

Higher Education Innovation Funding: Institutional five year KE strategies (HEIF 2016-17 onwards): policy and request for strategies (HEFCE 2016/16)

Annex A1: Template for institutional five-year KE strategies (for HEIF 2016-17 onwards)

Please complete this form, and the **two tables in Annex A2**; these may be downloaded from www.hefce.ac.uk/pubs/year/2016/201616/. Text boxes may be expanded to the required length, and are expected to be in proportion to the level of HEIF allocation received in 2016-17. Please do not attach other documents or annexes. Guidance for completing the forms is at Annex B in the main document.

Completed form and tables should be emailed to heifstrategy@hefce.ac.uk by **noon on Monday 31 October 2016**.

Name of institution	The University of Sheffield
Contact person for correspondence who is also responsible for ensuring that the head of institution has approved this strategy for submission to HEFCE	
Name	Dr Sarah Want
Position	Head of Research Partnerships & Engagement & Assistant Director of R&IS
Address	New Spring House, 231 Glossop Road, Sheffield, S10 2GW
Email	sarah.want@sheffield.ac.uk
Phone	0114 222 1445
Note that we intend to engage with this contact person in the event of queries regarding the institutional KE strategy. We will contact this person annually as part of our HEIF monitoring process.	
Has this KE strategy been approved for submission to HEFCE by the head of institution?	
Yes	

Section A: Knowledge exchange strategy

The strategy

1. Summarise the key aspects of your five year KE **strategy**, including:
 - a. Priority objectives.
 - b. How your KE strategy relates to the wider institutional mission and individual corporate strategies.

- c. Key trends and drivers creating opportunities and challenges.
- d. Likely key barriers and enablers to implementing your strategy.
- e. The key activities by which you will realise your objectives, such as contract research, enterprise education, continuing professional development.

The University of Sheffield (TUoS) currently receives a maximum allocation of HEIF funding and an additional top cap allocation to reflect our consistently strong HE-BCI return. Knowledge Exchange (KE) is enshrined in TUoS' [Strategic Plan](#) as “the goal of changing the world for better through the power and application of ideas and knowledge”.

TUoS has always viewed KE as more than a funding mechanism; it is a key priority and strategic need for our University. Five years ago we launched our Impact, Innovation and Knowledge Exchange (IIKE) strategy. This strategy has now successfully matured and embedded, and our new 5-year KE Delivery Plan intends to build on progress achieved, maintaining the same key areas of focus:

- Partnerships
- Intellectual Property (IP)
- Place
- Embedding and Promoting KE

Our priority objectives, and the key activities to achieve them, are tightly woven into the inter-connected themes of our Strategic Plan as follows:

Theme 1: Research and its impact

Our strategy is to focus on the key research strengths where we are acknowledged global leaders; to deliver an increase in high quality international research partnerships; and to better promote new initiatives for early career researchers (ECRs).

To support this we will align our KE delivery plans and investment fully with institutional research priorities; provide support for GCRF funding bids and the development of the partnerships that will support them; and ensure that the KE support mechanisms available within our institution are relevant and accessible to ECRs.

We have reviewed and refined our commercialisation activities to ensure best use of our IP to stimulate innovation within the University and with our partners and maximise the impact of our ideas and knowledge on the wider world. This aims to provide greater flexibility and support a broader range of IP exploitation - see section 2 for detail.

Our continuously reviewed and expanded CPD program and tailored individual support equip researchers with the knowledge and expertise to tackle impact confidently.

Theme 2: Our strategic partners

Our ambition is to identify and develop large-scale partnerships with tier-one organisations in line with our strategic priorities and shared values. We want to focus on collaboration in areas of strength, promoting research activities that we could not pursue alone, and guarantee a demonstrable and sustainable purpose for every partnership. We will deliver this through the further development of a formal account management function (including wider use of digital platforms such as Salesforce) to better support all partnerships.

Each faculty maintains a priority list of relationships within a pipeline, focusing investment on strategic research priorities and placing an emphasis on relationship management. The allocation process for our KE investments is designed to identify and nurture activity that demonstrates the capacity to deliver sustainable follow-on opportunities.

Our HEIF funding has created an integrated KE ecosystem with “no wrong door” for potential partners seeking to collaborate. This provides a robust framework through which we can flexibly and responsively channel the various Impact Acceleration Accounts (IAAs) and other impact funding our institution receives to cater for a wide range of relationships and partners. We will continue to use tried and tested interventions, such as collaborative R&D and secondments, to work with them effectively. In addition, we will respond proactively to new opportunities which require a different approach.

Theme 3: Our place, locally and globally

Our strategy is to enhance our strengths locally and globally to carry out excellent research that makes a direct difference for communities near and far; and to drive the regional economy through our research-led Advanced Manufacturing Innovation District (AMID), and transform the UK’s approach to infrastructure, high value manufacturing, and employer co-designed and funded apprentice degrees.

There is formal recognition of the interdependency between the success of the University and the region, and this will drive KE activity in this area. The focus of this activity, as set out in Section 2, is on the creation of an AMID and of improving the cultural vibrancy of Sheffield. We actively lead the City Region to opportunities that it could not access otherwise - for example internationally or in areas of science and innovation. The [Science and Innovation Board](#) (SIB) for the Sheffield City Region is chaired by our Vice Chancellor, and HEIF provides the secretariat to this board. The recently completed Science and Innovation Audit (SIA), led by TUoS in partnership with Lancaster University and key players from the SIA region, was delivered by the SIB and will also inform our activity over the next five years. By investing in initiatives to bring vibrancy to the city centre (such as the [Ideas Bazaar](#), [Festival of the Mind](#), our City Development Team, and various partnership projects e.g. [Business Improvement District](#), a five-year project backed by more than 500 local businesses) and working with regional partners to create a thriving cultural offer, we hope to attract and retain the students, graduates and skilled employees vital to the city’s economic health, in line with our strategic objectives.

Globally, we aim to forge key partnerships relating to our areas of research strength across the world, but in particular in Europe, China, the U.S. and India. TUoS will continue to proactively seek out opportunities for new translational research collaborations like those already established with Nanjing Tech University and the Shanghai Academy of Spaceflight Technology.

Theme 4: Our education and student experience

Designing our educational offering to be as inclusive as possible, and equipping our students with the skills, experience and contacts they need to gain top-flight employment are key priorities of our educational mission.

Developing more innovative KE-based educational models like the nationally-acclaimed apprenticeship programs offered by our Advanced Manufacturing Research Centre (AMRC) will increase our range and variety of widening participation activities and open up new pathways into higher education.

We will continue to fund proven mechanisms such as the University of Sheffield Enterprise (our platform to support student enterprise and entrepreneurship), strengthening commercial opportunities arising from this area, and focusing on alignment of this activity with partnerships, IP and Place focused delivery. The RISE platform (linking graduates with local businesses) also enables us to increase the entrepreneurship, innovation skills and professional experience of our undergraduates and graduates. Working with local SMEs and big industry partners to develop more opportunities for placements and internships will boost retention of highly skilled graduates.

We will use international partnerships to offer our students opportunities for experience in world class research, innovation and volunteering, through arrangements such as the summer exchange program with Nanjing and Ohio State Universities (see Section 2).

Key trends and drivers creating opportunities:

Changes in the HE Sector: REF impact has been a significant driver in raising the importance of collaborative research partnerships, and the HE sector as a whole is experiencing a greater need to diversify its sources of research funding.

Acknowledged success of new approaches to knowledge exchange: Independent recognition of the AMRC as a benchmark for translational research facilities has created an appetite for new centres that develop a bespoke response to an identified demand for translational research.

HEI Partnerships: The trend towards cross-University collaboration on KE initiatives creates opportunities to maximise investment in e.g. stakeholder events, thought leadership bodies and regional regeneration initiatives.

Global Challenges Research Fund (GCRF): This fund provides an excellent avenue to look beyond Europe for the partnering opportunities that are urgently needed for international growth post-Brexit.

Key trends and drivers creating challenges:

Economic climate: The range and level of government funding available to support innovative R&D is also changing which introduces a level of uncertainty around how best to unlock partnerships.

Need for greater efficiencies: Post-Brexit there is growing pressure internally to work more efficiently. KE investments will have to deliver multiple outcomes that benefit teaching and research as well as meet our KE objectives.

How we will overcome these challenges and respond to these opportunities:

Our broad base of KE activity places us in a position of strength to overcome our challenges. We offer a broad and diverse portfolio of possible interventions.

TUoS supports an integrated KE ecosystem in which there is 'no wrong door' for potential partners. We have used HEIF funding to establish an effective and robust platform to flexibly allocate and apply the different IAAs and impact-specific funding managed by our institution.

Our understanding of what works is informed by many years of HEIF funding to trial a wide variety of KE interventions. It has been refined over the past two years by in-depth review and consultation with stakeholders across and beyond the University.

During this KE strategy period, these three strengths will allow us to: use our KE funding with the greatest possible efficiency, ensuring the best resource is matched to best activity; bring our good understanding of the needs of our likely and preferred partners to bear in unlocking stronger, deeper partnerships and offering them flexible, tailored and sustainable solutions.

By seeking to actively embed KE within current and future research partnerships with other HEIs will further maximise efficiency in our use of HEIF investment.

2. Provide further details on the **focus** of your key activities and expected contributions, such as:

- a. Target sectors (in business or public services or the third sector), technologies, or societal 'grand' challenges.
- b. Any geographical focus (international, national, regional, local).
- c. Any focus on particular types or groups of organisations (such as SMEs, large companies, whole industry supply chains, charities, community groups, public sector agencies, local authorities, local economic partnerships).

TUoS supports an integrated KE ecosystem in which there is 'no wrong door' for potential partners. We have used HEIF funding to establish an effective and robust platform to flexibly allocate and apply the different IAAs and impact-specific funding managed by our institution, which allows us to cater for a wide range of relationships and partners. Our current, inter-connected ecosystem includes:

Faculty facing KE delivery teams that have evolved based on years of experience to best meet their particular needs.

Thematic centres, both major established bodies (such as the AMRC and the School of Health and Related Research) and smaller entities focused on particular sectors and technologies (Grantham Centre, Energy 2050).

Self-contained and self-funded projects such as the HEFCE Catalyst Anchor Institutions and Apprenticeship Pathways projects.

Place and economic development activity including City and Cultural Vibrancy projects, and major infrastructure projects such as the AMID as well as engagement activities which aim to improve the innovation system in the region, e.g. the Science and Innovation Board and its associated work program and our Managing Directors Club.

Cross cutting activity including Commercialisation, Student Enterprise, Entrepreneurship and Employability, and Public Engagement (PE).

Each element in the KE ecosystem tailors its delivery mechanisms to best meet its particular needs. This is reflected in the way in which we deliver the four objectives of our KE Strategy:

1. **Partnerships:**

In general, the focus of partnerships (sector, geography and type of organisation) will be determined by the most promising routes towards the impact associated with the research being undertaken. The focus is on finding the partner with the best impact route, and the greatest willingness and capacity to engage and deliver this impact.

Our faculties have each defined their individual focus for KE. For example, The **Faculty of Engineering** will focus on Advanced Manufacturing, Automotive, and Aerospace. They will focus on strategic partnerships with Siemens, Jaguar Land Rover and Huawei. The **Faculty of Social Sciences** will strengthen their existing links with Governmental Departments, including the Department for Work and Pensions, while seeking to develop emerging relationships with departments such as the Department for Business Energy & Industrial Strategy. The **Faculty of Science** already have a clear focus on food security. New areas for KE development will be identified in the Physical Sciences. The **Faculty of Arts and Humanities** are building a national and international reputation for their work with a variety of heritage organisations. The **Faculty of Medicine, Dentistry and Health** work with academics to build up projects that offer commercial potential. These projects align with specific sectors, with life course biology, digital and medical devices, and public health/health economics offering immediate potential.

Our **major centres** will continue to focus on sectors that align with their individual core strategies:

- The AMRC is focused on advanced machining and materials research for aerospace and other high-value manufacturing sectors.
- The Medical AMRC and the Nuclear AMRC are aligned to the HealthTech sector and Civil Nuclear sectors respectively.
- With a world class reputation for research excellence, the School of Health and Related Research (SchARR) supports private industry, public and third sectors as well as other policy, decision-making and academic collaborations in health.

Our **multi/transdisciplinary translational research centres**, such as Energy 2050 are aligned with priority areas set by government or key partners such as UK Research Councils and Innovate UK as detailed in section 5.

2. Intellectual Property (IP)

Our IP Development and Commercialisation function has:

- A holistic in-house IP capability designed to capture the broadest spectrum of commercial opportunities (including non-STEM). Whereas the scope is wide ranging, there is a focus on areas that offer the greatest potential, including software and therapeutic drugs.
- A fund created specifically to invest in SMEs: a 'made in Sheffield' financial model.

A focus on greater flexibility in how we use our IP will enable us to work easily across the Technology Readiness Levels, e.g. accessing a range of funds to achieve impact from the translational aspects of our Biomedical Life Sciences activity and related sectors, as well as considering structured ways in which we can build access to our IP opportunities into our strategic partnership offering. Such flexibility will be greatly assisted and encouraged by an Accelerator Fund, created in 2016 with EIF investment (£200k), which has been used to leverage additional internal investment (circa £800k). The desire is to build a unique TUoS funding model, which will enable a full spectrum of technology transfer activity. We are exploring a 'made in Sheffield' financial model appropriate for a

University embedded in the city region, with ambitions to expand global partnerships driven by a fund investing in companies, primarily SMEs, that aspire to innovation-driven growth but lack the capital to go forward. We aim to create a fund that provides an environment of opportunity through intense market engagement.

3. Place:

Our activity in this area will deliver the University's agreed approach to regional engagement and vision to be a strong and global university, with a focus on three specific areas:

3.1) Advanced Manufacturing Innovation District (AMID).

We will engage with local authorities and partners from private and public sectors to develop a cluster of advanced manufacturing activity attracted by the access to innovation and skills that the University can offer. This will involve assisting the growth of existing industry, exploiting new opportunities (for example in nuclear new-build and other large scale infrastructure), and attracting major new inward investments. It is anticipated that the growth of the high value manufacturing sector will lead to wider high quality economic impacts by attracting associated professional services. HEIF funding will be directed towards the development of the Sheffield Science and Innovation Board as a fully functioning thought leadership group, not only for the city region but for the wider ambition of the North.

3.2) Cultural and Economic Vibrancy of Sheffield's City Centre.

The University has an important stake in ensuring that Sheffield's city centre grows as a culturally vibrant and economically thriving urban centre. We will focus on activities that contribute to making Sheffield a good place to start and grow a business, and a city that attracts inward investors alongside creative and entrepreneurial people.

3.3) Wellbeing, fairness and social justice.

The University actively promotes fairness and social justice across our city region, issues that are inseparable from the creation of greater economic strength and high-skill employment opportunities. Our choice of KE activity and partnerships will reflect this. We will contribute significantly to public health within the City Region through participation in industry-led initiatives developed in partnership with public health providers. Staff and students will be supported to engage in innovative activities to support the physical and mental well-being of less advantaged communities.

4. Embedding and Promoting KE:

Appropriate and sustainable structures: Our internal governance structure is driven by our strategic needs, not by funding mechanisms. Through it we will disseminate best practice and ensure institutional coherence and purpose for our KE activities.

KE networks: We will create a network of KE professionals supporting KE across disciplines and with specific industry sectors, in addition to providing bespoke, project specific support.

Empowering People: HR processes have been developed to recognise and reward activities relating to KE, impact and engagement. We provide a program of CPD sessions

around impact, which we continually review and expand to meet the needs of our staff in all disciplines and at all career stages.

Communicating change: We will make it easy for all audiences to identify and understand the range and breadth of our research, and will continue to use targeted communications to show how this research is changing the world for the better. Our PE team will continue to encourage and support our researchers to bring cutting edge research to a range of publics in new and engaging ways.

Student Enterprise, Entrepreneurship and Employability: This activity has been successfully embedded at TUoS and remains an important element of our KE strategy. Our ongoing work in this area will be focused on activity where a direct economic or societal benefit is in sight.

We will develop a pipeline of placement opportunities based on the needs of business. Working in partnership with the students and the host organisation, KE professionals will seek to identify links between our portfolio of placements and the wider University offer, creating further growth opportunities for our partners and supporting the retention of highly skilled graduates in the region.

3. Describe the **evidence base** used to formulate this strategy, including:
 - a. Feedback from economic and societal partners.
 - b. Evaluations and reviews.

Our KE activity is informed by a rolling program of review and evaluation. Some detail of specific activity which informs the strategy set out here is detailed below. More detail on the rolling program of evaluation is given in Section 6.

An internal review of KE delivery was undertaken in 2015/16. This built on the findings of an external evaluation carried out by EKOSGEN which consulted with KE Delivery Teams, academics and external partners receiving KE support. Taking on board the input from these stakeholders, two key changes have been implemented: 1) Pipelines of KE activity are now in place across all delivery teams. 2) We have woven together all our sources of funding to support KE, including HEIF and our portfolio of Impact Acceleration Accounts.

These developments provide confidence that the best of our HEIF resource is directed, at the right time, to the development of partnerships that demonstrate the greatest potential for impact, and ensure that KE Delivery Teams are more output focussed.

Examples of partner feedback:

- HEIF funding has been used to provide specific research support to Chatsworth in the form of a Post-Doctoral Research Associate who has catalogued part of their collection. This has increased their understanding of the collection, allowing them to think about how it could best be used for public engagement activities and exhibitions. "We've been really impressed by the level of support offered by the university. It has exceeded our expectations." This initial project has led to multiple follow-on projects, which attracted the interest of the Yorkshire Country House Partnership. In turn, this led to partnerships with Brodsworth Hall and English Heritage.

- Our Faculty of Science took the decision to direct KE resource towards a specific research group that demonstrated translational potential in the area of food security.

Within a year, a number of significant partnerships have been embedded, including a significant new relationship with Agrii. David Downie, CEO of Agrii got in touch following a visit to Sheffield to say, “we are very aligned and inspired by the way you are both approaching agriculture and companies within the sector. Our integrated approach and brand values of R&D, technical led solutions look well aligned with your approach.”

At the end of 2014, the University agreed a new approach to the commercialisation of IP which allows it to maintain its relationship with IP Group, while at the same time allowing the University to maximise the income and impact possible from other commercialisation routes. This new approach was informed by a year-long review of current best practice, informed by internal consultation but led by a group of individuals drawn from across the sector.

We are being experimental with our approach to IP in order to determine what will work best for our portfolio of activity. For example, in 2016 we commissioned Research Consulting to work with our academic and professional services colleagues in our Faculties of Arts & Humanities and Social Sciences to investigate the potential for IP development with a view to better understanding the types of translational activity that may be possible beyond the more traditional commercialisation route.

Our new approach to IP remains formative, however we are already seeing evidence of improvement. We have reached an all-time high in our licensing income at £2.0M in 2016 to date, increasing from £420k in 2013-14 and £1.4M in 2014-15. We have had 310 IP disclosures from our academics since 2012-13, made 68 agreements and set up 3 spin out companies. We will continue to monitor these metrics with the expectation that our revised approach to IP will continue to show strong performance in this area.

Our approach to ‘Place’ is informed by a long history of consultation and evidence gathering, dating back to the production of the ‘Shaping the Future of the Sheffield City Region Economy’ report in 2010. Since then, we have worked extensively with partners within the City Region and across the N8 to determine where our investment will bring the greatest benefits. Through our Vice Chancellor’s chairmanship of the Sheffield City Region Science and Innovation Board, and his board membership of the LEP we have jointly delivered the report “Preparing for the Northern Powerhouse: Smart Specialisation & the Sheffield City Region”, and have led the delivery of one of the first wave of Science and Innovation Audits (SIA). This work has allowed us to gather an in depth understanding of our local, regional, and Northern economies relevant to our research and innovation strengths, and this informs the focus of our regional engagement program. In addition, our cultural vibrancy activity is developed jointly with partners in the city through our (past) Chairmanship and membership of the City’s Cultural Consortium, and our membership of various other relevant boards and committees in this area (e.g. the City’s Brand Trust).

We are developing similar relationships with local economic partnerships in other areas of the City region where there are mutually beneficial reasons for us to do so.

Our ‘Think Ahead’ framework for the professional development of researchers has offered support to more than 1000 research staff and more than 4000 postgraduate researchers since it was launched in 2012, winning the Times Higher Education Award for Outstanding support for Early Career Researchers in 2014.

TUoS also received the Widening Participation Initiative award in 2014 after the first cohort of 250 advanced apprentices started their engineering careers at the AMRC. These apprenticeships are a first amongst any research-intensive university in the UK

and are employed by global leaders such as Rolls-Royce and TATA, and by local high-tech supply-chain companies.

Our Public Engagement and Impact team was Highly Commended in the Public Engagement and Advocacy category at the Association of Research Managers and Administrators (ARMA) awards held in June 2016, for a hugely successful project called [KrebsFest](#), which celebrated the life and work of Nobel Prize winning academic Sir Hans Krebs.

4. Provide details of the main intended **outcomes and impacts** of your strategy.

The headline outcomes and impacts that are most significant to our strategy, referencing the headings from the PACEC report in October 2015 are set out below, along with our intended measurable indicators set against them.

Considering the effort required to collect information to quantify outcomes and impacts relating to KE activity, our intention is to use existing indicators, either those which form a part of the University's suite of KPIs supporting the delivery of our Strategic Plan (of which Innovation is a key part), or which we are already required to return via e.g. the HE-BCI return. In addition, our intention is to continue a rolling program of external evaluation (every two years), which will help to identify qualitative impact and outcomes with a focus on informing our KE investment decisions going forward. This evaluation program is likely to uncover evidence relating to other outcomes and impacts detailed in the PACEC report, which are not focused on here.

Understanding that the development of metrics for KE is a developing science, we would welcome discussion with HEFCE about our plans in this area.

Skills from KE to understand issues and develop ideas and solutions

This heading would take in the majority of our KE partnerships activity, and our intention is to continue to use the HE-BCI return as our main method of reporting against this. Our focus will continue to be on contract and collaborative research income as a proxy for engagement.

Improved innovation, the development of technology and IP through testing and application to products and processes

Our focus on greater flexibility in how we use our IP will enable us to work easily across the Technology Readiness Levels.

We will measure our performance in this area by tracking the number and value of deals done. A deal could be income from licences or securing investment for a spin out company, for example. We will be measuring the Gross Value Added, the Net Added Value and the cash flow back to the University from these deals.

Shaping and developing regional partnerships, including LEPs, local authorities, and business groups

Performance in this area is likely to be evidenced through qualitative information gathering, as well as through evidence of partnership winning and delivery of projects and funding. Some of this can be evidenced through established reporting mechanisms (e.g. through ERDF reporting of economic outputs). This activity is likely to result in our

achieving two other outcomes from the table: a) Strengthening the innovation system through businesses and regional agencies and b) Support and outputs for high tech and innovative sectors.

5. How is your institutional strategy aligning with **national priorities**, such as:
- Addressing the Government's economic growth and productivity agenda, including spatial dimensions to productivity – local, national & international, and innovation and skills.
 - Priorities of the UK Research Councils and Innovate UK.

Addressing the Government's economic growth and productivity agenda

Through the 'Place' theme, our KE strategy has a focus on working with partners to drive growth and economic renewal at a regional, national and international level, through research & innovation and the development of a skilled workforce. The majority of our delivery against this agenda will be through our Catapult centres, as well as through the development of functional partnerships across the North through our regional engagement function. Some of these are detailed in Section 8.

Locally, a key driver of our economic growth and productivity activity will be the creation of a full-service Advanced Manufacturing Innovation District (AMID) that will provide a hub for the kind of radical innovation that even the largest companies cannot achieve on their own. Here, multinationals and SMEs will work alongside world-leading researchers on new ideas in energy, transport, infrastructure, manufacturing, and health.

Addressing priorities of the UK Research Councils and Innovate UK

As described previously, our review of KE ensures that our focus areas for KE strategy and translational research activities are fully aligned with the priority areas of both the UK Research Council and Innovate UK, and these will be used to prioritise and target the support and funding given to proposals in our KE pipelines.

For example, health, wellbeing and life sciences are addressed by our involvement in the city region's CARE 2050 initiative and the work done within SchARR, while our Energy2050 research institute employs collaboration with industry to turn innovation into working solutions across the energy spectrum, accessing facilities such as the AMRC to deliver innovative energy solutions for any commercial requirement. Emerging and enabling technologies will be developed and translated through KE activities across TUoS, e.g. within Computer Science, Automatic Control Systems Engineering and Sheffield Robotics.

In the area of infrastructure, our Integrated Civil and Infrastructure Research Centre (iCAIR) will enable the Sheffield City Region to redress the balance and translate advanced technology from high-value manufacturing into the low-productivity construction and infrastructure sectors. In addition, our Urban Institute, in partnership with engineers, architects, developers, planners, policy makers and community groups, aims to address the major social, economic and environmental challenges facing our cities.

Plant Production and Protection (P3) and the Grantham Centre for Sustainable Futures will focus on food security and the sustainability of our environment and resources, working with business, politicians and communities to develop and embed sustainable practices and make the case for change.

In addition to the existing high value manufacturing activity carried out within the AMRC and HVM catapult, our new Royce Translational Centre will offer manufacturing companies the opportunity to adopt next generation technology to produce and process metal powders, bridging gaps within the UK supply chain and developing world-leading products and processes that will help re-shore key parts of manufacturing and drive the UK's economy forward.

Management of KE

6. How does your HEI **monitor** and evaluate its progress in knowledge exchange, including assessing outputs, outcomes and economic and societal impacts?

Please describe the policies, procedures and approach you have in place to measure progress, evaluate outcomes and identify lessons learned. Please also outline any key performance indicators (KPIs) that you may have defined. This should include methods to set, track and evidence achievements against intended outcomes and impacts in question 4 above.

Our policies, procedures and approach to measuring progress build upon the foundations established during the previous HEIF period. The PVC R&I is the academic lead for KE and reports into the Vice Chancellor, and all KE (including HEIF) delivery plans are signed off at University Executive Board level. At present, an KE Advisory Group provides quarterly updates and advice relating to the delivery of this activity. Members of the Advisory Group are drawn from across the spectrum of KE activity, including faculty-specific and institution-wide initiatives. This leadership ensures that activity is given prominence at institutional, faculty and departmental level.

All KE activity is coordinated by a central team, which sits within Research and Innovation Services (R&IS). The Head of Research Partnerships works closely with, and as an advisor to, UEB and is responsible for efficient and effective use of all KE funding, including HEIF, IAAs, HEFCE Catalyst funding and, where relevant, regional growth funding. This team promotes, publicises and administers the spend, as well as reviewing and reporting on success, and organising stakeholder events. This team also manages our rolling external evaluation program that commissions a review of our KE activity every two years, with the next evaluation currently scheduled for 2017.

Individual KE Delivery Teams have established their own baselines and methods for monitoring progress and evidencing success in line with their individual objectives and environments. The Faculty of Engineering, for example, have an objective to raise industrial income from £4m to £7m per annum by October 2018, whereas the Faculty of Arts and Humanities, focussing on their portfolio of strategic partnerships, will monitor the number of partnerships and volume of projects taking place within each.

While different methods and tools are used to monitor progress across our KE ecosystem, we are embedding a common approach and the use of Salesforce (CRM) to monitor KE activity within our pipeline process. When an activity goes 'live' we will capture and share the anticipated:

- Impact type (e.g. economic, policy, cultural, health and wellbeing or environmental)
- Location and reach
- Indicators of the benefits expected for:
 - the primary investigator,
 - the partner (where applicable),
 - third parties

When the project is drawing to a close we will determine outcomes and impact achieved, and potential for future impact against the baseline information gathered above and schedule reviews to monitor progress.

We are mindful that this system can only track the information that we manage and, therefore, we will ensure that we maintain strong relationships with partners and all areas of our KE ecosystem to ensure that we capture the ongoing impact from our KE activities.

With regard to the main intended headline outcomes and impacts that are described in question 4, Salesforce will again provide the primary platform for data capture, in conjunction with more in-depth conversations with PIs and partners. Our commercialisation team has existing systems and procedures in place to capture the volume and value of its activity.

7. How do you propose to increase efficiency and effectiveness of KE over the funding period?

Please consider the following areas in your response:

- a. Internal: building or streamlining capacity and coordination.
- b. External: collaboration, including the use (or not) of shared or pooled services.
- c. Use of good practice materials or networks.
- d. Disinvesting and focusing on priority areas of KE.
- e. Building on past successful approaches.
- f. Any other areas.

Internal efficiencies: We have streamlined our approach to KE with investments focusing on the priority areas described previously using the interventions that have been shown to be most effective. Pipelines of potential activities are used as a basis for matching best resource to areas of research excellence in an integrated manner and making disinvestment decisions. An example of this in practice shows HEIF-funded Business Development Managers creating a pipeline of potentially high-impact research which can be matched to available funding streams, e.g. RCUK Impact Acceleration Accounts, often drawing on a mix of resources during a project's journey from research to impact. Researchers and KE professionals benefit from a suite of KE-related training, predominantly delivered centrally.

Partnership Management Information: HEIF funding has allowed us to pilot the use of Salesforce as a CRM tool for KE activity across the University. This system has been built 'ground up', connecting those keen to use the facility. Our intention is to roll this system out University wide over the next five years, to enable us to proactively track and manage our interactions with partners across the institution. Salesforce will also be used to monitor aspects of KE performance, and ultimately increase efficiencies in the system. Other management information and data to support partnerships are provided centrally by R&IS.

Leverage: £3.10m of KE funding invested between 2011/12 - 2014/15 has leveraged an additional £6,290,768 of private sector investment and grant funding; with every pound (£) of KE funding generating an additional £2.02.

We will continue to use KE funding to leverage additional KE resources or combine funding from different sources to deliver added value for funders. For example, we have a track record of securing Medical Research Council (MRC) Confidence in Concept and Proximity 2 Discovery monies. Both schemes have employed institutional HEIF contributions totalling circa £50k to leverage an additional £450k from the MRC. Our City Vibrancy team uses internally allocated funds to leverage further funds to deliver activities at greater scale; in 2015/16 £100k of HEIF funding was used to leverage an additional £600k in external funding.

Internal networks and best practice: Governance and administration of KE is coordinated centrally by the Research Partnerships and Engagement (RPE) team in

R&IS, which promotes the sharing of best practice across TUoS. During 2016/17 the KE Think Tank mentioned in section three will be embedded, ensuring that this best practice can be shared in the most efficient and effective way.

External Networks and best practice: TUoS is an active member of the following networks for KT professionals:

- Russell Group KT directors
- N8
- YU KT Directors
- Auril
- Praxis Unico,
- White Rose

TUoS also supports the co-delivery of a broad portfolio of KE projects with other HEIs, which are detailed in the following section, and actively shares best practice with other HEIs, for example the findings from our recent HEIF-funded study of commercialisation in the Arts, Humanities and Social Sciences were presented and discussed at a recent Oxford University Innovation workshop.

8. Related to efficiency and effectiveness in the institutional or professional infrastructure for KE (not academic), please set out:

a. The **total number** of UK HEIs with which you **collaborate** in KE

We engage with many HEIs. Since August 2013, we have worked with 86 UK HEIs for new research grants.

The total number of research grants secured since 2013 shows that, on average, a quarter of projects have an HEI partner on board (includes UK and international partnerships):

2013-14: 199 of 763 projects with HEI partner (26%)

2014-15: 191 of 717 projects with HEI partner (27%)

2015-16: 205 of 828 projects with HEI partner (25%)

The vast majority of these projects involve an element of KE via their Pathways to Impact. Specific KE collaborations with HEIs are discussed further in 8b.

b. Outline your strategy for maximising **collaboration** with other UK HEIs as the means to achieve greater efficiency and effectiveness in KE. Describe specific, major collaborations that are particularly significant to delivery of your strategy

Local HEI Collaboration

Our strategy to lead development within the Sheffield City Region involves close collaboration with Sheffield Hallam University. This began through the Local Enterprise Partnership and has extended to local entrepreneurial engagement mechanisms like the Sheffield Managing Director's Club (<http://www.mdclub.org.uk/>) and the Science and Innovation Board (<http://www.sheffield.ac.uk/business/supporting-business/sib>). We will deliver the Sheffield Innovation Program (SHIP), including the promotion of SME engagement with the new capital translational research facilities being developed by the

two universities. We will continue with our joint delivery of the RISE Graduate internship program with Creative Sheffield and the Growth Hub.

National HEI Collaborations

Our bid to lead one of the first five Science and Innovation Audits relied on collaboration with Lancaster University to extend our scope to a much broader Advanced Manufacturing Corridor.

Our AMRC and Nuclear AMRC provide two of the seven centres offering world-class equipment, expertise and collaborative opportunities as part of the High Value Manufacturing Catapult.

TUoS is a partner on the Transport Systems Catapult, driving global leadership in Intelligent Mobility, promoting sustained economic growth and wellbeing through integrated, efficient and sustainable transport systems.

TUoS is the lead institution for Advanced Metals Processing which forms part of the Sir Henry Royce Institute for Advanced Materials, a collaboration involving six other HEIs (Cambridge, Manchester, Imperial, Leeds, Oxford and Liverpool). A recent investment of £8m will be used to develop a translational research centre that will form part of the AMID.

We actively pursue collaborations through our membership of the N8, White Rose and Yorkshire Universities consortia, in KE as well as research.

N8: Our Plant Production and Protection (P3) research group is part of a wider N8 collaboration around Agrifood and is planning to host a large-scale stakeholder engagement event under the N8 banner.

In the area of Health, we collaborate with HEIs through the Yorkshire and Humber Academic Health Science Network and the Northern Health Science Alliance (which represents the N8 Universities and their associated NHS Trusts). Both of these groups work well together to strengthen industry links and collaborations.

White Rose: Our consortium with York and Leeds furthers knowledge exchange in two ways:

1) White Rose Doctoral Training programs (covering Arts & Humanities, Mechanistic Biology and Social Sciences) are devoted to recruiting and training high-potential students to be leaders in their fields, to the benefit of the economy and society.

2) White Rose University Press (<http://universitypress.whiterose.ac.uk/>) and the White Rose Open Access repository (<http://eprints.whiterose.ac.uk/>) make cutting edge research readily available to the widest possible audience, in line with HEFCE's stated belief that open access will benefit economic growth driven by publicly funded research and increase public understanding of research.

Yorkshire Universities brings together the major HEIs in the Yorkshire and Humber region. YU KT Directors have scoped a joint response to the problem of SME scale-up. Building on our regional support for SMEs with Sheffield Hallam, we will investigate opportunities to support this YU KT objective.

Section B: Use of HEIF 2016-17 allocation and future HEIF priorities

9. Please complete Table A of Annex A2 (available to download as an Excel file at www.hefce.ac.uk/pubs/year/2016/201616/) with the attribution of HE-BCI **outputs** to infrastructure categories, and to HEIF **inputs**.

10. Please complete Table B of Annex A2 (available to download as an Excel file at www.hefce.ac.uk/pubs/year/2016/201616/) with the breakdown of how you are using HEIF in 2016-17 by expenditure and infrastructure categories.

11. Please add any explanatory notes here on how you have completed Table A and B that will help in aggregating your information with that received from other HEIs to form a sector-level database and overview.

We do not currently capture the data needed to populate Table A, informed estimates have therefore been provided.

Our approach has been to consider each infrastructure category in turn and reflect on the associated past performance from our HE-BCI return. We have cross referenced this data to the areas of our KE ecosystem in order to reflect the percentage of activity that we believe underpins the associated performance for each category.

Our HE-BCI outputs do not measure everything that HEIF achieves as indicated in our response to question 4.

12. How is your HEIF 2016-17 allocation being used to deliver the strategy set out in Section A, and what are your anticipated **priorities** for use of HEIF in future years?

Our HEIF funding is used to support our integrated KE ecosystem. It is this HEIF funded foundation that provides a robust framework through which we can flexibly and responsively channel the various Impact Acceleration Accounts (IAAs) and other impact funding our institution receives to cater for a wide range of relationships and partners.

For 2016-17, HEIF is invested in our 4 key areas of activity as follows:

- 64.1% of our HEIF allocation will be used to develop Partnerships
- 6.2% will be invested in IP activity
- 6.5% will be used to develop 'Place'

The remainder of the fund (23.2%) will be used to embed and promote KE throughout the institution.

Our anticipated priorities for the use of HEIF in future years will follow the same strategic objectives as are set out for 2016/17, working across our KE ecosystem to direct the best of our resource to the best of our activity.

Section C: Additional information

13. Please summarise the institutional equality and diversity policies that relate to knowledge exchange activities, and provide web links to any published policies.

The University is committed to eliminating all forms of discrimination and to promoting equality of opportunity and good relations between people of different groups in all of its

functions and activities. Arrangements for achieving this are set out within the University's Equality and Diversity strategy and action plans – Excellence Through Inclusion – and progress is reported regularly to the University Council via the Equality and Diversity Board (EDB) and will be linked to published equal opportunities action and implementation plans as necessary.

As a University, we understand the importance of creating a vision where diversity and inclusion are valued by all. There is no doubt that we can only achieve real long-term success by including people – staff, students, suppliers and business partners - from all backgrounds and all sectors of society, and ensuring they are part of our University community, valued for their contribution and able to flourish and succeed.

Equal Opportunities Policy and Code of Practice for Staff:

<http://www.shef.ac.uk/hr/az/eopolicy>

Equality & Diversity Strategy: <http://www.sheffield.ac.uk/hr/equality/strategy>

14. Please give any additional comments on any matter related to KE strategy and/or the use of HEIF.

Headline statements:

Our priority objectives for KE are tightly woven into the inter-connected themes of our Strategic Plan.

TUoS supports an integrated KE ecosystem in which there is 'no wrong door' for potential partners. We have used HEIF funding to establish an effective and robust platform to flexibly allocate and apply the different IAAs and impact-specific funding managed by our institution, which allows us to cater for a wide range of relationships and partners.

This integrated ecosystem is informed by a rolling program of review and evaluation.

Our strategy is to focus on the key research strengths where we are acknowledged global leaders; to deliver an increase in high quality international research partnerships; and to better promote new initiatives for early career researchers (ECRs). We will identify and develop large-scale partnerships with tier-one organisations in line with our strategic priorities and shared values.

We will enhance our strengths locally and globally to carry out excellent research that makes a direct difference for communities near and far; and to drive the regional economy through our research-led Advanced Manufacturing Innovation District (AMID), and transform the UK's approach to infrastructure, high value manufacturing, and employer co-designed and funded apprentice degrees.