans provides details of additional formula funding invested in specific CCF projects, as well as its use in a much wider range of collaborations. University plans highlight that many different types of collaboration are needed to deliver the IS effectively, including: IS specific collaborations to raise awareness or form partnerships; collaborations with local leaders and bodies; with industrial or technology networks; with specific R&D partners; or for sharing good practice between universities on policies and practices for commercialisation. The multi-network nature of the commercialisation system is described in **Diagram 1**.

## Conclusions and observations

62. We have assessed plans and particularly uses of IS uplifts in detail and we believe that funds have been used appropriately and for purposes intended. This is evidenced in the breakdowns we give in Annexes and the case studies in this report as well as in picture form in **Diagram 1**, all of which appear fully in line with the Ideas Chapter to the IS White Paper.

63. We also believe that the HE sector has made good progress to embed the policies and priorities of the IS. There are some pace-setters in small and large institutions, but, we feel reasonably, many HEIs are building on their current strengths and experimenting to determine future strategy. University approaches are affected not just by funding available to HE, but also by funding to businesses to help them engage with the HE knowledge base. As broader IS funding opportunities roll out, we can anticipate acceleration of university delivery.
64. We hope that this report will provide insights and examples to help individual HEIs consider their plans and develop their strategic approaches further in the future.
65. These observations support the approach that we have previously set out, to call for a next round of strategies and plans in 2019-20 for the five year period from 2020-21. We would expect to see more rapid, profound and widespread embedding of the IS in this next round of documents, when IS should inform institutional strategies and not just expenditure plans.
66. Although progress in IS delivery so far seems sound, a note of caution is that there may be a risk of capacity constraints from the focussed increase on one area of KE activity, commercialisation, particularly in terms of high quality staffing. As well as overall increase in scale, it is clear that there is now a wider distribution of commercialisation activity across the HE sector, with HEIs with less track record in areas such as IP exploitation embarking on new developments.
67. These observations point to us continuing to take close interest in the development of good practice in the HE sector in commercialisation, including through our forthcoming KE Framework and the KE Concordat. The CCF programme seems particularly significant in driving collaborative commercialisation practice more generally, and this is a very important aspect to IS delivery. A CCF type approach may be particularly valuable in future in areas of emerging and widespread technological strength across the HE sector, notably AI and digital.
68. The place agenda is clearly very important in IS delivery. A great number and range of different HEIs pay attention to the opportunities and challenges of their places in the IS plans. Many plans focus on developing an entrepreneurial eco-system to support their commercialisation, as discussed in the McMillan review. Eco-system related developments include use of IS uplifts for improvements in physical infrastructures, clusters and networks, IP pipelines and enterprise capacity, accelerator programmes and access to finance. The university anchor role is emphasised in many plans, with a particular focus on supporting local industrial strategies and SIA developments, and stimulating IS awareness and

connections across a location. There are examples of universities playing a role to connect national and local IS developments.

69. Plans demonstrate that HEIs are paying close attention to developments from UKRI, particularly to the role of Innovate UK to stimulate the business engagement side to IS and provide commercialisation opportunities. There are good examples of synergies being delivered through combining uses of funds of different UKRI councils. A few HEIs do not mention UKRI or local links and this may be appropriate to their KE strengths. Case studies throughout this report demonstrate though that IS delivery may be accelerated through tapping into a wider range of IS opportunities, and hence all HEIs may wish to consider evidence in this report toward linking into wider stakeholder networks.
  
70. HEIs demonstrate a significant range of different and innovative approaches to IS delivery. There are a few areas where references were lower than we might have expected, notably international links, mobility schemes and innovative academic posts. These may be areas for further support, for example, through our Research England Development (RED) Fund or wider UKRI programmes.

## Glossary

AI	Artificial Intelligence
CCF	Connecting Capability Fund
ESIF	European Structural and Investment Fund
ERDF	European Regional Economic Development Fund
HEIF	Higher Education Innovation Fund
IS	Industrial Strategy
ISCF	Industrial Strategy Challenge Fund
IP	Intellectual Property
KE	Knowledge exchange
KTPs	Knowledge Transfer Partnerships
UKRI	United Kingdom Research and Innovation



## Annex A - Use of Industrial Strategy uplift for KE professional capacity

<b>Research exploitation</b>	
<p><b>Industrial strategy dedicated</b></p> <p>KE professional capacity dedicated to delivery of the Industrial Strategy (IS), includes:</p> <ul style="list-style-type: none"> <li>• New or major restructuring of teams to deliver IS; creation of a central institutional IS team</li> <li>• Supporting/developing an IS strategy for the institution; and/or supporting senior university management and academic leadership on IS opportunities</li> <li>• Identifying academic strengths across the institution, or with HE partners, related to IS</li> <li>• Identifying and developing local, national and international industrial and other user partners to address IS</li> <li>• Seeking, compiling and disseminating information about IS and IS funding opportunities</li> <li>• Supporting events to promote IS awareness amongst academics/researchers; and events with local businesses</li> <li>• Supporting alignment of national and local industrial strategies</li> <li>• Identifying and disseminating information on IS/ISCF bidding opportunities</li> <li>• Securing partners and developing bids</li> </ul> <p>Variety of levels of numbers, including academic IS leads (analysed separately), senior managers and support posts.</p>	31 HEIs
<p><b>Strategic and corporate R&amp;D partnerships</b></p> <p>Capacity to attract/develop/support major corporate or strategic R&amp;D partnerships for the institution; or with responsibility for supporting a specific corporate partnership across the institution. Capacity to develop and evaluate approaches to impacts of such activities.</p>	27 HEIs
<p><b>Working with SMEs and UKRI related posts</b></p> <p>Capacity dedicated to networks, support and partnering with SMEs (including with local bodies); and work with Innovate UK (beyond ISCF): includes:</p> <ul style="list-style-type: none"> <li>• Enterprise and innovation support for SMEs, including in specific innovation hubs</li> </ul>	18 HEIs

<ul style="list-style-type: none"> <li>• Digital or technical support to SMEs eg support in using specialist equipment and facilities</li> <li>• Links with KTN or Innovate UK competitions support</li> <li>• KE support for EPSRC Innovation Fellow</li> <li>• Support and management of KTPs</li> </ul>	
<b>Technology transfer</b>	
<p>Capacity focused on technology transfer, IP exploitation and spin-outs development. Includes posts focused on accessing Innovate UK Investment Accelerator. In several cases, this is the first IP post for the institution</p>	<p>27 HEIs</p>
<b>Networks/physical infrastructure management and support (Clusters, centres, incubators and science parks)</b>	
<p>Includes capacity focused on:</p> <ul style="list-style-type: none"> <li>• Supporting development, management and partnership links of regional and technological clusters - includes offshore cluster, creative industries, cyber, marine, space and fashion</li> <li>• Supporting and engaging partners for Industrial strategy related centres eg ageing, batteries etc</li> <li>• Posts supporting Catapults links and agreements</li> <li>• Local links for national centres eg Turing Centre</li> </ul> <p>Support for development, management, tenant links and enterprise support for science parks and incubators</p>	<p>12 HEIs</p>
<b>Enterprise, Skills and local links</b>	
<p>Capacity to support LEPs including to develop local industrial strategy; regional and local engagement, supporting social and local innovation. support to apprenticeships development, partnering and management; and student enterprise. Enterprise support to SMEs including in Growth Hubs</p>	<p>17 HEIs</p>

## Annex B - Use of HEIF uplift for project expenditures

<b>Research exploitation</b>	
<p><b>Costs of events and networks (non staff) – internal and external</b></p> <p>Industry: industry workshops and fora; seeding and supporting networks in industry and in local economy; industry engagement and panel meetings. Includes specific networks e.g. AIRTO and TWI (subscriptions, costs of meetings)</p> <p>Industrial Strategy specific: raising profile of IS in local region and businesses; engaging academics and businesses in IS themes; showcasing technologies to business in IS challenge areas; workshops and sandpits with local business on ISCF bids</p> <p>Local: engaging new local innovative businesses; SME events</p> <p>International showcases of expertise and technologies</p> <p>In HE: HEI-HEI KE collaborations; internal IS steering groups; internal academic workshops to identify alignment of research areas with IS themes; cross discipline KE sandpits.</p>	28 HEIs
<p><b>Institutional scoping projects (non staff costs, external experts and advisers)</b></p> <p>Overseas opportunities: scoping overseas countries with high innovation budgets/capability for partnering, also global training opportunities; potential (including in collaboration with other UK HEIs) of international research/KE programmes; benchmarking KE functions with overseas comparators.</p> <p>Local: project costs for support to LEP and cross-LEP (eg Midlands Engine) including leading Innovation Council; inward investment promotion for area; regional engagement; market research into R&amp;D needs and skills gaps analyses; expert reports to support development of the Local Industrial Strategy and support development And delivery of SIAs; planning and reports on local and regional sectors and clusters, accelerators and eco-system; development, businesses cases and planning of physical infrastructure i.e. local science parks.</p> <p>Industrial strategy specific: internal audits of IS potential, roadmapping, planning and market research on IS sectors; pump priming grants on industry relevant topics and production of marketing and business plans.</p>	40 HEIs

<p>Internal: planning and development, marketing and other evidence on tech labs, enterprise campuses, marine clusters, digital infrastructures and autonomous marine test range; pilot studies, internal institutional pilots/studies, expert analyses (e.g. for AHRC creative clusters) and marketing plans e.g. for new tech.</p> <p>Expert advice on: administrative systems for KE and impact, upgrading systems and new evaluation systems and policies; legal agreements for collaboration; HR/EDI e.g. in entrepreneurship policies; upgrade impact systems and evaluation; bid and partner analyses and development.</p>	
<p><b>Pump priming of academic projects</b></p> <p>Industrial strategy specific: pump priming, seed funding, acceleration, challenge and small projects/grants in IS areas, includes clean growth, AI/data and ageing; specific seedcorn grants for arts, humanities and social sciences in IS themes; pump priming for academic collaboration with industry in IS themes; pump priming IS sweeps.</p> <p>Mini IS challenges – students and SMEs</p> <p>Industry/corporate partners: academic KE projects fund to initiate industry collaborations; seed funding of corporate-start up relations;</p> <p>funding for academic-industry sprints to surface project ideas; includes AI, Quantum, Cyber security and Plants</p> <p>Local: pump priming local/regional academic projects; local makerlab events</p> <p>Academic/staff KE seeding, projects and impact extension funds/awards</p>	30 HEIs
<p>Co-investing – with industry, local (ESIF) and other UKRI</p> <p>With industry: in projects and PhD; post KTP follow-ons; SME Vouchers.</p> <p>Local: co-fund ESIF/ERDF projects e.g. diagnostic tool for SMEs, innovation supply chain, food lab, growth hubs.</p> <p>UKRI: match RC schemes; KTP pump priming and co invest with industry in KTPs and PhDs; follow on development of an EPSRC centre and IS institute; additional (to CCF) funding into RE CCF projects.</p>	19 HEIs
<p><b>Technology transfer – non staff, externals</b></p>	
<p>Proof of principle, concept, seed and technology development milestones funding</p> <p>Technology audits and commercialization reviews; proto-typing and technology demonstrators; digital developments</p>	42 HEIs

<p>IP: patenting, protection, licensing and legal spin-out costs – internal and external advisers</p> <p>Spin out investments, and investment into spin outs to scale ups</p> <p>Funds for incubation and acceleration support; accelerator programmes; enterprise events; training for new ventures; consultancies on accelerator and angel fund potential; incubator and angel investment clubs</p> <p>Expert/technical advice on exploitation of physical infrastructure e.g. in-house air simulator, digital and software infrastructure, testbeds</p>	
<p><b>Enterprise and Skills</b></p>	
<p>Student enterprise: training and development programmes; projects and consulting; entrepreneurship project funds; summer schools including tech accelerator; business plan competitions;</p> <p>Enterprise support programmes eg SMEs</p> <p>CPD: development of executive education, CPD and short courses programmes, apprenticeships development, STEM ambassador programme.</p>	<p>17 HEIs</p>

## Annex C - Use of IS uplift for academics and major centres

<b>Academic costs</b>	
<p><b>Training and development</b></p> <p>Academic training and development courses for industry engagement, Industrial Strategy, enterprise</p> <p>External training – use of Cambridge Judge accelerator (by other HEI), midlands Medici academic entrepreneur training</p>	9 HEIs
<p>Academic KE posts</p> <p>Joint academic appointments with users</p> <p>Academic/KE posts in space cluster; commercial academic IS leads; enterprise fellows; Industrial Strategy fellows; application engineers at TRL4-7</p>	6 HEIs
<p><b>Buying out academic time for KE and seconding in</b></p> <p>Buying out time: on spin-offs; to develop corporate partnerships; for IS opportunities and projects; with industry on engineering courses</p> <p>Seconding academics to Combined Authority on Local Industrial Strategy; ECR secondments to industry in IS areas; seconding in industry advisers</p> <p>Staff and student (e.g. PG) exchange programme academic-industry exchanges.</p>	12 HEIs
<p><b>Major (multi-expenditure category) investment in KE centres</b></p> <p>Positive Ageing R&amp;I Institute; Digital and healthcare innovation hubs; Bioscience centre innovation and skills (local); Life sciences campus/park; KE dementia centre with charity</p> <p>Inter-disciplinary/KE centres in Materials, Nanoforce; Cyber Security Centre; Smart tech centre (local); KE/Logistics Institute with Catapult; Engineering innovation centre; AI and data analytics innovation centre</p>	19 HEIs

<p>Story Lab on audiences of the future; SME innovation centre in digital creativity; Productivity Centre focussed on digital skills for SMEs; Digital academy for SMEs and skills</p>	
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<p>KE/research institutes in space, health, creative</p>	
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<p>Industrial Strategy Institute; Apprenticeship hub in manufacturing skills; Enterprise Centre for local business</p>	
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