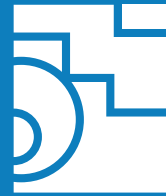


THE FUNDING ENVIRONMENT
FOR UNIVERSITIES 2015

THE ECONOMIC ROLE OF UK UNIVERSITIES



Universities UK

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Executive summary

Universities play an intrinsic role in the UK economy. They increase skills, support innovation and attract investment and talent. Higher education is a high-growth UK export industry in its own right. In 2011–12:

- universities generated over £73 billion of output
- universities directly employed 378,250 people, and a further 373,794 full-time equivalent (FTE) jobs in other sectors of the economy were dependent on expenditure of universities. This accounts for 757,268 FTE jobs throughout the economy and is equivalent to 2.7% of all UK employment in 2011¹
- the higher education sector as a whole (including universities and off-campus spending of non-UK students and visitors) generated an estimated £10.71 billion of export earnings for the UK²
- universities contributed over £36.4 billion to UK GDP. Off-campus expenditure of international students and visitors contributed a further £3.5 billion. In total, this contribution comes to over £39.9 billion, equivalent to 2.8% of GDP in 2011³

However, these figures alone do not fully capture the contribution that universities make to the UK economy. Universities play an important part in supporting economic growth and overcoming several weaknesses of the UK economy, including lagging labour productivity, low investment in research and development (R&D) and skills shortages.⁴

Universities ensure that the UK remains competitive in the global market by supporting greater business innovation and export-led, knowledge-intensive growth.

Universities have an important part in supporting businesses to drive product, process and service innovation. Innovation is a key driver of UK growth and plays a critical role in increasing private sector productivity.

Innovation is enabled and supported by universities in a number of ways:

- Through a range of knowledge exchange activities with businesses, such as long-term collaborative research programmes, consultancy and bespoke training. This has been shown to significantly improve business investment in R&D, business performance on process and product innovation, the sale of

¹ Universities UK (2014) "The impact of universities on the UK economy", report by Viewforth Consulting. Available at: <http://www.universitiesuk.ac.uk/highereducation/Pages/ImpactOfUniversities.aspx>

² *ibid*

³ *ibid*

⁴ BIS (2014) Insights from international benchmarking of the UK science and innovation system, report by Tera Allas

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novel products and the use of technical information.⁵ Furthermore, the technical and soft expertise of students is perhaps the most diffused and effective means of knowledge transfer for universities.

- By commercialising innovative ideas. This includes taking a proactive role in the commercialisation of universities' research through investment in academic and graduate spinoffs, and backing ventures that can add value and complementary expertise to their internal R&D facilities.
- By helping to facilitate innovation indirectly, by providing space for innovative firms to interact closely and assisting the development of networks.
- By promoting entrepreneurial talent through education and entrepreneurship support services. This helps graduates and local residents gain the confidence, skills and tools needed to start their own business.

Universities play an important part in responding to skill needs as the shape of the workforce changes.

The UK is seeing a growth in high-wage analytical, non-routine jobs; an expansion of manual low-wage roles; and a contraction of middle-wage jobs. As a result, it must ensure that the higher-level skills required in the labour market are met.⁶ Universities have an important role to play in meeting this demand both through their more traditional model of three-year undergraduate university study and by developing a broader range of pathways to higher skills.⁷

Increasing productivity

Research shows that across public and private sectors, the knowledge and higher-level skills possessed by workers influence productivity, both directly and indirectly. Analysis by the Department for Business, Innovation and Skills (BIS) estimates that a 1% increase in the share of the workforce with a university degree raises the level of long-run productivity by 0.2-0.5%.⁸

⁵ Department for Business, Innovation and Skills (2014) [Estimating the effect of UK direct public support for Innovation](#)

⁶ UKCES, *Working Futures 2012-2022* (2014) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298510/working-futures-2012-2022-main-report.Pdf; and UKCES, *The Labour Market Story: The State of UK Skills*, (2014). https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/344440/The_Labour_Market_Story- The_State_of_UK_Skills.pdf

⁷ UKCES (2014) *Forging Futures* Available online at: <http://www.universitiesuk.ac.uk/highereducation/Documents/2014/ForgingFutures.pdf>

⁸ BIS (2013) *The relationship between graduates and economic growth across countries, a report by NIESR*

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Building and attracting talent

Universities can increase a local skills base, even in the absence of a strong local economy that might demand those skills. This can set in motion the virtuous circle of a highly-skilled workforce attracting investment and innovation. The rising demand for graduates and university courses, evidence gathered through student and employer surveys, and the stable graduate wage premium in the labour market⁹, show that university degrees provide a learning experience that remains distinctive and valued by employers and prospective students alike.

Meeting employer needs

Some businesses present a variety of unique skill challenges that are difficult to meet, other than through employer-led, bespoke and flexible alternative learning pathways.¹⁰ Increasingly, universities are collaborating with employers to develop diverse and innovative pathways to higher level skills.

Data collected through the Higher Education-Business and Community Interaction survey (HE-BCIS)¹¹ shows that of the 161 higher education institutions surveyed in the UK, 108 offer continuous work-based learning, and 150 universities offer bespoke courses for business on campus or on business premises. When asked about the extent to which employers are involved in the development of content and reviewing of curriculum, 113 out of 161 rated this as four or five out of five.

Supporting social mobility

Universities see supporting social mobility as a core part of their mission. Through this process they not only improve the livelihood of individuals, but also unlock the talent and potential that these individuals can bring to the economy. Between 2004 and 2013, the higher education participation rate of young people in the most disadvantaged areas in England increased by 43%.¹²

Universities create prosperity in their local areas, contributing to regional growth, jobs, investment and community wellbeing.

Universities contribute significantly to regional growth, helping regions to achieve their economic potential by supporting innovation and entrepreneurship, attracting investment and talent, and creating jobs.

⁹ See Walker, I., and Zhu, Y. (2013) The impact of university degrees on the lifecycle of earnings, BIS paper no. 112

¹⁰ UKCES (2014) *Forging Futures* Available online at:

<http://www.universitiesuk.ac.uk/highereducation/Documents/2014/ForgingFutures.pdf>

¹¹ HESA (2015) Higher Education - Business and Community Interaction (HE-BCI) survey 2013-14, released March 2015

¹² Source: HEFCE (2013) Trends in young participation in higher education

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Universities as economic and civic leaders and place shapers

Many universities act as 'anchor institutions' in their local area. They are in an ideal position to take the lead on significant socio-economic issues at a local level by:

- helping to shape local economic strategies, for example by supporting their Local Enterprise Partnership (LEP) in the development of their European Structural Investment Fund (ESIF) strategy
- linking research and teaching priorities to local economic and social needs
- promoting public engagement, community well-being and active citizenship skills

Universities as investment magnets and global economic ambassadors

Universities play an important role in attracting foreign direct investment. They ensure that a strong talent pool is available for local companies and they are a globally recognised source of research and innovation. They are also important for the creation of the high-potential industry clusters and innovation hotspots sought by investors.

Universities anticipate future needs, help to shape policy and drive research and innovation to enhance efficiency and effectiveness.

Universities provide knowledge and insight that can support both the private and the public sector. They have a role in driving discovery that is unmatched by other actors in the innovation system. Discoveries such as the graphene, the structure of DNA, MRI, Stem Cells and LCDs¹ – all of which were underpinned by the work of academic researchers from UK universities – may not have occurred in the absence of publicly-funded research departments.

The accumulation of knowledge and the cross-fertilisation of ideas across disciplines within university departments puts academic researchers in a good position to anticipate future trends in and the dynamics of technological development. This – combined with their ability to draw together stakeholders – also means universities have an important part to play in informing and supporting evidence based policy-making.

Policy implications

Universities are vital to the UK economy, actively supporting businesses with innovation, creating and diffusing knowledge, and providing training in higher level skills. Policies designed to promote the growth of the UK economy must recognise the breadth, complexity and significance of universities' role.

The UK's success in higher education is underpinned by sustained government investment and a higher education policy and funding system that is globally recognised as sustainable, including:

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- **Autonomy with accountability**
Autonomy allows UK universities to shape and invest flexibly in their strategies and respond quickly to challenges as they arise. Simultaneously, the accountability regime (as reflected, for instance, in selective funding processes) ensures that public funding is spent efficiently and effectively. The dual support system for research is a crucial element to this.
- **Diversity**
The all-round excellence of the sector depends to a large extent on universities' ability to cultivate their specific strengths and cater to different economic and skills needs, including those that are specific to their regions and localities.
- **Sustainability**
UK universities' ability to invest in the long term and remain resilient to external developments – such as increasing international competition for students on research and innovation – ultimately relies on a funding system that, despite being strongly orientated towards performance, still ensures financial stability and predictability.

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Introduction

The UK has a very ambitious growth agenda for the next decade. To succeed, the national economy will need to make significant progress on a number of fronts, including productivity, skills, infrastructure, business competitiveness, entrepreneurship and innovation.

The UK already performs well on some of these indicators, ranking first in Europe and fourth in the world for entrepreneurship¹³, second in the world for innovation and the quality of its scientific research institutions¹⁴, and within the world's top ten countries for business competitiveness.¹⁵ It also has a highly qualified workforce and a flexible labour market, with high levels of employment and economic activity.

However, its potential might be held back by a number of weaknesses, including:

- declining labour productivity¹⁶
- low firm leadership and management skills¹⁷
- low investment in R&D relative to GDP
- skills shortages in key sectors and a lack of Masters/PhD graduates working in research to exploit science and innovation¹⁸

The UK 'productivity puzzle' is perhaps the single most challenging issue that the UK economy will have to resolve to unlock long-term growth. In 2013, the UK's labour productivity gap with other G7 countries was the widest reported since 1992 (17 percentage points).¹⁹ Analysis by the IFS shows that output per hour had fallen by nearly 12.3% in 2012, compared to its pre-recession trend.²⁰ Enhancing productivity is critical to bringing GDP growth closer to its potential.

As central knowledge nodes and centres of economic activity at local, national and international level, universities play a crucial role in aiding economic recovery and driving the long-term growth of the UK economy by:

- creating prosperity in their local areas through contributing to regional growth, jobs, infrastructure, investment and community wellbeing
- ensuring that the UK remains competitive in the global market by supporting greater business productivity and export-led, knowledge-intensive growth,

¹³Global Entrepreneurship and Development Institute (2014) Global Entrepreneurship Index 2015

¹⁴World Intellectual Property Organisations, Cornell University, INSEAD (2014) Global Innovation Index 2014

¹⁵World Economic forum Global (2014) Competitiveness Index 2014–15

¹⁶IFS (2013) "The IFS Green Budget 2013. Chapter 3: The productivity puzzles Available online at: <http://www.ifs.org.uk/docs/34598THZZ12.pdf>

¹⁷BIS (2014) Insights from international benchmarking of the UK science and innovation system, a report by Tera Allas

¹⁸ibid

¹⁹Office for National Statistics (2015) [International Comparisons of Productivity - Final Estimates, 2013](#)

²⁰IFS (2013) "The IFS Green Budget 2013. Chapter 3: The productivity puzzles" Available online at: <http://www.ifs.org.uk/docs/34598THZZ12.pdf>

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and helping rebalance the UK economy towards high value-added sectors and a more even spread of resources and activity

- responding to skill needs as the shape of the workforce changes
- anticipating future needs and driving research and innovation

1. Defining higher education's contribution to economic growth

Universities' core business is founded on the autonomous production and diffusion of public knowledge across research, teaching and innovation. This is what makes the economic benefits of their activity so significant, long-lasting and widely shared across the economy. At the same time, this can make it difficult to define and measure universities' contribution to the economy, particularly in an open innovation system where co-production of knowledge is increasingly becoming the rule, rather than the exception.

When examining universities' contribution to the economy, four matters must be considered:

1. The higher education sector's positive impacts across teaching, research, innovation and growth interact in complex and sometimes unanticipated ways. This makes it difficult to disentangle and quantify market and non-market effects, identify indirect beneficiaries and account for the role of internal synergies and efficiencies.
2. The returns generated by the sector will often accrue to the economy via other innovation actors, such as businesses, charities and the public sector. This can be attributed to the public nature of most knowledge-based activities within universities and increasing openness of the innovation process.
3. The nature of the contributions that universities make to the economy will vary across industries, geographies and the higher education sector. Universities are autonomous institutions, deeply embedded in their local areas and interpret their economic role as a function of their individual research and teaching strengths and goals within their local economic and social context. With such a complex interplay of needs, aims, capacity and vehicles for growth across economic sectors and geographies, there will never be a 'one size fits all' approach or measure.
4. There is also an important implicit cost for the economy in 'discouraging' university activity because insufficient production and diffusion of knowledge can by itself constrain economic growth.²¹ This cannot be accurately predicted or quantified.

To fully appreciate the role that universities play in the UK economy, we need to recognise the breadth and complexity of the sector and its contributions. This report examines the contribution that universities make to the UK economy in a range of

²¹ Nesta (2012) Plan I: the case for innovation-led growth

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different ways. Where appropriate, it considers both market and non-market benefits, when the latter have been shown to impact growth indirectly.

2. Overview: calculating the economic impact of universities

Higher education is a high-growth UK export industry in its own right, worth over £10.7 billion in export earnings.²² The government's industrial strategy identifies higher education as a key sector to drive export-led growth.²³

In 2011–12 alone, universities across the UK generated a total of £73 billion in output. They directly contributed over £36.4 billion to UK GDP, and off-campus expenditure of international students and visitors contributed a further £3.5 billion. This means that, in total, universities contributed nearly £40 billion to UK GDP, equivalent to 2.8% of GDP in 2011.²⁴ This corresponds to more GDP per unit than a number of other sectors, including health, construction and public administration.²⁵

Students and staff from all parts of the world contribute significantly every year to the wealth of local economies across the UK. Nearly 20% of the output generated by the sector in 2011–12 depended on the expenditure of students from outside the EU. Because both universities and their students purchase the vast majority of goods and services from local businesses, the benefits of their expenditure are largely retained locally.

For every £1 million of university output, a further £1.35 million of output was generated elsewhere in the economy: in GVA terms, every £1 million of university GVA was associated with the generation of a further £1.03 million in other UK industries.²⁶

Because of their scale, universities are also large employers, providing thousands of jobs in their local areas. Nearly 760,000 full-time equivalent (FTE) jobs in the UK were generated and supported by the higher education sector and its students in 2011–12, directly and indirectly.²⁷ For every 100 jobs created directly within a university, 117 extra jobs are generated elsewhere in the economy, not including the

²² Universities UK (2014) *The impact of universities on the UK economy, report by Viewforth Consulting*. Available at:

<http://www.universitiesuk.ac.uk/highereducation/Pages/ImpactOfUniversities.aspx#.VTTGVU1ATKI>

²³ Department of Business, Innovation & Skills. (2013) *International Education: Global Growth and Prosperity*

²⁴ Universities UK (2014) *The impact of universities on the UK economy, report by Viewforth Consulting*. Available at:

<http://www.universitiesuk.ac.uk/highereducation/Pages/ImpactOfUniversities.aspx#.VTTGVU1ATKI>

²⁵ *ibid*

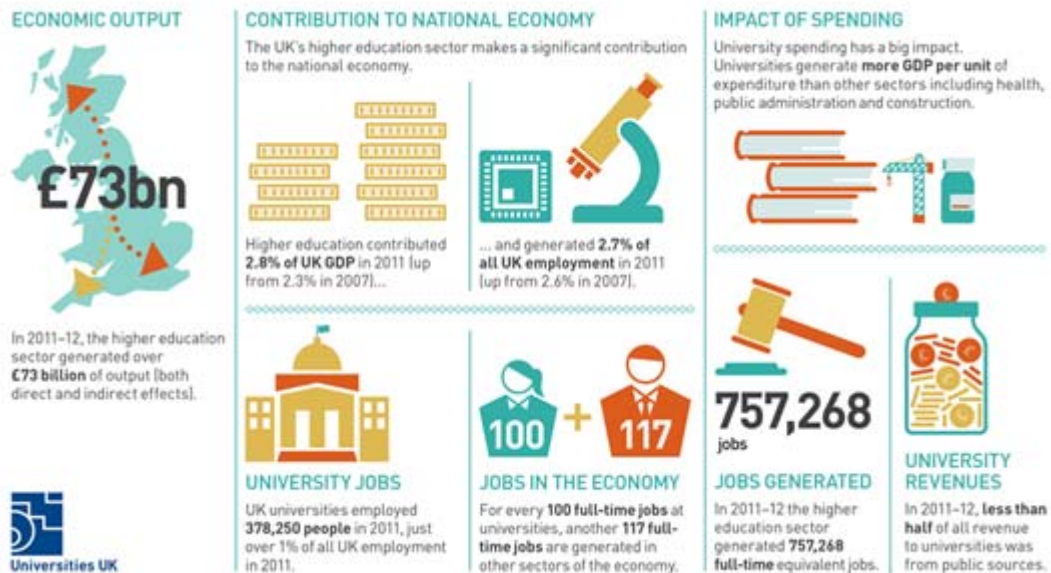
²⁶ *ibid*

²⁷ *ibid*

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off-campus expenditure from non-UK students, which, on its own, created or supported an additional 62,380 FTE jobs in 2011–12²⁸.

Figure 1: The economic impact of higher education institutions



²⁸ ibid

3. Universities ensure that the UK remains competitive in the global market by supporting greater business innovation and export-led, knowledge-intensive growth

Universities support and enhance business innovation capabilities. They help businesses of all sizes drive product, process and service innovation, finding solutions that allow them to cut costs, increase sales, access new markets and create and retain high-quality jobs in the UK.

By supporting businesses and organisations in their innovation, universities boost the long-term potential of the UK economy to thrive globally, enhancing the success and competitiveness of UK companies and improving the quality and efficiency of public and private services. Technological change (new products and services creating novel market opportunities) and efficiency (lower production costs/time) are the key factors that generate a step change in productivity. Innovation can offer opportunities to achieve both.

3.1 Universities as knowledge providers

Universities engage in a wide range of knowledge exchange activities, such as long-term collaborative research programmes, consultancy, and bespoke training. The involvement of universities in business innovation has a number of important advantages:

- By conducting long-term, speculative research, academic researchers can create and spot 'upstream' (distant from market) innovation opportunities that other players, such as customers and suppliers, might not. A growing body of evidence shows that public funding for research is fundamental to enabling this, as individual and business incentives differ from those of governments.²⁹ Markets encourage activities that generate returns on rapid timescales. However, this is at odds with the basic scientific exploration that some forms of innovation, particularly technological innovation, depend on.³⁰
- When 'downstream' (close to market) innovation opportunities have already been identified, businesses in an open innovation system are not necessarily able to procure all the expertise needed to bring the product or service to market. Sometimes it requires peer-reviewed knowledge, highly specific skills or experimental approaches that may only be available in universities.

²⁹ Mazzucato, Mariana. (2013) *The entrepreneurial state: debunking public vs. private sector myths*. London: Anthem Press.

³⁰ Jones, Richard. (2013) *The UK's innovation deficit and how to repair it*. Sheffield Political Economy Research Institute. Paper No. 6.

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- Academic support can be easily adapted to businesses of all sizes: universities' wide portfolios of research, consultancy and training make it possible for them to tailor support to the needs and scale of individual businesses. Engagement can occur through ambitious, long-term collaborative R&D programmes. However, it is often done effectively on a much smaller scale, for example through the exchange of people, feasibility studies or innovation voucher schemes.³¹

Research commissioned by BIS has highlighted the substantial positive impact of collaboration with universities and public sector research establishments on business performance. Businesses that engage in these partnerships are not only more likely to invest in R&D themselves (+161%)³², but tend to perform significantly better on process and product innovation (respectively, +40% and +45%), sales of novel products (+72%), and use of technical information (+57%) than similar firms over a three-year period.³³

In addition, a survey of firms across three UK regions found that firms that collaborated with universities were six times more likely to report that they introduced product innovations, and 5.1 times more likely to report that they introduced service innovations.³⁴ As further suggested in a report commissioned by Universities UK, businesses that engage with universities on innovation are much more likely to report a better performance on product range, market share and product quality than those that do not.³⁵

³¹ Universities UK (2014) Innovation Vouchers and LEP Structural Funds strategies, UUK innovation and growth factsheet series.

³² This figure relates to R&D investment measured as a proportion of turnover

³³ Department for Business, Innovation and Skills (2014) [Estimating the effect of UK direct public support for Innovation](#)

³⁴ Howells J; Ramlogan R; Cheng S (2012) Universities in an open innovation system: a UK perspective, International Journal of Entrepreneurial Behaviour & Research, Vol. 18 Iss: 4, pp.440–456

³⁵ Swann, 2009, cited in Schmuecker K; Cook W (2009) [Beyond bricks and mortar boards: universities' role in building regional economies](#), a report for Universities UK and the Institute for Public Policy Research IPPR, 2009

Open-loop solutions for recycled glass

Sheffield Hallam University

Background

A project team at Sheffield Hallam University's Art and Design Research Centre worked with local manufacturer Resin Building Products Limited to develop TTURA™ (later renamed Resilica), an eco-friendly composite using glass waste. TTURA™ is an attractive, durable material typically consisting of 85% recycled glass, including previously 'difficult' waste from consumer, building and automotive waste streams. The material was developed after four years of research work at Sheffield Hallam University, funded by two linked AHRC research grants of £41,644 (1999-2000), and £119,387 (2002-2004).

Impact

As a result of the project:

- An offshoot company, Eight Inch Ltd, was set up to commercialise TTURA™. The company won Manufacturing Business of the Year at the 2004 Startups Awards.
- The developed material won a number of international awards, including the International Design Resource Award 2001 for sustainable design in Seattle, USA; the Sixth International Design Resource Award (IDRA) in Japan 2003.
- TTURA™ was used in a number of public spaces and structures across Europe including the 'Blue Carpet', a major public art work commissioned by Newcastle City Council, a translucent staircase at the fashion store B2B, and the paving of Dublin's regenerated docklands, designed by landscape artist Martha Swartz.
- An evaluation conducted by PwC suggests that over 25 years new companies selling TTURA™ could generate Gross Value Added of between £2,355,295 to £3,202,663, and Intellectual Property royalties ranging from £530,170 to £929,478 (in present value terms).

Source: AHRC

Business-university interactions have been shown to deliver substantial returns. The UK Innovation Research Centre has found that investment in the public science base

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yields a return of at least 20%³⁶, although it could be considerably higher than this.³⁷ This means that a one-off 5% increase in public spending on science could permanently raise private sector productivity by at least £90 million per year. This is a benefit worth £1.8 billion to the economy.³⁸ The extent to which these benefits can be realised depends crucially on business-university collaboration and business R&D performance.³⁹

3.2 Universities as innovation facilitators/brokers

Aside from contributing to business innovation directly by collaborating on the development of new products or services, universities also play an important role in facilitating innovation indirectly. For example, they provide space for innovative firms to interact closely and assist in the development of networks.

Increasingly, universities are investing in spaces, equipment and facilities that are open to, or shared with, the local innovation community. This is an effective way for them to accommodate the needs of the local innovation community and help maintain the world-class facilities that are needed to attract talent and investment from other parts of the UK and the world. In the 1980s, the UK only counted a handful of university-owned science parks. Nowadays, about half of the UK's around 100 science parks are owned by or linked to universities.⁴⁰ The UK is home to Europe's top and the world's second best university-led business incubator, SETsquared.⁴¹

UK universities' income from facilities and equipment-related services grew by nearly 60% in real terms over the last decade.⁴² This finding is supported by qualitative research which suggests that equipment sharing arrangements between universities and businesses are increasingly common. Access to university infrastructure comes with a wealth of expertise that becomes critical to businesses' innovation processes.

³⁶ UK-Innovation Research Centre (2014) The economic significance of the UK science base, a report for the Campaign for Science and Engineering

³⁷ Department of Business, Innovation and Skills (2014) Insights from international benchmarking of the UK science and innovation system, a report by Tera Allas

³⁸ UK Innovation Research Centre (UK-IRC) (2014) The economic significance of the UK science base, a report for the Campaign for Science and Engineering

³⁹ Ibid.

⁴⁰ Murray Brown, J. (2014). Science parks' role as innovation centres 'under threat'. *Financial Times*. [online] Available at: <http://www.ft.com/intl/cms/s/0/e7915d52-0285-11e4-91ac-00144feab7de.html?siteedition=uk#axzz3artGOvYZ> [Accessed 22 May 2015]

⁴¹ UBI Global (2014) University Business Incubator Index 2014

⁴² HESA (2015) Higher Education - Business and Community Interaction (HE-BCI) survey 2013-14, released March 2015

Europe's top and the world's second best university led business incubator: SETsquared

University of Bath, University of Bristol, University of Exeter, University of Southampton, University of Surrey

Background

SETsquared is an enterprise collaboration between the University of Bath, the University of Bristol, the University of Exeter, the University of Southampton and the University of Surrey. The partnership supports early-stage companies by providing opportunities for them to access academic research and establish research partnerships, collaborate with industry specialists and entrepreneurs, and access investors. Over 1000 companies benefit from SETsquared support and services.

Impact

- A study by Warwick Economics and Development finds that businesses incubated by SETsquared have created around £3.8 billion in GVA between 2002 and 2014, and estimates that high-tech start-ups incubated by SETsquared will contribute a further £7.3bn in GVA to the UK economy in the next 10 years.
- Firms incubated by SETsquared have created 9,000 jobs since 2002 and this is expected to increase to around 14,200 by 2025.
- SETsquared has supported many successful graduate entrepreneurs. The partnership's activities include an annual Student Enterprise Award, an enterprise and innovation training programme for postgraduate researchers and business planning and pitching competitions.

Source: Warwick Economics and Development

3.3 Universities as innovation investors

As part of their role as innovators, universities have taken steps to help innovative ideas cross the so-called 'valley of death' between research and its commercial exploitation. This includes taking a proactive role in the commercialisation of their research when opportunities arise, through investment in academic and graduate spinoffs, and backing ventures that can add value and complementary expertise to their internal R&D facilities.

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Although these activities often generate a return for universities, the greatest value added from these investments come in the form of strengthened research and commercialisation expertise for staff; successful innovation in business; and social and economic benefits for customers, users and beneficiaries.

Spin-off activities represent a small fraction of universities' third mission activities, but are nonetheless an important vehicle for research impact and innovation. Between 2010–11 and 2013–14 alone, UK universities helped generate nearly 15,000 new graduate start-ups and academic spin-offs, helping many of these with seed funding, subsidised space, mentoring and business support.

There are further ways in which universities are facilitating the move of ground-breaking ideas to markets. This includes activities like creating or investing in venture capital funds to setting up full-blown venture capital and loan entities, individually or in partnership with other institutions.

Neurosolutions: a commercial partnership between academia and industry to develop novel drugs for neurological disorders

University of Warwick

The University of Warwick has led multidisciplinary electrophysiological research from 2000 to the present day, building up expertise in a range of preclinical platform technologies to support the translation of basic neuroscience to clinical trials.

Neurosolutions is a spinout company created in 2001 to promote interaction with industries and commercialise research. The company develops its own novel compounds and provides translational biomedical research services to biotechnology and pharmaceutical industries to facilitate the development of new drugs and strategies to treat neurological disorders.

Impact

- Neurosolutions generates revenues averaging £1.4 million per annum and employs 15 full-time staff.
- Since its launch, Neurosolutions has earned around £7.5 million in contracts from biotechnology and pharmaceutical industries, supporting over 100 industrial clients – including major companies and SME's – from across the world with the development of new strategies for neurological disorders.
- Neurosolutions has developed two patent-protected novel compounds for treating neuropathic pain and dental pain in partnership with Sosei (a Japanese biopharmaceutical company) and Ampika Ltd (a medicinal plants business spun out of the University of Cambridge).

Source: REF 2014

EyeSpyFX

Ulster University

Background

The University of Ulster is increasingly involved in digital media activity, with strong links into industry and a growing portfolio of research collaborations with digital media companies through Knowledge Transfer Partnership (KTP) and Innovation Voucher schemes.

Initial research into the remote control of robotic devices at the Art and Design Research Institute in the School of Creative Arts led in 2001 to the creation of a spin-out company, EyeSpyFX, whose first product was 'My Webcam', a mobile phone app for controlling pan and tilt webcams.

Impact

Since 2001 EyeSpyFX, has evolved into a specialist app developer working with a wide range of global security and webcam developers, and has so far:

- attracted over £780K in funding (including InvestNI and NI's Technology Strategy Board)
- created employment for four University of Ulster graduates
- successfully launched its first product 'My Webcam', which was top 100 Utility app for 4 months and recognised by Orange in 2008 as "Best of Utility" app
- expanded its services into the design and development of bespoke applications on multiple platforms (the company has collaborated with celebrated Irish artist Jim Fitzpatrick to develop and launch a new portfolio app for the Apple iPad. Using the 'pinch and stretch' function of the iPad, the app allows the user to explore and expand the finest details of Jim's intricate work, creating a new way of interacting with art)

Source: UUK 2009

3.4 Universities as promoters of entrepreneurial talent

In knowledge-based economies, the highest economic potential is often found in small, newly-established innovative companies that can operate flexibly and thus expand quickly.⁴³ However, aspiring entrepreneurs are often held back by low confidence, risk and operational challenges. Universities across the UK have been increasingly engaged in initiatives to nurture entrepreneurial talent through education and entrepreneurship support services. This is helping graduates and

⁴³ NESTA (2009) *The vital 6 per cent: how high-growth innovative businesses generate prosperity and jobs*. Available online at: <http://www.nesta.org.uk/sites/default/files/vital-six-per-cent.pdf>

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local residents gain the confidence, skills and financial tools needed to start their own business.

Evidence shows that graduates are associated with higher levels of early-stage entrepreneurial activity. In 2014, the Total Early-Stage Entrepreneurship Activity (TEA) rate for graduates in the UK was 10.8%, compared to a UK average of 8.6% and a rate of 7.4% for non-graduates.⁴⁴ Furthermore, the difference in TEA for graduates and non-graduates forms part of a longer term trend. A possible explanation for this could be the typical age of graduates, however analysis shows that being a graduate is associated with higher levels of early-stage entrepreneurial activity regardless of age.

Universities' renewed focus on promoting social entrepreneurship deserves separate consideration. Social enterprise has great potential for the UK economy and society. As well as favouring a socially responsible business model and positive social change, social enterprises contribute £24 billion to the UK economy.⁴⁵ They have shown rapid growth that remained strong even during the recession and have opened up work opportunities for local residents, including the most disadvantaged.⁴⁶ Given the centrality of social objectives within universities' missions, institutions have taken steps to promote social entrepreneurship through a variety of tailored activities, including: student placements, seed funding, procuring or providing services to social enterprises, and even supporting students setting up their own businesses in university-subsidised business spaces and development laboratories.

⁴⁴ Data from the Global Entrepreneurship Monitor (GEM). Mark Hart and Karen Bonner. (2015) "GEM UK: Graduate Entrepreneurship". Aston Business School and Enterprise Research Centre. In this report, TEA is defined as a combination of nascent entrepreneurs - individuals who are committing resources, such as time or money, to starting a business - and new business owner-managers, whose business has been paying income, such as salaries or drawings, for more than three, but not more than forty-two, months'

⁴⁵ Social Enterprise UK (2013) *The people's business: state of Social Enterprise Survey 2013* Available online at: http://www.socialenterprise.org.uk/uploads/files/2013/07/the_peoples_business.pdf

⁴⁶ Ibid.

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The Graduate Entrepreneurship Project

University of Bradford, University of Huddersfield, University of Hull, University of Leeds, Leeds Beckett University, Leeds Trinity University, University of Sheffield, Sheffield Hallam University, University of York, York St John University

Background

The Graduate Entrepreneurship Project (GEP) launched in 2007 and is run by 10 universities in Yorkshire. The project aims to provide the best possible enterprise and business start-up support to students and graduates, securing funding from the European Regional Development Fund for two consecutive rounds (2007–2010 and 2011–2014).

The package of support offered via GEP includes:

- mentoring and advice from a full-time advisor based at the university, and funds to procure specific expertise and regular visits from external subject-specific advisors
- funding: highly competitive Proof of Concept funds of up to £1,000 and start-up grants of up to £2,500, channelled via the partner institutions
- entrepreneurs Boot Camp: a four day residential, giving participants an opportunity to work on their business plans supported by expert business advice on a range of issues
- university showcases, networking events and workshops focussing on commercial and entrepreneurial skills

Impact

In the two rounds of funding received, GEP helped create the following:

- A total of 351 Full Time Equivalent jobs and 278 businesses that survived more than 12 months.
- Businesses that successfully commercialised innovative products and secured private investment. For instance, in 2012, GEP helped 19-year-old University of York student Alexandros Kontos start his own business to commercialise Waterfox, a high-performance web browser he developed for three years. Through GEP, the University of York provided Alexandros with a range of support services, including business advice, a proof of concept grant of £1,000 and the opportunity to attend a Boot Camp. In its 2-3 months, Waterfox received over 100,000 downloads and helped Alexandros secure a contract with the global online security company AVG. Waterfox now counts over 3 million users worldwide.

Source: Enterprise Educators UK

4. Universities play an important part in responding to knowledge and skill needs as the shape of the workforce changes

The UK labour force is changing. This change is characterised by growth in high-wage analytical, non-routine jobs, an expansion of manual low-wage roles and a contraction of middle-wage jobs.⁴⁷

A recent sector analysis by BIS judged that UK prospects are strongest in higher skilled activities, such as R&D, design and marketing. By 2022 there are projected to be two million additional jobs in occupations requiring higher level skills, such as managers, professionals and associate professionals. The total employment share requiring higher skills will increase from 42% to 46% of all those in employment.⁴⁸

The changes in the shape of the labour force require the UK to ensure that it develops the higher-level skills required by the labour market.⁴⁹ Universities have an important role to play in meeting this demand both through their more traditional model of three-year undergraduate university study and by developing a broader range of pathways to higher skills for those preparing for employment as well as for those already in employment.

Higher skills – particularly graduate skills – are crucial for increasing human capital and therefore, productivity. A key factor behind labour productivity is human capital stock, defined as ‘the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being’.⁵⁰ Graduates represent 26.2% of all those in employment, but account for 35.4% of the UK’s human capital stock.⁵¹

Furthermore, research suggests that graduate skills accumulation contributed to roughly 20% of GDP growth in the UK from 1982 to 2005, and that a 1% increase in the share of the workforce with a university degree can raise the level of long run productivity by 0.2-0.5%.⁵² The UK share of the workforce with a university education increased by 57% between 1994 and 2005. This would mean an 11-28% increase in

⁴⁷ UKCES, Working Futures 2012-2022 (2014) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298510/working-futures-2012-2022-main-report.pdf; and UKCES, The Labour Market Story: The State of UK Skills, (2014). https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/344440/The_Labour_Market_Story- The_State_of_UK_Skills.pdf

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ Office for National Statistics (2014) *Human Capital Estimates, 2013*. Available online at: http://www.ons.gov.uk/ons/dcp171766_374868.pdf

⁵¹ Ibid

⁵² BIS (2013) *The relationship between graduates and economic growth across countries, a report by NIESR*

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the UK's long run productivity, suggesting that at least one third of the increase in labour productivity between 1994 and 2005 could be attributed to the increase in graduate skills in the labour force.

Research shows a link between graduate skills and higher productivity at different aggregation levels, including across nations, regions, industries and firms:

- Companies that have higher concentrations of knowledge workers (above 35% of the workforce) create, on average, returns per employee three times higher than those of companies with fewer knowledge workers (20% or less of the workforce).⁵³
- Qualitative research conducted by the Centre for Cities and the McKinsey Institute in five of the UK's fastest growing clusters reports that for many businesses the 'broad skills-base in the UK' is a core part of their 'reason to stay'.⁵⁴ Their research suggests that the large numbers of high-quality graduates and post-graduates produced by UK universities form the backbone of most high-growth businesses within clusters'.⁵⁵
- HM Treasury identifies skill as one of the five key drivers of productivity which impacts on the economic performance of a region.⁵⁶ Research shows that there is a strong correlation between productivity and the number of hours worked by graduates at the regional level.⁵⁷

4.1 Universities as talent builders and attractors

Higher education enhances students' knowledge and skills, increases their future productivity and helps to meet business demands for higher skills and knowledge. Universities can also act as a means of increasing the local skills base, even in the absence of a strong local economy that might demand those skills. This can set in motion the virtuous circle of a highly-skilled workforce attracting investment. The technical and soft expertise of students is perhaps the most diffused and effective means of knowledge transfer for universities. Graduates and returning workers, as well as applying and sharing the knowledge developed during their studies, will permanently raise their employers capacity to initiate and carry out innovation processes internally.

⁵³ McKinsey & Company (2010) *The productivity imperative*. Available online at: http://www.mckinsey.com/insights/growth/the_productivity_imperative

⁵⁴ Centre for Cities and McKinsey & Company (2014) Available online at: <http://www.centreforcities.org/publication/industrial-revolutions/>

⁵⁵ Ibid.

⁵⁶ Sebnem Oguz and Jonathan Knight, Office for National Statistics (2011) *Regional economic indicators*. Economic and Labour Market Review

⁵⁷ Ibid.

Stimulating long-term growth in UK SMEs: the LEAD® programme

University of Lancaster

Background

University expertise can sometimes help identify and solve significant skill gaps in business. A strong example is the Leading Enterprise and Development (LEAD®) programme, which supports leadership skills development in small and medium-sized enterprises (SMEs). The programme builds on insights gained from multidisciplinary research conducted at Lancaster University to address the SME leadership deficit that has been found to constrain the growth of the UK economy since the 1990s.

Impact

The LEAD® programme has:

- supported the skills development of over 3,000 SME owners, creating over 10,000 jobs
- helped improve SME performance. An independent evaluation of the original LEAD pilot showed that:
 - 90% of participants reported significant increases in profitability, employment or sales turnover
 - three quarters of participants raised productivity by £8,800 a year on average
 - participants had an average growth rate of 3.5% a year, an average increase in jobs of 3.6% a year and added £11 million in net sales per annum in 2004–11, of which about £7.5 million a year is attributable to LEAD
- informed a successful £32 million regional growth fund bid to support business growth in 20 UK cities. This is expected to leverage £2.8 billion of additional private sector investment and create or safeguard 77,000 jobs
- expanded nationally and internationally. LEAD currently has four franchises in the UK: LEAD North West, South West, London and Wales. Insights from LEAD also informed the development of a National Australian Leadership programme and attracted interest from a number of overseas governments wanting to deliver an equivalent programme

Source: REF 2014

The rising demand for graduates and university courses, as well as the stable graduate wage premium in the labour market⁵⁸, show that university degrees provide

⁵⁸ See Walker, I., and Zhu, Y. (2013) The impact of university degrees on the lifecycle of earnings, BIS paper no. 112

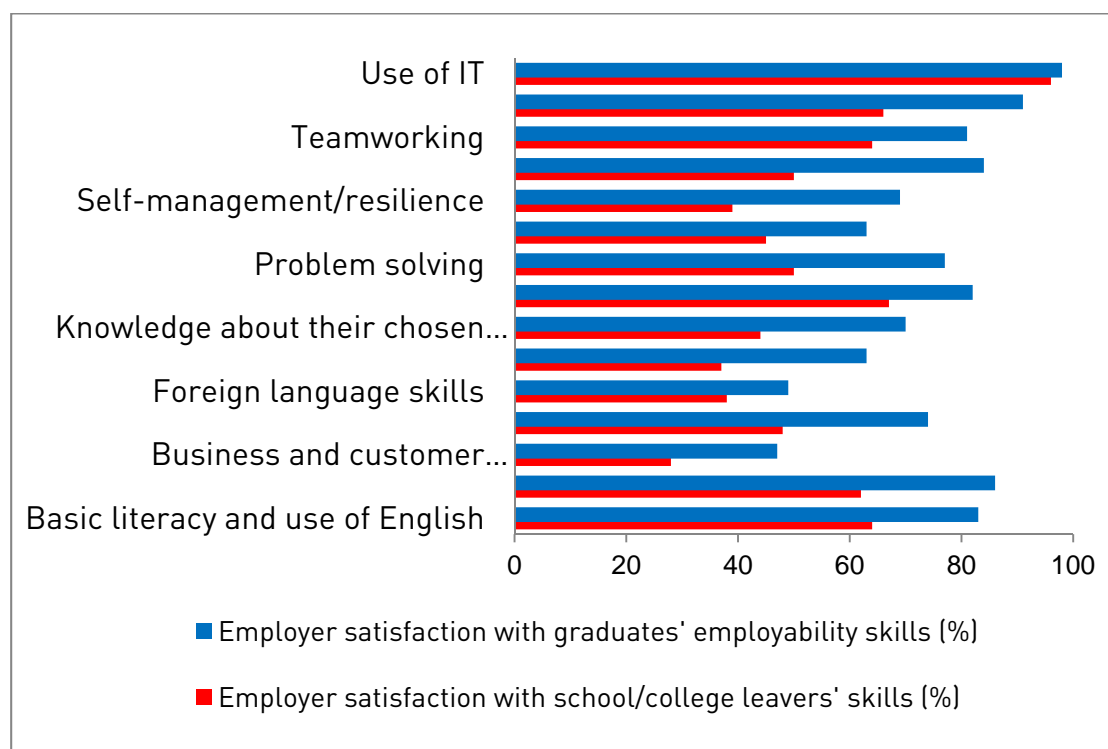
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a learning experience that remains distinctive and valued by employers and prospective students alike. Evidence shows that university courses continue to produce the best learning and labour market outcomes for employers and graduates:

Benefits for employers

In a 2013 UKCES survey, a higher proportion of employers across all UK nations were satisfied with the work-readiness of graduates compared to all other recruits. In England 84% of respondents reported that graduates were 'well' or 'very well' prepared, compared to 74% for further education leavers and 66% for 17–18 year-old school leavers⁵⁹. Another survey of employers also suggests high levels of satisfaction with graduates across a number of skills which far exceed satisfaction levels with school leavers, particularly on analysis skills, self-management and problem solving. (Figure 2)

Figure 2: Employer satisfaction with graduate skills and school leavers' skills



Source: CBI/Pearson

Benefits for individuals

Student satisfaction has continued to increase in recent years, reaching a new high of 86% in 2014⁶⁰. Graduates are less likely to be unemployed than lower-qualified young people (Figure 3) and their employment outcomes remain positive. A recent

⁵⁹ UKCES (2014) Employer skills survey 2013: Technical report, Evidence report no, 82

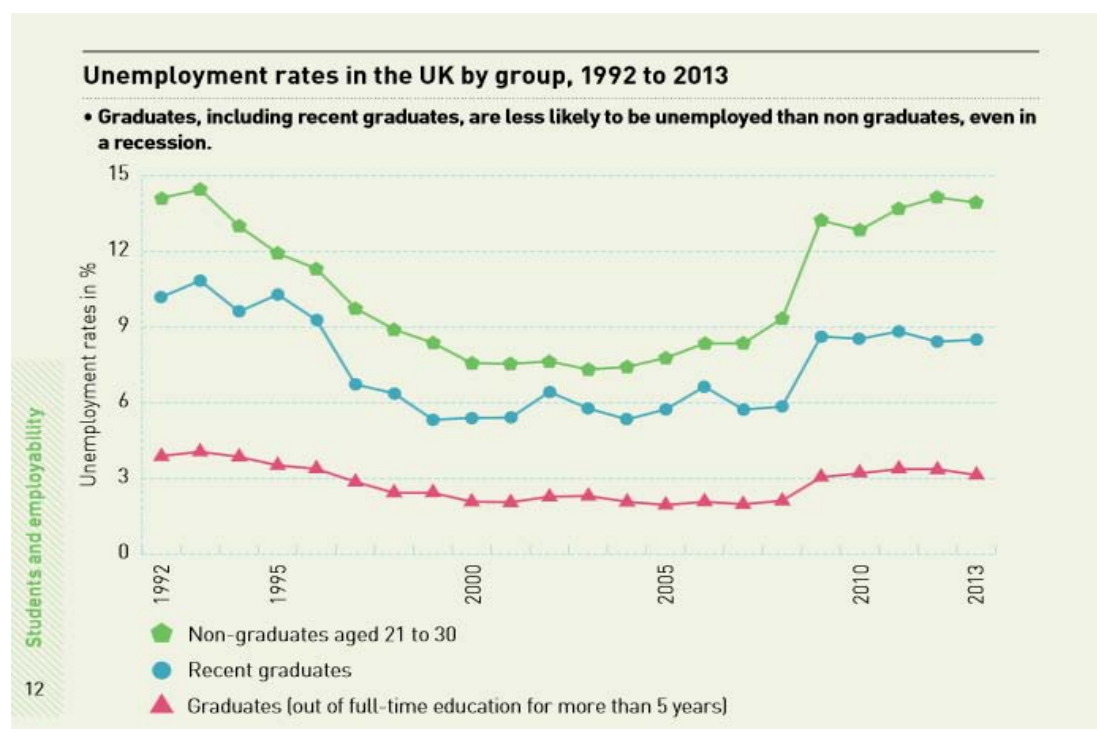
⁶⁰ National Student Survey data

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survey by the Association of Graduate Recruiters predicts an 11.9% rise in vacancies for the next recruitment round, following an increase of 4.3% in 2014⁶¹. Their long-term prospects also remain strong, as over 80% of new jobs created by 2020 are projected to be in occupations with high concentrations of graduates⁶².

Figure 3: Unemployment rates in the UK by group, 1992 to 2013



Source: HESA

Meeting business demands

Policy makers are not only concerned with increasing the number of individuals with higher level skills and knowledge, but also wish to ensure that those individuals develop the right skills to contribute effectively in their future career.

Some businesses present a variety of unique skill challenges that are difficult to meet, other than through employer-led, bespoke and flexible alternative learning pathways. Universities are increasingly integrating these within their core offer by collaborating with local employers to develop pathways to high-level and high-value jobs.

Data collected through the Higher Education-Business Community Interaction Survey (HE-BCIS) shows that of the 161 higher education institutions surveyed in the

⁶¹ Association of graduate recruiters (2015) The AGR recruitment survey 2015: Winter review, a report by CFE research

⁶² UUK analysis based on data from the Office for National Statistics, Labour Force Survey 2013 Q2 and UKCES (2012) Working Futures 2010–2020

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UK, 108 offer continuous work-based learning, 150 offer short bespoke courses for business on campus or at business premises. When asked about the extent to which employers are involved in the development of content and reviewing of curriculum, 113 out of 161 rated this as four or five out of five. Businesses also play an important part in providing projects and resources to help students understand the real-world applications of the skills they develop.

Since many of these learning pathways are built around specific business or employer needs, their design will vary significantly. However, they often share the following common characteristics:

- They suit a variety of skills and career progression needs. Many of these pathways – for example, industry-accredited degrees – lead to first and Masters degrees. However, there are also learning offers at lower qualification levels. Some of these learning offers are delivered through franchise programmes run by other partners (such as further education colleges), but lead to an award from the franchisor institution, which remains responsible for ensuring high quality standards.
- They have significant employer input and a strong work-based learning component. This often entails guaranteed work experience placements during or at the end of the course. More than one in four employers (28%) is also involved directly in developing higher education institution course offerings by taking part in degree programme advisory boards and participating in course design. This type of involvement can help ensure that qualifications and course content are geared towards meeting real business needs. Although larger employers tend to be most active in this way (30%), nearly a fifth of SMEs (22%) are also involved.⁶³
- They are also particularly suited to some of the UK's priority sectors or professional functions that present specific skills shortages and mismatches. Research suggests that employers tend to engage with universities where their higher level skills needs cannot be sufficiently met through existing sources.⁶⁴ This is the case for many of tomorrow's high growth sectors for the UK economy, such as the creative industries.

⁶³ UKCES. (2014) *Forging Futures*. Available online at:
<http://www.universitiesuk.ac.uk/highereducation/Documents/2014/ForgingFutures.pdf>

⁶⁴ *ibid*

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Partnership with British Airways to deliver a pathway in aircraft maintenance

University of South Wales

Background

British Airways (BA) and the University of South Wales (USW) have partnered to deliver a specialist pathway that prepares graduates for a career in aircraft maintenance. This pathway comprises a BSc degree in Aircraft Maintenance Engineering at USW and industry-standard EASA Part 66 training (which is essential for a career in aircraft maintenance) awarded under BA's licence.

Students can gain hands-on experience with Rolls-Royce Spey engines, and a full-size BAE Jetstream 31 commercial plane. BA offer up to 50 places at their facilities for students to complete the practical tasks and hands-on hours required as part of their industry training.

Impact

- The partnership allows BA – who already employs over 1,400 people in South Wales – to recruit the very best graduates with skills appropriate for their business, addressing a significant skills shortage in aircraft maintenance engineers at the national and international level.
- In addition, BA is also able to promote the development of its existing employees through opportunities to study academic modules from USW at undergraduate and postgraduate level.

Source: UUK/UKCES (2014)

Community-based part-time degree programme

Swansea University

Background

Since 1990, Swansea University has offered a community-based part-time degree programme in 13 community venues across South West Wales and on a university and a college campus. The programme primarily targets disadvantaged and isolated communities; in 2012–13, around 29% of all participants were from Community First areas (the most deprived areas of Wales). Participants receive support through a number of routes, as follows:

- A 10-week BA preparation programme for learners without a tradition of higher education.
- Free, impartial educational and careers advice available throughout the programme.
- Flexible support – available face-to-face at community venues, by telephone or email – to ensure retention and encourage student involvement and active participation, including extensive study skills support.
- A dedicated library at the South Wales Miners' Library.
- Video conference facilities that enable courses to be delivered at Pembrokeshire College from Swansea University.

Impact

As of December 2014:

- 450 part-time students have attained university degrees
- 253 more are currently studying for a community-based part-time degree
- retention rates have averaged 87%
- 73% of students have achieved a first or upper second degree qualification

Source: UUK/UKCES (2014)

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Meeting the skill needs of the public sector

As well as supporting the skills needs of businesses, a number of studies have also highlighted the value of university degrees in a range of public sector professions. For example, a study by Nurse Forecasting in Europe (RN4CAST) examines nine European countries, exploring whether differences in patient to nurse ratios and nurses' educational qualifications were associated with variation in hospital mortality after common surgical procedures⁶⁵. The study concludes that the number of preventable hospital deaths could be reduced if greater emphasis were placed on ensuring that nurses have bachelor degrees.

Universities do not only support skills development at graduate level, they also support teaching in schools by educating future teachers⁶⁶ and by using their knowledge and experience to inform curriculum development. University delivery of initial teacher training and teacher education is highly regarded. In a 2013 survey of newly-qualified teachers, 89% of those who had been trained at primary level within a university route rated the overall quality of their training as 'good' or 'very good'. Among secondary NQTs the rate was even higher at 91%, which was greater than the levels of satisfaction reported from other training routes.⁶⁷

4.2 Universities raise aspiration and support social mobility

Universities have made widening participation a core part of their mission. Their strategies typically target interventions that help improve the opportunities of disadvantaged people at all life stages. In that process they not only improve the livelihood of individuals, but also unlock the talent and potential that these individuals can bring to the economy.

Social mobility is closely linked to the wider performance of the economy; an OECD study warns that low mobility can curb economic growth and constrain productivity.⁶⁸ This implies that even from a narrow economic perspective, failure to tackle disadvantage and low aspirations have a negative impact on the UK's economic wellbeing.

⁶⁵ RN4CAST. "Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study".

⁶⁶ Universities UK. The impact of initial teacher training reforms on English higher education institutions. Available at: <http://www.universitiesuk.ac.uk/highereducation/Documents/2014/ImpactOfITTR reformsOnEnglishHEIs.pdf>

⁶⁷ National College for Teaching & Leadership, The newly qualified teacher survey (2013), available at: http://dataprovion.education.gov.uk/public/page.htm;jsessionid=5598EB228B74456AFBC603C5C2A566A7?years=2013&years=2012&years=2011&nhs=hk_185344&na=forward&popupmode=&hiddenXSRFPParam=06b6e955-4fa8-4010-9893-cae79d215c7b&topage=viewRespDiffInsTypesReports&submit_view=View

⁶⁸OECD (2010) *Intergenerational Social Mobility: a family affair?* Available online at: <http://www.oecd.org/economy/obstaclestosocialmobilityweakenequalopportunitiesandeconomicgrowthsaysoecdstudy.htm>

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Universities in England estimate that they will spend £673 million on improving access to higher education in 2014–15 – or 27% of fee income above the basic level of £6,000.⁶⁹ Between 2004 and 2013, the higher education participation rate of young people in the most disadvantaged areas in England increased by 43%.⁷⁰ Universities not only work to ensure that a diverse student body enrolls on their courses: they also work to meet the needs of their students and ensure that they succeed. The UK has very low non-completion rates, amongst the best in the world.

Universities create prosperity in their local areas, contributing to regional growth, jobs, investment and community wellbeing

Universities help to ensure that all regions achieve their economic potential: they attract investment; create and support local jobs; ensure community wellbeing; and play an important role in shaping regional growth strategies.

Many major knowledge-based economies across the developed world, including the UK, have recognised the benefits of place-based approaches to growth, such as smart specialisation. The OECD defines smart specialisation as a strategic approach to economic development, in which 'countries or regions identify and select a limited number of priority areas for knowledge-based investments.'⁷¹ To be successful, such an agenda will need to mobilise and coordinate the best resources and stakeholders in local areas, particularly those that are closely linked to innovation.

Universities recognise their role as economic actors and the contribution they can make to place-based economic agendas. They harness their resources to drive regional competitive advantage in key areas of the economy and to solve the wider issues that affect local policymakers, businesses and residents through 'place-shaping' interventions.

4.3 Universities create prosperity in their local areas, contributing to regional growth, jobs, investment and community wellbeing

Universities contribute significantly to regional growth, helping regions to achieve their economic potential by supporting innovation and entrepreneurship, attracting investment and talent, and creating jobs.

Universities as economic and civic leaders and place shapers

Many universities act as 'anchor institutions' in their local area. They are in an ideal position to take the lead on significant socio-economic issues at a local level by:

⁶⁹ Universities UK (2015) *Efficiency, effectiveness and value for money*
<http://www.universitiesuk.ac.uk/highereducation/Documents/2015/EfficiencyEffectivenessValueForMoney.pdf>

⁷⁰ Source: HEFCE (2013) Trends in young participation in higher education

⁷¹ <http://www.oecd.org/sti/inno/smartspecialisation.htm>

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- helping to shape local economic strategies, for example by supporting their Local Enterprise Partnership (LEP) in the development of their European Structural Investment Fund (ESIF) strategy`
- linking research and teaching priorities to local economic and social needs
- promoting public engagement, community well-being and active citizenship skills

Universities as investment magnets and global economic ambassadors

Universities play an important role in attracting foreign direct investment. They ensure that a strong talent pool is available for local companies and they are a globally recognised source of research and innovation. They also play an important role in the creation of the high-potential industry clusters and innovation hotspots sought by investors.

Universities anticipate future needs, help to shape policy and drive research and innovation to enhance efficiency and effectiveness.

Universities provide knowledge and insight that can support both the private and the public sector. They have a role in driving fundamental discovery that is unmatched by other actors in the innovation system. Discoveries such as the graphene, the structure of DNA, MRI, Stem Cells and LCDs⁷² – all of which were underpinned by the work of academic researchers from UK universities – may not have occurred in the absence of publicly-funded research departments.

The accumulation of fundamental knowledge and cross-fertilisation of ideas across disciplines within university departments puts academic researchers in a good position to anticipate future trends and the dynamics of technological development. This – combined with their ability to draw together stakeholders – also means universities have an important part to play in informing and supporting evidence based policy-making.

⁷² Universities UK (2006) EurekaUK - 100 discoveries and developments in UK universities that have changed the world

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4.4 Universities as economic and civic leaders and place-shapers

Universities have been established in their local areas for longer than most other private organisations and are far less likely to relocate elsewhere. Their ability to attract and retain students, staff and research partners depends crucially on the desirability of their local areas. Therefore, they have both the capacity and incentives to make a difference to the prosperity and appeal of regions over the longer term. Universities are in an ideal position to take the lead on significant socio-economic issues at the local level, for example by:

- **shaping local economic strategies**
 - This role is best exemplified by universities' close involvement in shaping their Local Enterprise Partnerships' (LEPs) European Structural Investment Fund (ESIF) strategy. A recent survey of institutions in England undertaken jointly by UUK, HEFCE and DCLG suggests that the vast majority of universities have helped shape their local LEPs ESIF strategy.⁷³ They typically do so by providing data and evidence for strategic economic plans and ESIF local implementation plans, or by providing strategic input through one or more university representatives on local ESIF/innovation sub-committees. In some cases they also support LEPs on developing their 'smart specialisation' approaches.

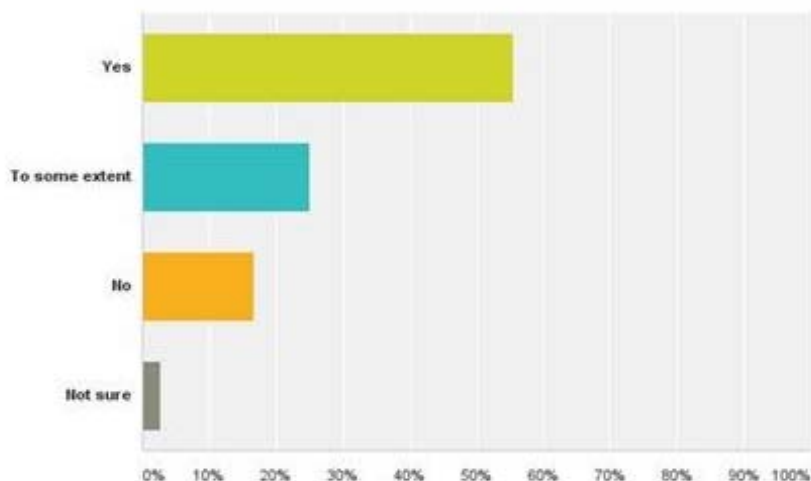
⁷³ UUK/HEFCE/DCLG (2015) [Assessment of university involvement in ESIF 2014-2020 Programme](#)

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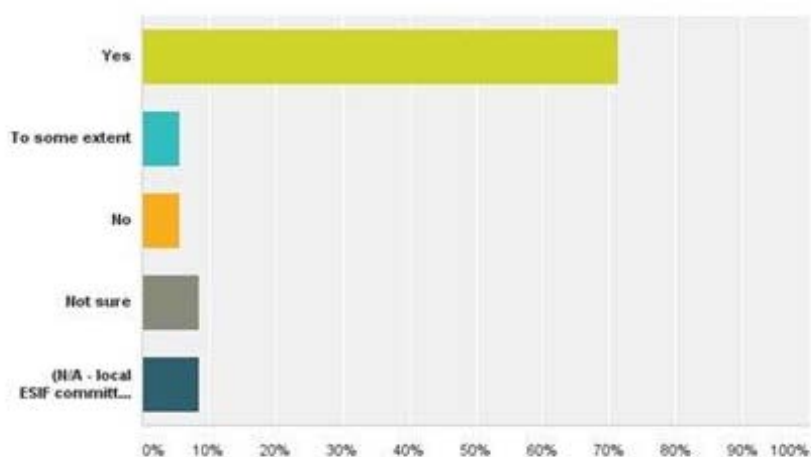
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Figure 4: Higher education sector participation in shaping ESIF implementation plans and representation on ESIF committees

Q2: Has the HE sector in your LEP area provided any practical support for the preparation of ESIF Implementation Plans?



Q5: Is the HE sector represented on your local ESIF committee?



Source: UUK/HEFCE/DCLG

- **linking research and teaching priorities to local economic and social needs**
 - Many universities were founded by industrial benefactors with the specific goal of meeting the research and training needs of local industries and trades. Today, universities continue to pursue this goal, though often with a more explicit regional growth focus. There are many examples of research departments, centres and programmes co-founded with other actors to build up local expertise and skills on issues that affect regions and advance their competitive advantage.

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- **promoting public engagement, community well-being and active citizenship skills**

Research shows that graduates are more engaged in public life, as they are more likely to vote and volunteer in their local community.⁷⁴ Almost 33% of students devote a significant proportion of their spare time to volunteering in a community, and there are over 725,000 students who volunteer for an average of 44 hours per year. This is primarily a spill over effect from universities' core teaching activities. However, universities increasingly pursue these as deliberate goals in their third mission strategies, encouraged by a sharpened focus on enhancing the impact of their research.

HE-BCIS data suggests that in 2013–14, nearly 8 in 10 institutions offered extramural courses for the public.⁷⁵ In that year only they held thousands of public events, including free lectures that were attended by over 1.8 million people. More than 100 universities across the country run museums and galleries that are open to the public, attracting nearly 4 million public visitors in 2013.⁷⁶

RCM Sparks

The Royal College of Music

Background

RCM Sparks is the Royal College of Music's learning and participation programme which provides opportunities for young people to learn about and play music. This year, the programme involved over 3700 children and members of the community and trained 130 RCM students. Approximately 60% of places at community workshops are free of charge. RCM actively recruits children from low socio-economic background to help those children to participate.

Source: UUK 2009

⁷⁴ <https://www.gov.uk/government/publications/benefits-of-participating-in-higher-education-key-findings-and-reports-quadrants>

⁷⁵ Higher Education Business and Community Interaction Survey, source: HEFCE

⁷⁶ Universities Museum Group and University Museums in Scotland (2013) Impact and Engagement: University Museums for the 21st Century

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4.5 Universities as investment magnets and global economic ambassadors

Universities, thanks to their scale, networks and reputation, can do a lot to attract major investors. They are particularly good at attracting the sort of knowledge intensive businesses that are needed to rebalance the UK economy towards high value-added sectors and tend to grow quickly and create high-quality jobs in their region.

Encouraging high-growth business clusters is an effective means of promoting economic growth. An extensive body of research recognises that business agglomeration (or cluster) effects act as catalysts for rapid growth in knowledge based economies. For instance, research suggests that the 31 top UK business clusters provide jobs to 1 in 7 employed people and produce 20% of the UK's output, despite containing just 8% of all businesses.⁷⁷ Universities often are the natural centre of business agglomerations or clusters due to their teaching, research and innovation activities.

⁷⁷ Centre for Cities and McKinsey & Company (2014) Available online at: <http://www.centreforcities.org/publication/industrial-revolutions/>

Universities UK

The economic role of UK universities

Creating a cluster of innovative laser companies in Scotland serving global markets

University of Strathclyde

Background

University of Strathclyde's Department of Physics has undertaken world-leading research in solid state lasers and non-linear optics, supported by £1.3 million of research funding during the period 1993–2001 from a range of sources including the EPSRC, EU and the National Physical Laboratory. Their research included the development of new laser technology that was better suited to the needs of cold atom research than the laser systems available commercially at that time.

Impact

- The university's expertise has helped to create a cluster in the West of Scotland that has become one of the leading European centres for innovative laser manufacture. This attracted investment to the local area from multinational company Thales Optronics, which decided to locate all its laser manufacturing in Glasgow, and the applied research organisation Fraunhofer Society, which chose this location to establish a new research centre in applied photonics, its first centre in the UK.
- Two highly successful spinout companies were created to commercialise the laser technology developed in house: Microlase (1992) and Msquared Lasers (2006)

Source: REF 2014

Growth also depends crucially on the ability of a country to attract investment from across the world, and the UK is one of the world's top destinations for Foreign Direct Investment (FDI).⁷⁸ Universities play a central role in attracting inward investment: they ensure that a strong talent pool is available for local companies; they are a globally recognised source of research and innovation; and they play an important part in the creation of the industry clusters and innovation hotspots sought by investors.

The UK has one of the highest proportion of domestic R&D financed from abroad in the OECD (21% in 2013)⁷⁹, and universities themselves secure of 15% of their R&D

⁷⁸ UNCTAD (2015) Global investment trends monitor 2015, No. 18

⁷⁹ OECD (2015) Main Science and Technology indicators, released 3 February 2015

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funding from outside the UK⁸⁰. Evidence published by the OECD argues that investment in universities is more effective in generating research intensive FDI than financial incentives to foreign investors.⁸¹ The same indication comes from other work undertaken for Universities Scotland, which suggests that the presence and quality of Scottish universities are cited as a key 'pull' factor behind nearly half of all FDI projects in Scotland.⁸²

This ability to encourage investment is reinforced by the 'soft power' that universities and their students are able to secure for the UK economy on a global scale through their reputation and influence. Both can do a lot to promote the reputation and attractiveness of their local areas to international investors, acting as economic ambassadors for their towns and regions at the national and international level. This can occur directly through the global investments and research links maintained by universities, but their students' role in championing the UK brand is also significant.

Many of the UK's graduates go on to occupy very influential positions in business and government around the globe. Most are highly likely to maintain strong networks in the UK and continue to buy UK goods and services long after graduation. As a result, they contribute strongly to the UK's diplomatic, economic and soft power.

⁸⁰ Office for National Statistics (2015) UK Gross Domestic Expenditure on Research and Development (R&D), 2013

⁸¹ Swann, 2009, cited in Schmuecker K; Cook W (2009) Beyond bricks and mortar boards: universities' role in building regional economies, a report for Universities UK and the Institute for Public Policy Research IPPR, 2009 f

⁸²Universities Scotland. *Grow, export, attract, support: universities' contribution to Scotland's economic growth*. <http://www.universities-scotland.ac.uk/uploads/Grow%20Export%20Attract%20Support%20Universities%20Scotland.pdf>

5. Universities anticipate future needs and drive research and innovation

It is widely recognised that the greatest long-term productivity advances come through breakthroughs in basic knowledge. By pushing back the technological frontier of the economy, such discoveries can lead to a step change in productivity which lasts over time. Yet, the conditions for the curiosity driven research that generates them are difficult to achieve outside of university departments; market failures and difficulties in appropriating the benefits of research results can deter private investment, even when this could lead to greater long-term competitive advantage for a firm or industry. Furthermore, given that innovation is a cumulative process, it often takes years and multiple discoveries to develop a practical application that can attract interest from other innovation actors.

5.1 Universities as knowledge pioneers

Universities have a role in driving fundamental discovery that is unmatched by other actors in the innovation system. As shown by extensive qualitative research, many of these discoveries take years to develop into field applications. Universities can successfully bring discoveries close enough to the market for other partners to get businesses on board once they come to the application stage.

Discoveries such as fibre optics, stem cells and graphene, the development of technologies like computers, solar panels and the internet, and medical breakthroughs such as the Hepatitis B vaccine, the portable defibrillator and modern infertility treatment – all of which were underpinned by the work of academic researchers from UK universities – may not have occurred in the absence of publicly funded research departments.⁸³

Various evaluations point at the economic benefits of curiosity-driven research, which inevitably underestimate the true social and economic impact of successful discoveries. Research suggests that investment in R&D typically has a rate of return in the range of 20%-50%, but could be significantly higher than this.

Some studies also provide evidence of the returns from research in specific disciplines. For instance:

- Mathematical science research generates an estimated contribution to the economy of £208 billion, and accounts for 10% of UK jobs and 16% of GVA.⁸⁴

⁸³ Universities UK (2006) EurekaUK - 100 discoveries and developments in UK universities that have changed the world

⁸⁴ EPSRC and Mathematical Sciences Council (2013) Mathematical sciences research Leading the way to UK economic growth, a report by Deloitte

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- Social science research contributes just under £5 billion to the UK economy every year, compared to an annual expenditure of around £540 million in research grants and contracts⁸⁵.
- For every £1 spent on research by the Arts and Humanities Research Council, the UK may derive as much as £10 of immediate benefit and another £15-£20 of long-term benefit.⁸⁶
- R&D investment in the aerospace sector generates a return of around 70% – that is, every £100 million invested in R&D is associated with an increase in GDP of £70 million in the longer term.⁸⁷
- According to estimates produced by a US study, \$2 billion of spending on research in genomics over the next decade could generate a return of between four and 30 times that investment⁸⁸.

The accumulation of fundamental knowledge and cross-fertilisation of ideas across disciplines that occurs within university departments in turn makes academic researchers well-placed to anticipate future trends and the dynamics of technological development.

Universities also have an important part to play in informing and supporting evidence-based policy-making. A wide range of players must work together to identify innovative changes in the way public services are delivered and drive process improvement.⁸⁹ Universities are often at the forefront of this co-production approach to public policy. They work with practitioners and the public to identify research-informed solutions that improve the efficiency and effectiveness of public service delivery to find sustainable approaches in the face of challenging social, economic and demographic trends.

⁸⁵ Bastow, S., Dunleavy, P., Tinkler, J. (2014) *The Impact of the Social Sciences: How academics and their research makes a difference*, Sage

⁸⁶ Estimates by PriceWaterhouseCoopers, cited in AHRC (2009) *Leading the world: The economic impact of UK arts and humanities research*

⁸⁷ Oxford Economics 'The Case for Space: The Impact of Space Derived Services and Data', 2009, p.4
<https://www.stfc.ac.uk/resources/pdf/case-for-space.pdf>

⁸⁸ Institute of Physics, 'Physics: transforming lives', 2013, p.40
<https://www.stfc.ac.uk/files/2428/Physics%20transforming%20lives.pdf>

⁸⁹ Harris M and Halbury D (2009) *The innovation imperative*, discussion paper for NESTA

Developing a strategic approach to procurement, saving millions for the NHS

University of Bath

Background

The University of Bath's Centre for Research in Strategic Purchasing and Supply (CRiSPS) is a leading authority on public procurement in the UK. CRiSPS has worked with the NHS for over 15 years to develop a more strategic and integrated approach to the approximately £14 billion spent annually by the NHS on goods and services. This work was supported by a number of grants from the NHS, EPSRC and Chartered Institute of Purchasing and Supply, which also made it possible to recruit a number of PhD students to work on the project.

Impact

- Up to £500 million in annual savings has been achieved across the NHS as a result of an MBA accredited module that, using insights from CRiSPS's research, trained teams of NHS buyers to implement a new approach to procurement.
- Methodologies have been designed to enable smaller businesses to engage more effectively with the NHS and to reduce the timescales needed to evaluate medical devices, and informed changes in the Department of Health's Commercial Strategy.
- A practical example of how a more effective procurement strategy secures benefits for patients, NHS organisations and taxpayers is the work that CRiSPS did to help the NHS secure digital hearing aids. With CRiSPS support and research insights, the NHS was able to negotiate a contract to supply over 260,000 digital hearing aids free to patients, at a reduced cost of £60 per unit. Before the changes were implemented, the NHS was purchasing 450,000 analogue hearing aids that cost an average £222 per patient per year. This helped the NHS save £252 million on the purchasing price of the aid and £45.5 million annually in total service costs. This was also a positive outcome for patients who now receive a better performing hearing aid free of charge.

Source: REF 2014

Economist helps the Bank of England respond to the financial crisis

University of Oxford

Background

In the wake of the collapse of Northern Rock in September 2007, Paul Klemperer, Edgeworth Professor of Economics at the University of Oxford, was asked by the then-Governor of the Bank, Mervyn King, to design a system for working out the best way to lend money against both safe government bonds and the more risky assets that many institutions held. This was to allow the Bank of England to respond effectively to the onset of the financial crisis, and supply liquidity urgently to the banks and building societies that needed it most at that time. Professor Klemperer developed a new design, known as the 'Product-Mix Auction', which helped the Bank of England understand banks' individual preferences and allocate the loans efficiently in a few minutes.

Impact

- In 2007, running the Product-Mix Auction model enabled the Bank of England to efficiently allocate money to the banks and building societies that needed it most urgently during the crisis.
- The Bank of England now uses the auction system on a regular basis to provide liquidity to the UK financial system. In 2010, the new auction was adopted as the Bank's standard mechanism for long-term repo operations.
- In October 2013 the current Bank of England Governor Mark Carney announced that the Bank would hold larger auctions to offer money at a lower cost and in exchange for a wider range of collateral.

Source: ESRC

6. Conclusions and policy implications

This report has illustrated the wide variety of ways in which universities are delivering value for the UK economy, and helping it seize the opportunities and address the challenges that may impact its growth potential in the long term. By considering their market benefits and the non-market ones that nonetheless indirectly impact economic growth, it has shown how these contribute to:

- creating prosperity in their local areas through contributing to regional growth, jobs, infrastructure, investment and community wellbeing
- ensuring that the UK remains competitive in the global market by supporting greater business productivity and export-led, knowledge-intensive growth
- responding to skill needs as the shape of the workforce changes
- anticipating future needs and driving research and innovation

The wide-ranging impact of their activities and the public knowledge foundations on which these are built make it difficult to understand the scale of their contribution to growth. At the same time, these traits are what make them a core asset for the economy, and a critical part of the thriving national innovation system that is needed to support sustainable growth in the UK. As a result, any policy aiming to promote the long-term economic success of the UK needs to have universities at its heart, recognising the breadth, complexity and significance of their contribution and the need for stable, continued support to enable further impact.

The current success of UK universities builds on decades of continued government investment and a higher education policy and funding system whose strengths are globally recognised and include:

- Autonomy with accountability: autonomy allows UK universities to shape and invest flexibly in their strategies and respond quickly to challenges as they arise. Simultaneously, the accountability regime (as reflected, for instance, in selective funding processes) ensures that public funding is spent efficiently and effectively. The dual support system for research is a crucial element to this.
- Diversity: the all-round excellence of the sector depends to a large extent on universities' ability to cultivate their specific strengths and cater to different economic and skills needs (including those that are specific to their regions and localities).
- Sustainability: UK universities' ability to invest in the long term and remain resilient to external developments (such as increasing international competition for students or on research and innovation) ultimately relies on a funding system that, despite being strongly

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orientated towards performance, still ensures financial stability and predictability.

Together, these systemic features have laid strong foundations for universities to support the UK economy. They should be preserved to ensure that the higher education sector can continue to contribute to meeting the complex social and economic challenges facing the UK over the next decade and beyond.

Universities UK (UUK) is the representative organisation for the UK's universities. Founded in 1918, its mission is to be the definitive voice for all universities in the UK, providing high quality leadership and support to its members to promote a successful and diverse higher education sector. With 133 members and offices in London, Cardiff (Universities Wales) and Edinburgh (Universities Scotland), it promotes the strength and success of UK universities nationally and internationally.

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