

University knowledge exchange for economic growth

A framework for guiding understanding
and evidencing success

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The views and arguments expressed in this report are of the authors and do not represent the positions of organisations or groups which the authors are currently, or were previously, members.

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ABOUT UCI

The Policy Evidence Unit for University Commercialisation and Innovation (UCI) is based at the University of Cambridge and aims to support governments and university leaders in delivering a step change in the contributions universities make to innovation and economic prosperity – nationally and locally – through their commercialisation and other innovation-focused knowledge exchange activities and partnerships.

UCI seeks to improve the evidence base and tools available to key decision makers in public policy and university practice as they develop new approaches for strengthening university research-to-innovation pathways, with a particular focus on commercialisation. To do so it draws on the latest advances and insights from both academic research and policy practice, as well as lessons learned from experiences in the UK and internationally.

The Policy Evidence Unit is funded through a generous grant from Research England to work in close partnership with them to develop next generation data and metrics able to better capture the nature, health and performance of university knowledge exchange.

Find more about our work: [UCI Policy Evidence Unit](#)

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1 Introduction

This briefing note sets out where universities have the potential to contribute to economic growth through their portfolio of knowledge exchange (KE) activities¹. The briefing note first clarifies what we mean by economic growth before identifying key drivers and enablers. It then presents a framework for identifying where universities could be expected to contribute to economic growth through KE, distinguishing four areas:

- Commercialising and scaling knowledge and technologies to create new sources of wealth
- Supporting companies to innovate, compete and scale for the benefit of the UK
- Enabling people to participate and engage productively in the economy
- Strengthening growth drivers and easing bottlenecks that power place/sector competitiveness to better enable organisations to innovate, compete and scale for the benefit of the UK

Based on this framework, we suggest key success statements about what good could look like in each of these areas. The final section identifies a suite of potential *outcome-focused* indicators that could be developed to capture progress. We have attempted, where possible, to leverage existing national datasets, although this was not possible in all areas of framework. Furthermore, the indicators suggested aim to capture the contributions of university KE activities to growth, and not the impacts of particular funding programmes in enabling these contributions.

2 Defining economic growth

Economic growth typically refers to increases in the size of the economy. It is often measured as increases in the Gross Domestic Product, which captures the monetary value of final goods and services produced in the country². In recent years, however, greater attention is being paid to wider forms of growth, not least:

- **Inclusive growth**, ensuring a fairer distribution of the benefits of growth
- **Sustainable growth**, ensuring growth meets the needs of present generations without compromising the ability of future generations to meet their own needs
- **Resilient growth**, ensuring the pattern of economic expansion can preserve the productive capacity of the nation, limit asset losses caused by shocks and disruptions, and adapt and engage in system transformation in anticipation of future shocks

¹ The framework builds on insights from key UCI studies, including not least Ulrichsen, T.C., Kelleher, L., Roupakia, Z., 2023. Knowledge Exchange Funding Review: Insights from a review of the literature. Policy Evidence Unit for University Commercialisation and Innovation, University of Cambridge, Cambridge, UK; and Kelleher, L., Ulrichsen, T., 2025. An introduction to research and innovation policy for regional growth.

² For a good overview of the economic growth debate, see <https://lordslibrary.parliament.uk/economic-growth-conditions-discussion-and-debate/>

3 Drivers of growth

Economic growth is ultimately driven by increases in the number of people engaging in the economy and the number of hours being worked (**labour participation rate growth**), and increases in the efficiency and effectiveness with which the economically active population (and other factors of production i.e. natural resources and capital assets) are able to produce economic outputs (**productivity growth**). Ensuring this growth is inclusive, sustainable and resilient requires attention to the synergies and costs associated with each of these additional priorities.

While many economists believe that economic growth over the long-run is driven largely by increases in productivity, given the UK currently faces both a productivity crisis and a labour participation crisis, we suggest that our framework attempts to capture how universities can contribute, through KE to both of these drivers.

4 A competitiveness lens on driving economic growth

Delivering productivity growth requires that the sectors, places and organisations across the UK become and remain competitive – domestically and crucially, internationally – in order to be able to attract and retain the investment, capital, talent, and companies and other organisations necessary to not just create value within the UK *but also* anchor it here over the longer-term for the benefit of the UK public.

At the individual level, it also requires people to become more innovative and productive and find new ways of enabling organisations and systems to become more competitive. It will also require significant efforts to increase participation in the labour market, enabling more people to contribute to economic activity in the UK.

This **competitiveness** – of sectors, places, and organisations – provides a valuable lens through which to examine where and how universities can contribute to sustainable, resilient and inclusive economic growth through KE. Crucially, given the scale and complexity of the UK economy, to deliver a step-change in growth at the national and regional levels, we need to increase competitiveness across different types of sectors, including:

- **Frontier industries** that will transform economies, provide strategically important technologies and products, and create significant opportunities for wealth creation.
- **Foundation industries** that provide critical inputs into key industries and essential infrastructure for the economy to function well.
- **Legacy industries** that typically represent a significant proportion of the economy and are in need of upgrading and diversifying to remain competitive and increase productivity.
- **The public (and third) sector** delivering public and essential services (e.g. healthcare, education, transport) that allow nations, sectors and places to develop / attract and sustain the necessary workforce, and companies and other organisations to operate efficiently and effectively to produce, deliver, and trade their economic output.

5 Dimensions of competitiveness where university knowledge exchange could contribute

Strengthening and sustaining the competitiveness of key sectors of the UK economy, and of places across the nations and regions of the country, requires attention to different levels of the system. This helps us to isolate different areas where universities could contribute to delivering increased economic growth through KE, and identify different types of indicators of success.

Commercialising and scaling knowledge and technologies to create new sources of wealth

The **entrepreneurial dynamism** of an economy, the ability produce knowledge, the capacity and capability to **commercialise and scale** these inventions and ideas into successful innovations delivering value in the economy, and the ability of nations to ensure these innovations are **adopted and diffused** more widely are known to be important drivers of economic growth over the longer term, and of the competitiveness, growth and survival of companies³.

Innovations are required in many areas, including not least in products (goods and services), production and business processes, enabling / platform technologies and innovation tools, organisational approaches (including strategy, business models, supply chains). In addition, we must also recognise that innovations are required not just in frontier industries of the private sector, but also in legacy sectors and in the foundational economy – including those focused on delivering public services and public and critical infrastructure – which typically employ significant numbers of people at both the national level and in specific places. These legacy sectors typically face significant barriers to innovation and resistance to change.

We must also recognise that the route to commercialising and scaling of emerging technologies may be through different types of companies, from startups and spinouts to large companies leading value chains, to small and medium sized enterprises in supply chains. It may involve different types of KE ranging from licensing agreements; further research to tackle emerging technical constraints; ongoing access to specialised facilities and equipment; access to suitable premises to drive development and growth; ongoing consultancy to solve practical problems that arise as the technology and company develop; and, workforce development, both technical and managerial.

³ See e.g. Audretsch, D. B. (2014). From the entrepreneurial university to the university for the entrepreneurial society. *The Journal of Technology Transfer*, 39(3), 313–321 and Bettis, R. A., and Hitt, M. A. (1995). The New Competitive Landscape. *Strategic Management Journal*, 16, 7–19.

Supporting companies to innovate, compete and scale for UK benefit

The ability of companies to innovate, compete and scale successfully is linked to their ability to (1) build up and secure the necessary resources (either internally or through acquiring external resources / collaborating with partners) to enable them to develop and produce their products; and (2) develop the necessary *strategic and operational capabilities* to combine these resources effectively to deliver their products into the market, access key markets, and create and respond to emerging opportunities and threats.

- **Key assets and resources** typically include knowledge, technology and IP; human capital (skills, knowledge and expertise of their staff); financial resources available for investment; data/ICT infrastructure; networks and alliances; physical infrastructure & tools; production and business processes; strategy and business models; supply chains; and other intangibles.
- **Key strategic and operational capabilities** typically include those enabling them to identify and seize new opportunities, respond to threats, and transform their organisations to create new sources of competitive advantage (including developing new business models); those that enable them to be entrepreneurial, collaborate, absorb external knowledge, to solve problems, and successfully deliver and commercialise innovations; and production-focused capabilities).

Enabling people to participate and engage productively in the economy

With the economic participation challenges facing the UK acting as a drag on economic growth, a key priority must be getting more people back into the labour market contributing productively to the economy. This may need the interventions to strengthen a range of factors including, for example, the level and alignment of skills and experiences with available job opportunities; attitudes, mindsets and ambitions around work and delivering value to the economy; the availability of (appropriate) opportunities for productive and fulfilling work; flexibility in the labour market (e.g. around childcare); the health and wellbeing of individuals and their families/dependents; empowerment and participation; and cultural awareness and attitudes towards work and perspectives on sustainability. Effective public services and infrastructure and the contribution of the third sector are likely to be critical across all of these areas.

In addition to taking steps to increase participation in the labour market, strengthening of human capital – the skills, knowledge and experiences of individuals in enabling them to contribute productively to the economy – is critical for driving increases in competitiveness and productivity, and hence economic growth. In addition to developing and **upgrading skills and driving continuous learning**, efforts to strengthen human capital should focus on ‘**capital deepening**’; equipping workers with more and better tools, machines and technologies to deliver their roles. This will require investment both the development and adoption/diffusion of new technologies and infrastructure at both the organisation and system level.

Strengthening growth drivers and easing bottlenecks that power place/sector competitiveness to better enable organisations to innovate, compete and scale for the benefit of the UK

The organisations and individuals involved in enabling, shaping, and producing the goods and services that generate economic value (large companies, SMEs, investors, universities & research institutes, technology development organisations, regulatory bodies, public agencies etc.) operate within a wider system (for example a sector and place) which is shaped by a set of **institutions** ('rules of the game'), framework **conditions**, system-wide **resources and assets**, and **system-level capabilities**. Collectively, these shape what a company and/or individual is able to do and build within the system, how they can partner, collaborate and trade (through both market-based transactions and wider linkages), and how effectively and efficiently they can create and capture value to compete in the market domestically and internationally.

- Availability of **enabling resources** within a specific sector/place, which companies are able to access to drive their operations and their ability to become competitive both domestically and internationally. These include, for example the availability of and access to existing knowledge and technologies; funding/investment; education and skills; translational research, development and innovation infrastructure (e.g. facilities, equipment, tools, expertise); and local or sectoral-based networks and alliances.
- A sectoral / regional environment with **conditions** conducive to enabling companies and others to innovate and compete successfully. These include, for example, the degree of **clustering** and the potential for agglomeration economies, access to **global markets**, the economic and social **stability** of the sector or place, the availability of well-functioning **public services and infrastructure**, and **quality of life** and cultural amenities in the area.
- Effective **system-wide institutions**, which set the 'rules of the game' and shape the choices and behaviours of both organisations and individuals. This can include e.g. government policies, public procurement practices, legal/IP regimes, regulations and standards, cultural norms
- **System-level capabilities and strategic directions**, for example through providing / supporting leadership and governance within places/sectors; supporting cluster building; building shared visions and mobilising communities to action; working collectively to attract inward investment, talent and companies to the region/UK; strengthening innovation and entrepreneurial capabilities across the system; and in helping to seed, shape and legitimise emerging markets.

Strengths, weaknesses and bottlenecks in these areas will shape the ability of those operating within the sector/place to attract and retain the resources and capabilities necessary to enable companies and others to innovate, compete and scale, creating and capturing value for the benefit of the region and the UK.

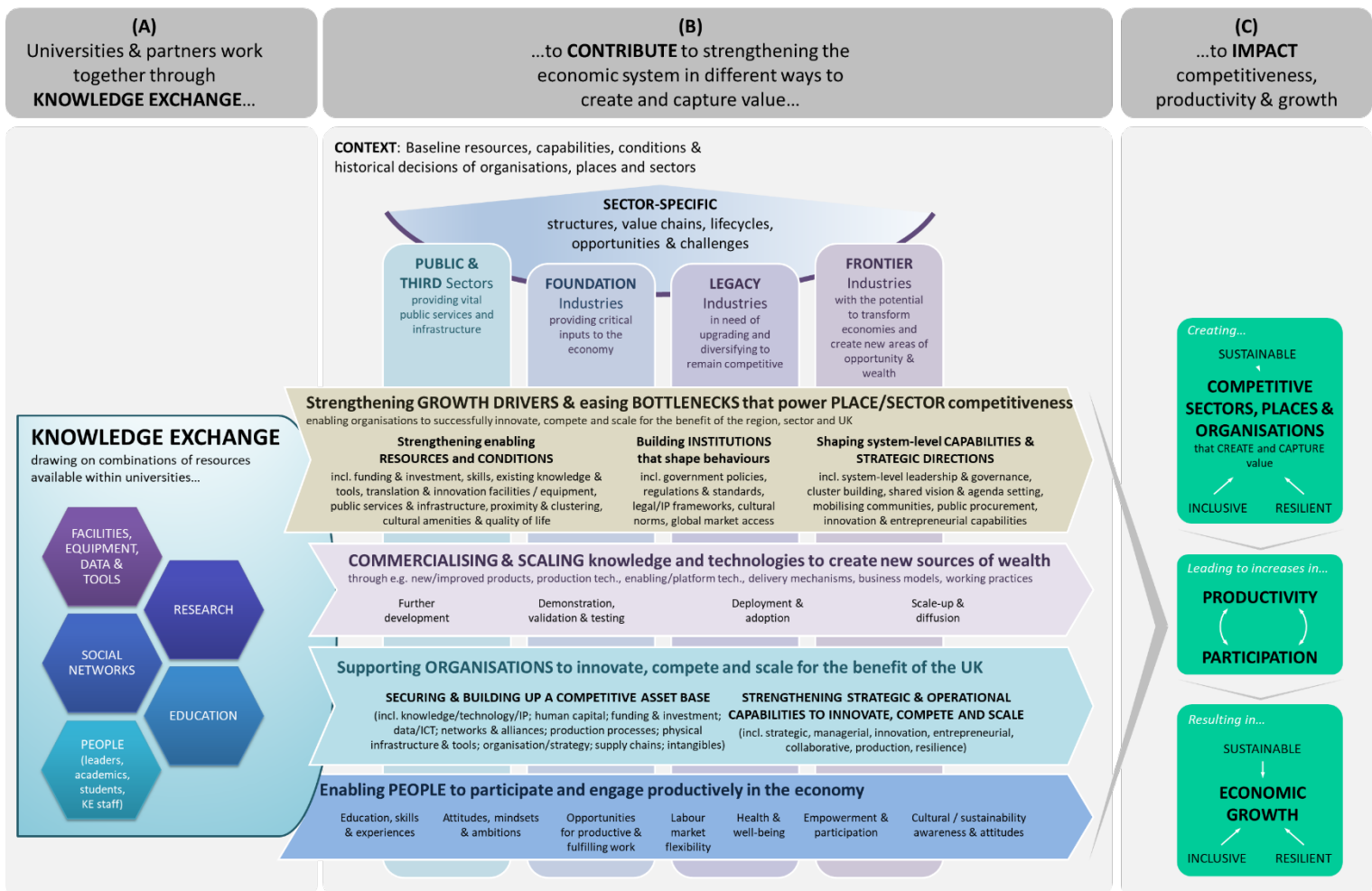
The importance of context and existing conditions

We must also acknowledge that the potential for universities to contribute to economic growth through KE will be shaped critically by the context within the KE is taking place. This includes factors such as the **baseline conditions, resources and capabilities** of the sector and place; the **constraining effects from historical decisions** and investments, the industrial **structure and economic diversity and sophistication** of the particular sector or local economy being targeted by the KE; the **economic and socio-political environment** of the local economy etc.

6 An economic growth framework for university knowledge exchange

Figure 1 brings together the key dimensions and drivers of competitiveness, and the routes to sustainable, resilient and inclusive economic growth through delivering more competitive sectors, places, organisations and people.

Figure 1 An economic growth framework for university knowledge exchange



It identifies four key layers through which universities, working with their partners, can deliver KE that focuses on contributing to:

- **TECHNOLOGY-APPLICATION LAYER: Commercialising and scaling knowledge and technologies to create new sources of wealth** – particularly through emerging technologies and knowledge leading to breakthrough and incremental innovations across products, processes, tools and organisational approaches. It also includes working with partners in the economy to accelerate the widespread adoption and diffusion of emerging technologies.
- **ORGANISATION LAYER: Supporting companies & other organisations to innovate, compete and scale in the UK** – by working with partners to help them build up and access new assets and resources (including technologies and tools, human capital, physical infrastructure, data/ICT, networks, investment), and develop the necessary strategic and operational capabilities to successfully innovate, compete and scale for UK benefit.
- **PEOPLE LAYER: Enabling people to participate and engage productively in the economy** – including upgrading skills and driving continuous learning (including their ability to leverage new tools, machines and technologies to become more productive), shaping mindsets and ambitions around work, improving people’s physical and mental health and well-being, and developing interventions to ensure people’s skills and experiences are aligned with opportunities to contribute productively to the economy.
- **SYSTEM LAYER: Strengthening growth drivers & easing bottlenecks to power place/sector competitiveness**, attracting and retaining the resources and capabilities needed to enable organisations to create and capture value for the benefit of the region and the UK. This includes through working to build up and strengthen:
 - The **enabling resources and conditions** of the place/sector, by working to develop and facilitate access to translational research and innovation infrastructure and tools, funding and investment, global markets, existing knowledge, effective public services, and cultural amenities.
 - The **institutions** that shape behaviours and actions of individuals and organisations including by helping to inform government policies, regulations and standards, legal/IP frameworks, and cultural norms.
 - The **system-level capabilities and strategic directions** for example through providing / supporting leadership and governance within places/sectors, supporting cluster building, building shared visions and narratives, mobilising communities to action, and strengthening innovation and entrepreneurial capabilities.

It also distinguishes between four key types of sectors, each facing different types of innovation and competitiveness challenges: frontier industries, legacy industries, foundation industries, and the public sector. Each of these will have their own structures and dynamics, value chains, opportunities and challenges, and conditions.

These differences, combined with the available resources and capabilities of the university (or group of universities) and their partners, shape where and how universities can contribute through KE to helping sectors, places and organisations become more competitive, and to helping people become more engaged and productive in the labour market. Key resources within the university include not least:

- Their **research portfolio** (both disciplines and types/stage of research)
- Their **education and learning** portfolio
- The variety of **facilities, equipment, data and tools** available on campus and through partners
- The **people** that inhabit the university, who have built up unique and valuable knowledge and expertise, and often have valuable **social and professional networks** that extend into different types of organisations, (parts of) sectors, and regions, both here in the UK and internationally.
- The **support and resources available to enable and facilitate** the development of productive KE interactions with partners

In each of these layers, and with each of these sectors, universities have much to contribute through knowledge exchange, either directly by working with partners to develop solutions to meet specific needs and opportunities; or more indirectly by helping partners explore where and how they can intervene to strengthen the economic system. Each of these areas could benefit from many different forms of knowledge exchange from collaborative and contract research, to spinouts and IP licensing, training, access to facilities and equipment, consultancy, networks and others.

7 Towards indicators of success

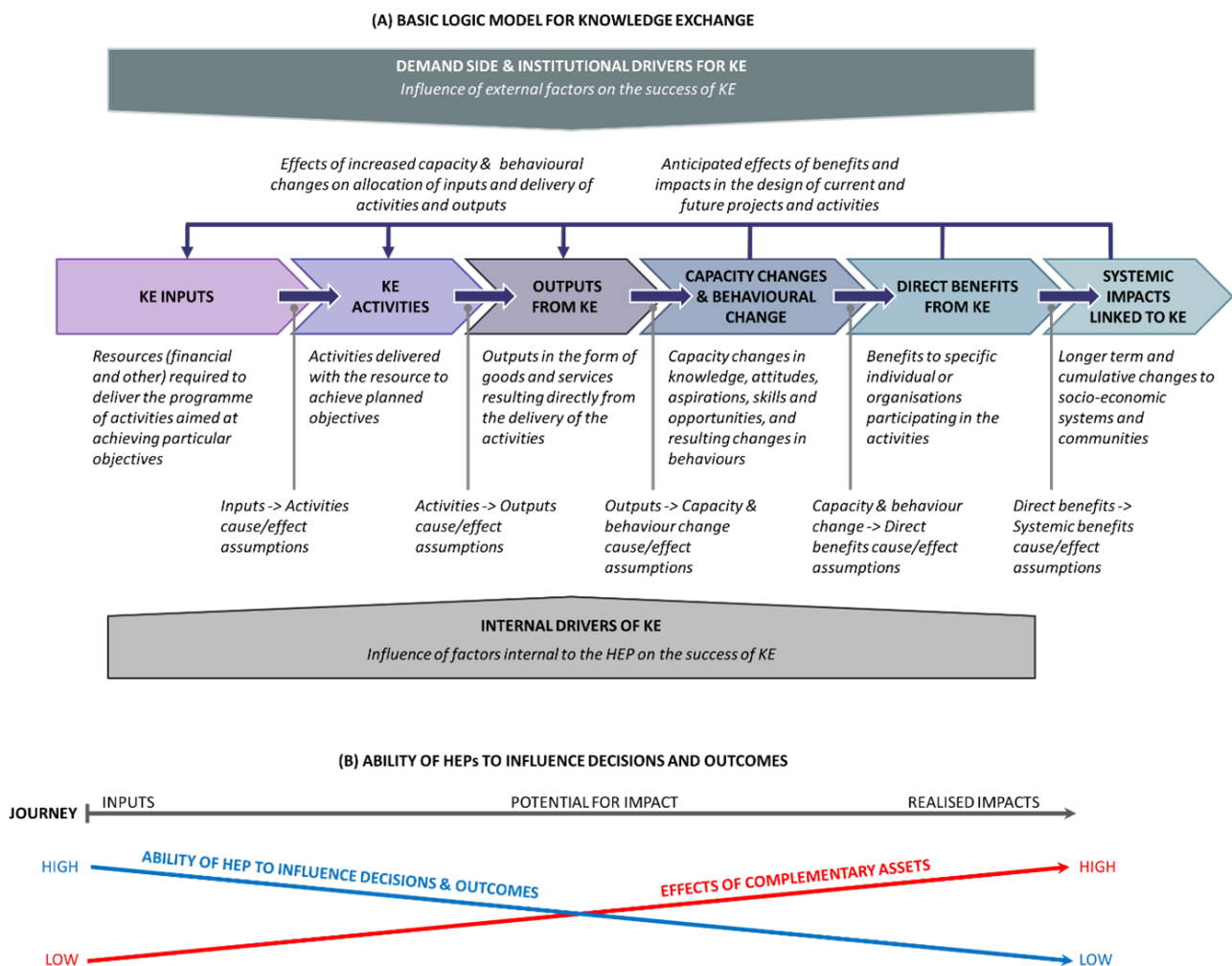
For each layer of the competitiveness challenge we can now develop specific statements that aim to capture what success could look like in terms of whether university KE activities are delivering meaningful contributions to delivering the ambition to increase economic growth. From there we can then identify potential indicators that provide signals and measures that successful outcomes are being realised. Importantly, in developing these statements and indicators, **we must be mindful of what we can and should expect from universities, and where their ability to influence outcomes has largely diminished.**

Our approach is guided by a logic model-based framework for KE developed in Ulrichsen et al. (2023)⁴. These types of frameworks – rooted in evaluation practice – can help us think about how to measure success and performance in KE. This generic logic model for KE (Figure 2) distinguishes between the **inputs** into the process of forming and delivering **KE activities** that seek to exchange knowledge with the aim of delivering benefits to the economy and society; the **‘outputs’** that directly emerge from these activities (e.g. courses provided, consultancy projects delivered, sponsored research projects delivered, patents granted, spinouts created etc.); the

⁴ Ulrichsen, T. C., Kelleher, L., & Roupakia, Z. (2023). *Knowledge Exchange Funding Review: Insights from a review of the literature*. Policy Evidence Unit for University Commercialisation and Innovation, University of Cambridge.

effects these have on the **changes in the knowledge, attitudes, aspirations, skills and opportunities** of individuals and organisations (e.g. academics, students, KE professionals, recipients of KE, as well as HEPs as organisations) to deliver KE; the **direct benefits** on the individuals and organisations engaging in the KE activities (i.e. new or improved functionality of the products or services, new ways of working, changes in their capabilities and capacities to deliver on their organisations objectives etc.); and the **longer term, cumulative and systemic benefits** arising from these direct individual-level benefits.

Figure 2 Framework for investigating the success of KE for performance optimisation



Source: adapted from Ulrichsen, T. C., Kelleher, L., & Roupakia, Z. (2023). *Knowledge Exchange Funding Review: Insights from a review of the literature*. Policy Evidence Unit for University Commercialisation and Innovation, University of Cambridge.

Note that beyond outputs we deviate somewhat from standard evaluation logic model structures that typically seek to isolate intermediate and longer-term outcomes and then final impacts. Given the nature of KE and the long and complex journeys that can often exist between delivering KE activities and impacts being realised in the economy and society – often requiring efforts and resources from many other organisations along the way, building on previous work, **we focus our attention on ‘trajectory measures’** rather than attempting to capture the long-

term systemic impacts linked to KE activities and investments⁵. In doing so, the focus turns to determining the ability of knowledge users and HEPs to develop and nurture effective interactions to (co-)develop, exchange and diffuse knowledge, and whether the knowledge exchanged is being utilised by partners in productive ways that will likely deliver socioeconomic impacts. This is also consistent with approaches being adopted by the European Commission which argues that, **for outcome indicators to be insightful and actionable for policymakers and funders, they should be sufficiently responsive and attributable to the intervention**⁶. Indicators that are less responsive are still valuable, but more as ‘context’ indicators.

To operationalise this approach within our logic-model framework, we follow insights from Mayne (2015) and seek to isolate those more direct benefits realised by the partners involved in KE, and then the longer-term, cumulative and systemic benefits. It also makes explicit the benefits of KE on the development of longer-term capacity and capabilities, and changes to the behaviours, of those involved for delivering long-lived streams of benefits beyond those that were enabled by the specific KE project.

We believe this provides a more intuitive understanding of the development and realisation of positive changes resulting from KE rather than focusing specifically on the temporal evolution of benefits. In addition, the distinction between direct benefits to the particular KE partner and systemic benefits provides a more explicit recognition of the potential benefits from concerted and sustained KE activities in helping to build, strengthen, and nurture their local and regional ecosystems and economies as well as key sectoral and technology-driven innovation systems.

Building on this approach, the following sub-sections provide suggested success statements for each of the key dimensions. Following this, potential indicators are suggested. For each success statement and suggested indicator we attempt to identify the part of the logic model on which it provides information, distinguishing between outputs, outcomes (capacity and behaviours), outcomes (direct benefits to those involved), and outcomes (systemic benefits).

Wherever possible, we have attempted to draw on existing data sources, recognising that many have limitations in being able to inform an understanding of the functioning and contributions of KE in enabling key pathways towards economic growth. **In some areas we do not believe there are sufficiently focused (or any!) data available that could provide such insights**; here we suggest potential opportunities for new data collections.

Finally, we recognise that we have suggested a relatively large number of indicators to ensure cover key areas where we would expect signals of the role and importance of KE in driving growth to be observed. However, we recognise that it may be necessary to reduce the number of indicators to develop a system of capturing and tracking these effects more tractable.

⁵ Following Ulrichsen, T. C., Kelleher, L., & Roupakia, Z. (2023). *Knowledge Exchange Funding Review: Insights from a review of the literature*. Policy Evidence Unit for University Commercialisation and Innovation, University of Cambridge.

⁶ Barca, F., & McCann, P. (2011). *Outcome indicators and targets, Towards a new system of monitoring and evaluation in EU cohesion policy*. Available at https://ec.europa.eu/regional_policy/sources/evaluation/performance/outcome_indicators_en.pdf. Accessed on 20th October 2025.

7.1 Commercialising and scaling knowledge and technologies to create new sources of wealth

COMMERCIALISING & SCALING knowledge and technologies to create new sources of wealth

through e.g. new/improved products, production tech., enabling/platform tech., delivery mechanisms, business models, working practices

Further
development

Demonstration,
validation & testing

Deployment &
adoption

Scale-up &
diffusion

7.1.1 Success statements

University commercialisation and wider knowledge exchange efforts enable and support:

- ...new technologies and knowledge developed within universities being further developed into applications (products, processes, organisational and other innovations) by private, public and third sector organisations that are gaining commercial traction / being deployed in the market [outcome – direct benefits]
- ...innovations (products, processes, organisational, other) based on inventions and knowledge developed within universities gaining widespread adoption within sectors and societies [outcome – systemic benefits]
- ...inventions and knowledge developed within universities unlocking significant new fields of applications and innovations [outcome – systemic benefits]

7.1.2 Potential indicators

Indicator	What does it tell us	Type of indicator	Potential sources
KE income to universities for collaborative and contract research (absolute value and normalised, change over time) <i>Adjust for trends in wider economy/industry</i>	Perceived minimum value by partners of their KE activities with universities focused on (co-)developing new ideas and technologies to solve challenges / specific problems of interest / need	Outcome – direct benefit	HEBCI
Number of disclosures with commercialisation potential (absolute and normalised by scale of research income), and change in this metric over time <i>Regardless of whether ideas/technologies can be formally protected (via patents/other routes) or not</i>	Insights on the scale of ideas entering the commercialisation pipeline and whether the pipeline is being maintained/expanded	Outputs	Would require amendments to HEBCI or alternative collection given issues with current 'disclosures' data point within HEBCI
Number of deals to commercialise / exploit idea/technology normalised by the scale of research and/or the number of disclosures <i>Note if data could be gathered on number of deals (regardless of type), this could replace the following 2 indicators specific to spinouts and licenses)</i>	Insights on the ability of universities to convert ideas into commercialisable propositions that gain traction with external partners	Outputs	New data required
Number of spinouts gaining commercial traction per £ 100 million research income	Signals of translation of ideas / technologies emerging within universities into the commercial world through spinouts	Outcome - capacity	Spinout Register linked to investment, employment data HESA finance records

Number of licenses to organisations (excluding spinouts) (total and normalised by scale of research) Ideally distinguishing between different types of licenses (fee-bearing / fee-free, exclusive vs non-exclusive)	Signals of adoption of ideas / technologies emerging from within universities by partners in the private, public and third sectors	Outcome - capacity	HEBCI <i>Note that we cannot currently distinguish between licenses to spinouts vs other companies</i> <i>We also do not know breakdown of licenses of different types</i>
Conversion rates of spinouts through key stages of the investment journey (seed, early-stage, scaling), and/or passing employment thresholds (recognising not all spinouts seek investment to develop)	Signals that spinouts are gaining commercial traction and are progressing in their efforts to commercialise and scale new ideas / technologies emerging from within universities	Outcomes – direct benefits	Spinout Register linked to investment, employment and turnover data. Employment and turnover data at the system level could be sourced via the ONS (although likely subject to publication restrictions at sub-system levels (e.g. smaller geographies, sectors, KE clusters). Not possible at university level.
% spinouts reaching key turnover thresholds	Signals that the ideas/technologies being commercialised through spinouts have been developed into products and services and are gaining traction in the market. Higher thresholds of turnover / and growth in turnover signal growing market adoption of the products/services commercialised through spinouts	Outcomes – direct benefits	Spinout Register and ONS secure data – limits analysis to the system level and some sub-systems subject to meeting non-disclosure rules.
% of spinouts reaching key positive long-term outcomes (acquisition, public listing, mature/stable growth phase)	Signals that the spinout companies are successfully commercialising ideas and technologies emerging from universities	Outcome – direct benefit	Spinout Register linked to investment, employment and turnover data. Employment and turnover data at the system level could be sourced via the ONS (although likely subject to publication restrictions at sub-system levels (e.g. smaller geographies, sectors, KE clusters). Not possible at university level.
Policy citations of research at UK universities – trends over time (disaggregate UK / non-UK policy influence, by different categories of policy)	Signals application of ideas emerging out of research to shape policy	Outcome – direct benefit	Overton
Scale of spinout employment / turnover for all active spinouts, and change over time	Assessment of the direct effects of spinouts on the economy through jobs and product/service sales	Outcomes – system benefits	Spinout Register and ONS secure data – limits analysis to the system level and some sub-systems subject to meeting non-disclosure rules.
% of spinouts reaching significant positive outcomes that have a significant employment base in the UK	Signals the ability of the UK to capture value from spinouts	Outcome – system benefit	Spinout Register and ONS secure data – limits analysis to the system level and some sub-systems subject to meeting non-disclosure rules.
Proportion of spinouts in the top 20/50/100 startups securing the most VC investment	Signals of the importance of university ideas/technologies in driving entrepreneurial activity in key sector for the UK	Outcome – system benefit	Spinout Register linked to investment databases
Proportion of patents/patent families in priority technology spaces for the UK <i>that are based on</i> UK university research (and change in proportion over time)	Signals of the changing importance of university ideas/technologies in driving innovation activity in key technology spaces for the UK	Outcome – system benefit	Patent databases

Forward patent citations of patents linked to UK universities (directly / indirectly)	Signals the use of patents and their value and importance of patents in driving subsequent inventions	Outcome – system benefit	Patent databases
Periodic studies to assess extent to which inventions based on UK university research have seeded new fields of technology development and innovation	Understanding of the importance of university research and commercialisation activity in unlocking breakthrough advances that seed innovation spaces and opportunities for wealth creation	Outcome – system benefit	Patent databases

7.2 Supporting companies & other organisations to become competitive in the UK

Supporting ORGANISATIONS to innovate, compete and scale for the benefit of the UK

SECURING & BUILDING UP A COMPETITIVE ASSET BASE
(incl. knowledge/technology/IP; human capital; funding & investment; data/ICT; networks & alliances; production processes; physical infrastructure & tools; organisation/strategy; supply chains; intangibles)

STRENGTHENING STRATEGIC & OPERATIONAL CAPABILITIES TO INNOVATE, COMPETE AND SCALE
(incl. strategic, managerial, innovation, entrepreneurial, collaborative, production, resilience)

7.2.1 Success statements

Companies and other organisations (in priority sectors for growth – frontier / legacy / public service delivery) that engage with universities through KE...:

- ... are more innovative, productive and competitive in their markets, both domestic and internationally [outcome – direct benefits]
- ... are more able to scale their operations in the UK, creating anchoring greater value for the benefit of the UK [outcome – direct benefits]
- ... have increased their efforts to develop and adopt innovations to drive increased productivity and competitiveness [outcome – capacity]
- ... have a strengthened resource base to innovate and compete in the market (including in areas such as technical and wider skills; facilities, equipment and tools; networks; funding/investment; IP and other intangibles) [outcome – capacity]
- ... have strengthened their strategic capabilities to innovate and compete in domestic and global markets (including strategic and managerial expertise and tools, innovation and collaborative capabilities, production capabilities) [outcome – capacity / behavioural change]

7.2.2 Potential indicators

Indicator	What does it tell us	Type of indicator	Potential sources
KE income to universities from private sector partners for contract research, consultancy, facilities and equipment hire, and CPD activities – absolute value and changes over time <i>Adjust for trends in the wider economy</i>	Perceived minimum value by private sector partners of their KE activities with universities focused on developing solutions to their challenges/help them pursue new opportunities.	Outcome – direct benefits	HEBCI
KE income to universities from public & third sector partners for contract research, consultancy, facilities and equipment hire, and CPD activities – absolute value and changes over time <i>Adjust for trends in the wider economy</i>	Perceived minimum value by public/third sector partners of their KE activities with universities focused developing solutions to their challenges/help them pursue new opportunities (e.g. around public service delivery)	Outcome – direct benefits	HEBCI - <i>ideally, we would be able to separate public from third sector, and identify different categories of public sector. However, the burden of doing so could be significant.</i>

<i>Significance / scale of KE effort with key sectors of the economy (private / public)</i>	<i>Required to bound the analysis of potential effects identified below</i>	<i>Scoping</i>	<i>Options include:</i> <ul style="list-style-type: none"> - <i>University accountability statements</i> - <i>New HEBCI part A questions</i> - <i>Surveys of academics / university leaders</i>
<i>For remaining indicators, limit analysis to those sectors of the economy which have been identified as significant / priority areas for KE efforts.</i>			
Increase in the % of companies cooperating with universities to support their innovation activities	Increasing reach of university KE into key sectors of the economy	Outcome - capacity	Analysis of UK Innovation Survey (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners
Reduction in barriers faced by partners in working with universities through KE to access, (co-)develop, acquire and exploit knowledge	Companies are facing reduced frictions and transaction costs when engaging in KE with universities, making it easier to develop, acquire and exploit knowledge to support their innovation efforts and wider objectives	Outcome – capacity	Periodic survey (e.g. every 3 years) of private / public sector partners
Assessment of extent to which KE activities of private / public sector partners exceeded, met, fell short of expectations	Insights on whether the KE delivered by universities is meeting the needs of partners in the economy	Outcome – capacity	Periodic survey (e.g. every 3 years) of private / public sector partners
Increased % of companies with cooperative agreements with universities viewing information from universities as high importance for their innovation activities, compared with companies without such agreements	Growing importance of university KE for in the innovation activities of companies	Outcome – capacity	Analysis of UK Innovation Survey (ONS Secure Lab)
Change in value of investment in innovation activities by companies with cooperative agreements / KE activities with universities, compared with companies without such agreements. <i>Note UK Innovation Survey identifies following categories of spend: internal R&D, acquisition of R&D, acquisition of machinery, equipment and software, acquisition of existing knowledge, training for innovative activities, design activity, and market introductions of innovations</i>	Insights on whether KE with universities is linked to increased investments by companies in their innovation activities.	Outcome – capacity	Analysis of UK Innovation Survey (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners
Increased % of companies that have cooperative agreements / KE activities with universities introducing new or improved product and process innovations, compared with companies without such agreements	Signals the importance of KE from universities in enabling companies to realise innovation outcomes	Outcome – direct benefit	Analysis of UK Innovation Survey (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners
Increased % of companies that have cooperative agreements / KE activities with universities using production-enhancing technologies, compared with companies without such agreements	Signals of the role of university KE in enabling companies to adopt technologies aimed at improving productivity.	Outcome – direct benefit	Analysis of UK Innovation Survey (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners

Assessment of the effects of cooperative agreements / KE activities with universities on key company performance metrics (e.g. in employment, turnover, productivity) <i>This could be compared with those without cooperative agreements in similar sectors/regions/sizes as a matched control group</i>	Provides evidence and insights on the importance of the link between KE with universities and company performance.	Outcome – direct benefit	Analysis of UK Innovation Survey linked to IDBR (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners
Importance of cooperative agreements / KE activities with universities for companies in introducing innovations with environmental benefits, compared with companies without such agreements	Provides evidence and insights on the role of KE in supporting / enabling transitions to more sustainable futures.	Outcome – system benefit	Analysis of UK Innovation Survey (ONS Secure Lab) <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners
% companies (spinouts/startups/others) with cooperative agreements / KE engagements with universities meeting ‘scale-up’ criteria, compared with a control group of similar companies without such links	Signals of the importance of university KE in helping companies to move through the scaling phase of development and delivering greater benefits to the UK through their operations	Outcome – system benefit	Analysis of UK Innovation Survey (ONS Secure Lab) linked to the ONS Business Structural Database / Inter-Departmental Business Register <i>And/or</i> Periodic survey (e.g. every 3 years) of private / public sector partners

7.3 Enabling people to participate and engage productively in the economy

Enabling PEOPLE to participate and engage productively in the economy

Education, skills & experiences Attitudes, mindsets & ambitions Opportunities for productive & fulfilling work Labour market flexibility Health & well-being Empowerment & participation Cultural / sustainability awareness & attitudes

7.3.1 Success statements

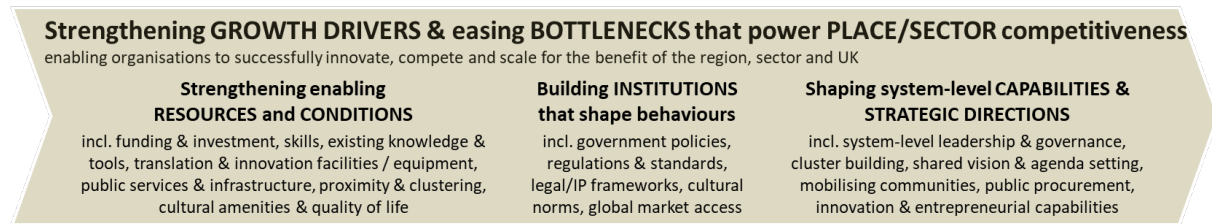
Through effective and efficient KE between universities and their partners, we would expect to see:

- ...reduction in current/future skills gaps facing industry and the public sector (e.g. through better alignment of skills provision to future needs of the economy, workforce development) [outcome – systems benefit]
- ...individuals engaging with universities for the purpose of professional development are more productive and competitive in the labour market [outcome - capacity/behaviour change]
- ...universities enhancing the availability of opportunities for productive and fulfilling work, including for hard-to-reach communities (for example through apprenticeships, internships and secondments, as well as through providing local leadership and inspiration, and support that helps get people back to work and improve their health/wellbeing) [outcome - capacity/behaviour change]
- ...students’ skills, knowledge, attributes and behaviours necessary for transforming creative ideas into actions enhanced through KE (including entrepreneurship and enterprise education and support) [outcome - capacity/behaviour change]
- ...cultural and sustainability awareness enhanced through KE with society and communities [outcome - capacity/behaviour change]

7.3.2 Potential indicators

Indicator	What does it tell us	Type of indicator	Potential sources
Individuals interacting with universities through KE (including, but not limited to training activities) have increased their skills levels in key areas of industrial / public service need compared with individuals that have not engaged	Provides evidence that KE being delivered by universities is helping individuals acquire increased skills in areas demanded by industry and the public sector. This should enhance their competitiveness in the labour market and the value they can bring to organisations	Outcome – direct benefit	If we know the geographic areas targeted by KE and how significant the KE effort is in this space, it may be possible to leverage information from datasets such as the Labour Force Survey (which includes qualification levels). However, the link to university KE efforts may be hard to establish without some form of new data collection.
Employers engaging with universities through KE (formal / informal) to develop their workforce believe the engagements have met or exceeded their expectations and they are witnessing benefits to the organisation	Provides evidence that the skills being acquired through KE by individuals in employment is being valued by their employers.	Outcome – direct benefit	Periodic survey (e.g. every 3 years) of private / public sector partners
Individuals interacting with universities through KE (including, but not limited to training activities) have increased their labour productivity (potentially proxied by their wage) compared with individuals that have not engaged	Provides evidence that KE being delivered by universities is having an effect on the labour productivity of individuals, signalling their increasing competitiveness in the labour market and the value they bring to organisations.	Outcome – direct benefit	If we know the geographic areas targeted by KE and how significant the KE effort is in this space, it may be possible to leverage information from datasets such as the Annual Survey of Hours and Earnings. However, the link to university KE efforts may be hard to establish without some form of new data collection.
Individuals previously economically inactive are more likely to be in employment following exposure to university KE efforts compared with those that are not	Provides evidence that KE being delivered by universities is helping to increase participation in the economy.	Outcome – direct benefit	If we know the geographic areas targeted by KE and how significant the KE effort is in this space, it may be possible to leverage information from datasets such as the Labour Force Survey. However, the link to university KE efforts may be hard to establish without some form of new data collection.
Graduates that have engaged in KE (including entrepreneurship) command higher wages / exhibit higher labour productivity compared with graduates that did not engage in KE during their time at university	Provides evidence that graduates of universities have benefited from KE during their time at university through increased productivity and higher wages.	Outcome – direct benefit	Requires new question(s) to be added to the Graduate Outcomes survey
Graduates that have engaged in KE (including entrepreneurship) are more likely to believe their employment fits with future plans, is meaningful, and utilises what the graduate learned at university, compared with those that did not engage in KE.	Provides evidence that graduates of universities have benefited from KE during their time at university through securing opportunities that better align with their future plans and is more meaningful to them.	Outcome - capacity	Requires new question(s) to be added to the Graduate Outcomes survey
Universities, through KE, are increasing the supply of trained labour in strategically prioritised areas for the UK economy and for their regional economies (including frontier and legacy sectors and public service delivery).	Provides signals that university KE is helping to meet skills shortages and increase skills provision in key areas for the UK economy.	Outcome – system benefit	New data, or amended CPD/CE data through HEBCI <i>And/or</i> Periodic surveys of universities / university staff to identify the focus of their KE efforts, including workforce/skills development

7.4 Strengthening growth drivers & easing bottlenecks to power the competitiveness of sectors and places



7.4.1 Success statements

Through effective and efficient KE between universities and their regional/sector partners, we would expect to see:

- ...increased availability and accessibility of key resources and capabilities necessary for organisations to innovate, compete and scale, and reduced bottlenecks faced by innovating organisations in accessing them (e.g. around knowledge, skills, translational & innovation-enabling facilities/equipment, finance) [outcome – capacity]
- ...regions better able to seed, attract and retain, and scale innovative companies [outcome – system benefit]
- ...increased inward investment for R&D/early-stage innovation into the UK and its nations/regions, as well as into key sectors [outcome – system benefit]
- ...emergence of new / strengthening of existing innovation-led and entrepreneurial clusters around universities capable of engaging in high value supply chains and global knowledge flows [outcome – system benefit]
- ...national/regional/sector-based institutions in key areas for economic growth (e.g. government policies, legal frameworks, regulations & standards, procurement processes which enhance demand for innovation) being shaped by ideas and knowledge developed within universities [outcome - capacity]
- ...stronger capabilities at the system-level to develop and implement national/region strategies (e.g. for growth and specialisation) and sector strategies to guide the effective allocation of resources to stimulate innovation and growth, and to enable the adaptation, transformation and resilience of the place/sector [outcome – capacity]
- ...greater experimentation across the system within the nation/region/sector about how to deliver on strategic ambitions and goals, with actions taken to learn from, and scale, experiments if successful [outcome – capacity]
- ...universities with stronger KE foundations and environments, better able to engage in KE in ways that meet the needs of industry and the wider the economy [outcome – capacity]

7.4.2 Potential indicators

Indicator	What does it tell us	Type of indicator	Potential sources
Reduced frictions at the interface between universities and their partners to (1) get engagements up and running; (2) work together to deliver KE; and (3) help partners to absorb and exploit the KE outputs. This could be measured by the change in barriers and enablers to the process	Signals of the health of the KE interface between universities and partners in the economy is working efficiently and effectively, focusing on the effectiveness of the interaction.	Outcome – capacity (of universities)	Periodic survey (e.g. every 3 years) of private / public sector partners
University staff and students are (1) motivated and incentivised to engage in KE, (2) have the necessary capabilities to engage, and (3) have access to the necessary resources, expertise and infrastructure to initiate and deliver KE engagements	Signals of the health of the KE interface, focusing on the strength of the enabling conditions within universities, not least whether they have the necessary capacity (resources, expertise, infrastructure, partners, organisational environment) to support, enable and deliver KE engagements	Outcome – capacity (of universities)	Period surveys of universities / university staff
Universities investing time and effort to work with local / sectoral partners to (co-)develop and implement local/sector strategies for innovation and growth (including cluster development, industry specialisation & transformation); attract inward investment; build strategic capability at the system-level; and increase the availability of / access to key resources and capabilities necessary for companies and others to innovate, compete and scale	Insights on how universities are investing time / effort to support the strategic development of their local economies and/or strategically targeted sectors.	Outcome – capacity (of universities)	Narrative statements submitted by universities setting out the nature and level of effort / resource being committed to these areas.
Value of (portfolio of) projects the university is significantly involved in that directly aim to strengthen the innovation potential and competitiveness of their local economies and/or specific sectors (could be included as part of narrative statement)	Trends in scale of efforts within universities to manage / deliver portfolios of projects designed to support the development and delivery of national / regional / sectoral strategic ambitions aimed at increasing innovation potential, industrial competitiveness and growth. In addition to the scale of effort, this provides a signal of the degree of experimentation across the system the university is involved in enabling to help deliver strategic ambitions and goals.	Outcome – capacity (of universities)	Cross-government (UK/national/regional) pooling of information on projects funded at/involving universities aimed at strengthening local economies / sectors New information required from universities / revised HEBCI
KE income to universities from public (& third) sector partners for contract research, consultancy, facilities and equipment hire – absolute value and changes over time <i>Adjust for trends in the wider economy</i>	Perceived minimum value by public (& third) sector organisations of their KE activities with universities to develop solutions to their challenges/help them pursue new opportunities (e.g. around public service delivery)	Outcome – direct benefits	HEBCI - <i>ideally, we would be able to separate public from third sector, and identify different categories of public sector. However, the burden of doing so could be significant.</i>
KE income to universities from public (& third) sector partners for CPD activities – absolute value and changes over time <i>Adjust for trends in the wider economy</i>	Perceived minimum value by public (& third) sector organisations of their KE activities with universities to help them build capability to develop and implement policies interventions and public services.	Outcome – direct benefits	HEBCI - <i>ideally, we would be able to separate public from third sector, and identify different categories of public sector. However, the burden of doing so could be significant.</i>

Universities positioned as important partners in the delivery of local growth strategies / key sector strategies	External validation of the role and importance of university in working with local partners to deliver strategic ambitions of the area.	Outcome – capacity (of system)	Analysis of local growth strategies / sector strategies / insights from bodies / individuals responsible for their development and implementation
Increase in number and value of inward investment projects for R&D/early-stage innovation into universities' local economies	Signal of the increasing attractiveness of the university's local economy to external investments	Outcome – capacity (enabling resources & conditions)	Databases such as those provided by fDi Intelligence on inward investment projects, limited to those sectors strategically targeted by universities through KE, and to the local economies around universities. Analysis of ONS Business Expenditure on R&D database which provides information on the value of R&D spend at both the enterprise level and within local R&D sites.
Increase in different types of finance availability (including venture capital) in universities' local/regional economies for supporting innovation & company emergence, development and scaling	Signal of the increasing attractiveness of the university's local economy to external investments	Outcome – capacity (enabling resources & conditions)	Commercial data providers of investment deals <i>And/or</i> Investment market reports such as the annual British Business Bank Small Business Equity Tracker
Reduction in the proportion of companies facing bottlenecks to innovation and growth relating to their ability to access / acquire the necessary knowledge and expertise, high-level skills, and translational & innovation infrastructure, equipment and tools, and access to early-stage finance/funding in key sectors/places targeted by university KE	Signals an improving system for innovation and the more efficient and effective flows and use of knowledge, resources and talent.	Outcome – capacity (ability to collaborate and engage)	Some insights could be gathered from the UK Innovation Survey (ONS) or other surveys such as the Enterprise Research Centre's Innovation State of the Nation survey ⁷ . <i>And/or</i> Potentially requires a new survey of businesses with good sectoral/regional coverage
Increase in the entrepreneurial dynamism of universities' local economy / key sectors strategically targeted by universities' enterprise and entrepreneurship efforts (university spinouts and startups as well as support for non-university startups) – measured by rates of enterprise births, deaths and growth, data/metrics from the Global Entrepreneurship Monitor e.g. total early-stage entrepreneurial activity	Entrepreneurial dynamism is known to be an important driver of innovation and growth in an economy.	Outcome – system benefit	ONS datasets capturing company development and growth e.g. number of enterprises / enterprise sites, and their development from the ONS Business Structure Database which leverages information from the UK Government's Inter-Departmental Business Register Global Entrepreneurship Monitor ⁸
Strength of entrepreneurial culture and capabilities within UK nations/regions, and participation in entrepreneurship (leverage data/ metrics from the Global Entrepreneurship Monitor)	The strength of entrepreneurial culture and capabilities are believed to be important drivers of entrepreneurial dynamism in an economy.	Outcome – behavioural change within system	Global Entrepreneurship Monitor ⁹

⁷ Roper, S., Nana-Cheraa, R., & Stanfield, C. (2024). Innovation State of the Nation 2023. Enterprise Research Centre.

⁸ For opportunities from the Global Entrepreneurship Monitor, see e.g. Hart, M., Bonner, K., Prashar, N., Ri, A., Mwaura, S., Sahasranamam, S., Alvarez Boulton, I., & Loung, A. (2024). *United Kingdom 2023/2024 National Report*. Aston University.)

⁹ Ibid.

<p>Data / metrics capturing the emergence & growth in innovation-led clusters around universities</p> <p><i>(Limit this to local economies where cluster development / support has been a strategic goal for its university's KE efforts)</i></p>	<p>Insights on the emergence of new, or strengthening of existing, innovation-led and entrepreneurial clusters around universities capable of engaging in high value supply chains and global knowledge flows.</p>	<p>Outcome – system benefit</p>	<p>Analysis of DSIT innovation clusters</p>
<p>Trends in the number of companies classed as 'scale-ups' in universities' local economies and in key sectors strategically targeted by university KE</p>	<p>Signals of the ability of companies in universities' local economies and in key sectors strategically targeted by KE to scale-up operations in the UK</p>	<p>Outcome – system benefit</p>	<p>ONS datasets capturing company development and growth e.g. on employment and turnover from the ONS Business Structure Database which leverages information from the UK Government's Inter-Departmental Business Register</p> <p>Scaleup Institute analyses</p>
<p>Scale & trends in policy citations of university research & staff in areas related to innovation, industrial, and economic growth policy development and implementation</p>	<p>Signals that ideas and knowledge developed within universities are shaping national/regional/sector-based institutions in key areas for innovation, industrial competitiveness, and economic growth (e.g. government policies, legal frameworks, regulations & standards, approaches to enhance demand for innovation).</p>	<p>Outcome – capacity / behaviour change</p>	<p>Overton, leveraging their classification of policy documents by government function category using the UN's Classification of Functions of Government (COFOG) (note that categories are assigned using a machine learning algorithm), and focused on SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation and Infrastructure)</p>