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# A Case Study on the Financial Value of Host University Engagement between the University of Surrey and the Surrey Research Park

Malcolm Parry☆

Managing director & CEO, Surrey Research Park, University of Surrey, UK

**Abstract**

The value of universities in driving economic development has been understood for a long time. However, with the increasing importance of the 'science—entrepreneurship' relationship in giving science its modern economic value there is growing interest in how this dynamic can be enhanced. One of the strategies that has been widely adopted has been the creation of research-science-technology parks although commonly these projects were being established prior to the theoretical approaches that justify their development.

This paper reports on a study that measured the financial value of the links between the University of Surrey and tenants on its Surrey Research Park project and also looks forward at strategies being adopted by the University concerning the continuous improvement of its technology transfer offering to increase the value of these links and put some empirical data behind the claims of the value of research-science-technology parks as part of a wider innovation strategy.

**Keywords**

Financial value; Innovation; Host University; Research capital for park

## I. INTRODUCTION

The role of universities in contributing to economic development is complex but proven. Historic evidence from international data from the 1960s to 2018 shows the value of universities in regional economic performance where a 10% increase in number of universities in a region is robustly associated with 0.4% increase in regional GDP.

There is also evidence that the size of a university also influences start-up activities in nearby areas including in the innovative high-tech sectors. This is facilitated by a Science and Technology Park and there is often a beneficial effect on GDP from spill-over driven growth via formal and informal interactions between university research and business, and the innovative activities of staff, students and graduates (Azmat et al., 2018).

The Tech Transfer Offices (TTO) infrastructure in universities that customarily supports the relationship commonly combines a number of activities. However, universities are being set the challenge by governments to increase their influence on regional economic development and they are working to build business connections. They are moving away from purely dealing with patent licencing and management to wider functions that include developing research, consultancy and educational links (Huggins, 2012). Today in a modern university the scale of the work of TTOs covers a much wider level of engagement. Details of these wider initiatives are noted in Table 1.

☆Correspondence to : Dr. Malcolm Parry
Managing director & CEO, Surrey Research Park, University of Surrey, Guildford, Surrey, GU2 7YG, UK
E-mail: m.parry@surrey.ac.kr

Table 1. University – Business links.

| Linkages | Activities |
|---|---|
| Collaborative research | Activities which involve undertaking a project in partnership with a firm or other organisation. |
| Contract research with SMEs | Activities which involve undertaking a project for a small or medium-sized firm (less than 250 employees). |
| Contract research with non-SMEs | Activities which involve undertaking a project for a large firm (more than 250 employees). |
| Consultancy contracts | Activities which involve the provision of a specific service, facility or piece of equipment to another organisation. |
| Courses for businesses | Activities which involve creating or providing education for the business community. |
| Patents | Activities which resulted in the application or granting of a patent. |
| Licences | Activities where the interaction involved the granting of licences. |
| Spin-outs | Activities which involved interaction with any firm which is: a spin-out with some ownership by a university; a spin-out not owned by the institution; a staff start up; or a graduate start up. |
| Establish investment funds | Some investment funds are internal, but others are based on resident Angel Clubs that are populated with external investors and to support this function some of these offices also offer a wide range of business clinics and business acceleration programmes. |

In addition, TTOs commonly have a research bid writing function that responds to both government and to business related research opportunities and provide a pre and post research award service that manages the delivery of outputs, and the financial and legal management of the research.

The changing role of TTO offices is happening in nearly all cultures, under nearly all political regimes and irrespective of the relationship between government and their universities. However, in some countries like the UK the policy environment for universities is compelling them to make this shift towards adopting a more entrepreneurial stance in their behaviour as many of the government grant and support programmes require collaboration with business.

Like all institutions universities are also aware of the changing business environment including the increasing interest in innovation as a process that adds value to science. To address this opportunity many universities, including the University of Surrey, have extended their reach into this activity by appointing a Director of Innovation Strategy.

In the case of the University of Surrey this role includes taking overall responsibility for leading the strategic development and operation of the University's Innovation programme. This includes developing and then maintaining its strategic partnerships and collaborations, including those that have a regional development focus. The role also carries the responsibility for managing the strategic aspects of the innovation portfolio, including knowledge exchange in its widest sense, intellectual property capture and management, and managing government supported business incubation and entrepreneurship activities.

## 2. SCIENCE-RESEARCH-TECHNOLOGY PARKS AND INNOVATION

In the UK, the first move to create science and research parks was by universities as part of their Tech Transfer activities. The University of Surrey were among the first seven universities to create its park in 1983. In the early days of development there were a number of criticisms of these projects (Massy et al., 1991) while there was also reports that reflected on their value (Wicksteed, 1985). The major criticism dwelt on measuring the growth performance of companies on science parks when compared with matched samples of

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companies in the general community and reported the finding that there was little or no difference.

Since these initial studies the science park movement has evolved to reflect significant social and technological change.

Science and Research Park now offer a much wider range of business support strategies that include simple co-working opportunities. The perceived success of these projects is now not only resulting in these being created by universities, such as the Surrey Research Park, which has sponsored the RocketDesk[1] and SETSquared, but also by commercial organisations such as Google Campus[2] and WAYRA[3] projects. In the case of Surrey's RocketDesk project it is a co-working space dedicated to computer games developers that is run on behalf of the Park by two games developers that are also entrepreneurs. The SETsquared project again a Surrey initiative is a multi-technology incubator/accelerator that also operates as a co-working space on the Park. The development of these projects has been validated in a report by the UK government (Bone et al., 2019) on how business incubation and accelerators provide significant benefits for those companies that register for these projects.

The computer revolution has grown beyond all imagination, as has the penetration of computing and associated connectivity in society (Zobel, 2016). Scientific literacy has increased substantially. It is reported that in China alone the numbers graduating each year has increased from 830,000 in 1998 to 6.8m in 2012 (Carlson, 2016) and estimates that, of the world population in 2020, there will be some 840m people with post-secondary education (Roser and Ortiz-Ospina, 2019) which not only increases international competition but also markets for innovation.

The level of innovation in science in the past 30 years has also led to the development of a number of technologies that support 'artificial revelation'. This has allowed the exploration of the phenomenon that can neither be seen or heard that has led to enabling general purpose technologies that are now being exploited in the commercial domain. The sophistication of these technologies suggests that for their exploitation opportunity entrepreneurs need to link with the research base where they are being developed to drive their value into the economy. An example is the development of image capture technology by IKinema that is associated with the University of Surrey's Centre for Vision and Speech Signal Processing and was involved in the development of the technology on the Surrey Research Park.

The level of interest by government in the mix of the activities that sit at the heart of innovation ecosystems and the relationships between these has prompted research to measure the multi-dimensional facets that are necessary to provide the capacity to support innovation (Cornell University et al., 2018) and associated business sophistication[4] . These are being used to measure a region's capacity to support innovation. Policy makers have become increasingly concerned over the last two to three decades about the role of innovation in economic performance. As a result there is an increasing focus on what this means, why it is important and how to create an environment that will increase its economic and social impact (Edler and Fagerberg, 2017).

One of the outcomes of this concern is the view that in today's economy entrepreneurship gives economic value to science, where science includes technology, engineering and social science, by creating growth orientated organisations that use science as its raw material. Experience and research findings suggests that place has a valuable impact on the efficiency of this process. In particular where locations combine well connected physical assets with the economic drivers of a research base, TTOs, incubation cultivators such as incubators and accelerators, and networks that link R&D to entrepreneurs (Vey et al., 2018).

## 3. RESEARCH SCIENCE AND TECHNOLOGY PARKS AND THE KNOWLEDGE ECONOMY

The widespread development of infrastructure that operate under the branding of research-science-technology-innovation parks and areas of innovation (STPs) is a testament to the value attributed to the 'science-entrepreneurship' relationship in the knowledge economy.

Their particular value derives from the support they offer to opportunity-entrepreneurs as they test demand and competi

[1] http://rocketdesk.co.uk/
[2] https://www.campus.co/london/en
[3] https://www.wayra.uk/
[4] World Bank Business Sophistication Index. Available at https://govdata360.worldbank.org/search?key=Business+sophistication+Index

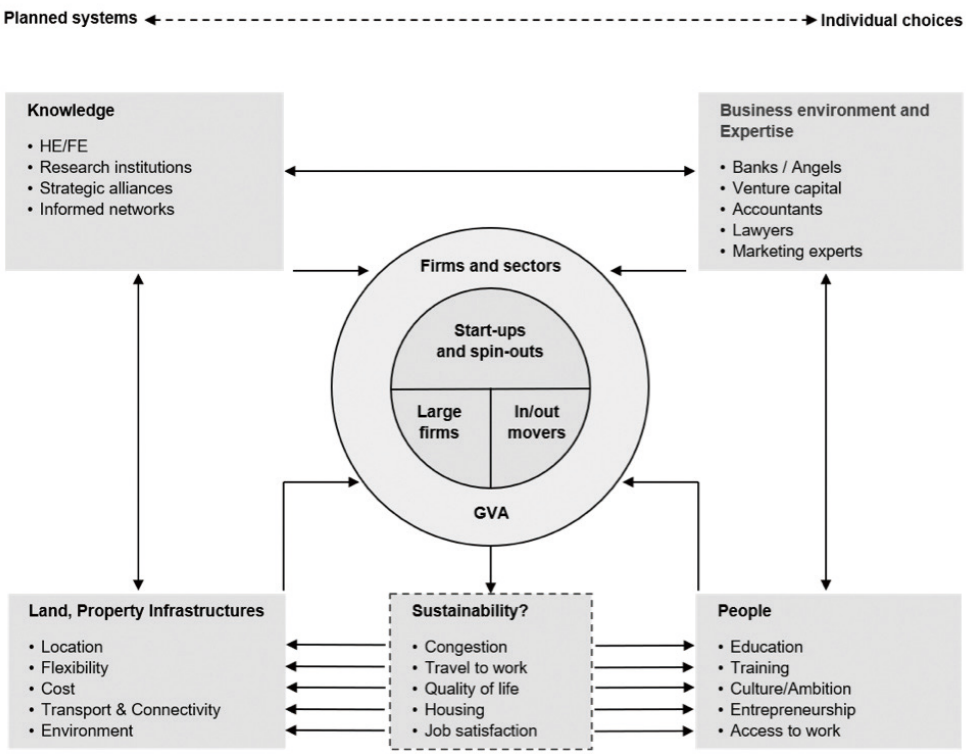


Fig. 1. Components of a place-based knowledge intensive cluster

Source: Doel and Green (2018)

tion for their products and services and work to raise investment to support the development of their business. For larger companies and specialist part of big corporates the attraction to these locations is access to technology, research facilities and talent.

In a broader context the level of interest by local government in the UK in the mix of the activities that sit behind these locations prompted a study (Doel and Green, 2018) into the mix of factors and linkages that increase the chance of building and sustaining a technology cluster around STPs.

Their findings identified both a range of planned and unplanned personal choice driven elements, which if brought together, drive up gross value-added activities (GVA). However, their success is dependent on the quality, extent and reliability of the linkages that connect these factors – see (Figure 1). An important part of the planned elements in the system in the UK through which to support the links from the knowledge component into the business activity include financial incentives. These include R&D tax credits that includes cash-back for loss making companies, innovation grants and loans, tax relief for business angel and venture capital investments, and tax relief for patent exploitation, and financial assistance to companies to support young researchers to work in innovative businesses.

Also to encourage universities in the UK to take an active role in economic development, the government has set up an Industrial Challenge Fund to support mission related research and innovation, and strength in places investment initiative to help build capacity in regions based on their respective R&D and business led innovation capacity and capacity for entrepreneurial discovery.

The UK government has also merged its Research Councils with its Innovation Agency to create the UK Research and Innovation (UKRI) which has been given responsibility for a number of grant and funding programmes that help to link business and suppliers of research such as the HE sector.

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In response to these opportunities the University of Surrey has made a strategic decision to modify the TTO activities which include bringing the Surrey Research Park operation within the remit of its recently rebadged TTO as Research and Innovation (R&I) and to undertake a study.

## 4. THE SURREY RESEARCH PARK

The Surrey Research Park was planned in 1981 and opened its first facility in 1984 with the intention of meeting five objectives for its three stakeholders. Those for the University were concerned with raising some independent income, building an ecosystem to support technology (knowledge transfer), and raising the profile of the University. The offer to tenant companies was to help them gain a competitive advantage through access to talent and technology, and the opportunity to share the risk of creating a start-up by offering business formation and development support while they become established. The third stakeholder being local government, gave planning permission for development with the purpose of the adding diversity to the employment opportunities in the region by encouraging the growth of technology related employment in the area.

University records show that the result of the formation of the Park has created over £126 million of free income for the University from its property investment, and its value as real estate is now estimated at over £120m. A study in 2014 reported more than 500 companies have been tenants on the site (Parry, 2014) since its first tenants moved into the 'incubator' known as the Surrey Technology Centre in 1984 of which some have grown on site, been acquired and left with their new owner, pivoted and left or merged with other tenants. In 2019 there are currently 179 companies on site.

A number of these tenants have collectively attracted substantial inward investment to the region on acquisition which is estimated to be of the order of £1bn into companies involved in cyber security (Daily Telegraph, 2008), AI data analysis (Scientific Computing World, 2017), and computer games (Niccolai, 2006) among other technologies.

A study in 2013 (Monck, 2013) reported that over the period from opening in 1984 there had been a substantial increase in employment in the knowledge-based sectors of the economy in Guildford and Surrey as a whole because of the growth of the Park. Figures at the start of 2019 include 4,500 employees in 179 companies and the study in 2013 indicated the Park has created an addition 7,000 jobs in the local area.

For a number of years detailed data was collected annually on the turnover of tenant companies using the UK government's Companies House records but with the change to the reporting obligations of companies this was made more difficult. Without this data, it is difficult to arrive at an accurate assessment of the contribution that the Park is making to the Guildford or Surrey economy; however, data on employment creation in the region does provide an insight into some of the influence that the Park has had on local and regional economic development. However, using the available survey data on employee numbers and estimates of the average turnover per employee of the companies on the Park from (4,500 staff currently and an average turnover of £140,000 to £150,000 per employee using data from 2011[5]), and a multiplier of 1.3 gives an estimate of £875m going into the regional economy.

Whilst the Park does not operate a formal sectoral policy the demand for space on the site has resulted in the emergence of a number companies in overlapping technologies and through the use of a proactive pricing policy the Park has focussed much of its support on start-ups and helping those that are successful to scale.

## 5. THE UNIVERSITY OF SURREY – SURREY RESEARCH PARK CASE STUDY

There is no formal literature on the measurement of the financial value of research, consultancy and student placements between tenant companies on science/research parks and their host organisation. To address this deficit this study was undertaken to:

- Create a benchmark against which future proactive strategies to develop university-commercial-business-and industry links with science park tenants can be measured.
- Inform the University's TTO activities in order to increase university-tenant links with the intention of increasing its economic and social impact in the region.

[5] Work Smart data for Detica Limited 2011 annual accounts

Table 2. Details of company size, % of these that had interaction, types of links and value over the period 2014 to 2017 between the University of Surrey and Tenants on the Surrey Research Park.

| | Large companies > 50 employees | Small and Medium sized companies between 10 and 50 employees | Micros companies < 10 employees | Totals £ are, 000 |
|---|---|---|---|---|
| Number of companies | 8 | 90 | 76 | 174 |
| % of companies with which interaction took place | 88% | 59% | 43% | |
| Value of Research | £677 | £756 | £1,330 | £2,763 |
| Value of Consultancy | £0 | £35 | £23 | £58 |
| Value of Studentship | £155 | £80 | £27 | £262 |
| Value of Professional year placement | £7 | £20 | £4 | £31 |
| Total value of links over period 2014-2017 | | | | £3,114 to give annual average of £775 |

To undertake the study an interrogation of both the University of Surrey's financial, and careers and employment records was necessary. Previous attempts to assess these links by interrogating companies has proved to be unsuccessful because the diversity of connections and the variety of levels of company staff that responded to the survey made it difficult to assess their full extent.

**Data on companies**

**Company size** - companies have been categorised by their size.

**Sector** – companies have been categorised by sector (Aerospace & Defence; Education; Engineering & Environment; Life Sciences; IT Consultancy, Software & Data; Media & Digital Games; Other).

**High interactions** – companies that have multi-disciplinary relationships across the University and / or that create income from more than one active engagement. This also includes companies that have a single large collaborative research award with the University and / or are a strategic contact.

**Moderate interactions** – companies that engage with a small number of departments across the University in one or two active engagements that create a relatively small income. This includes companies who have PTY placements.

**Low interactions** – companies that engage with one or two academic departments and do not create income. This includes module speakers, student projects, graduate recruitment and alumni.

**Discussions** – companies that are currently in discussion with the University with regard to potential opportunities to engage.

**No interactions** – companies with whom no interactions have been identified.

**Research** – The value of funded research conducted in collaboration with companies.

**Consultancy** – The value of Consultancy, including SME innovation vouchers (companies supplied with small grants to engage with the University).

**Studentships** – The value of studentships were assigned based on the type of studentship and the following assumptions: £14,000 stipend; £3,500 home/EU fees; £15,000 overseas fees; other £2,000; top-up £1,500.

**Professional Training Year (PTY) when students spend a year in a professional placement that is part of their degree** – The value of PTY is based on the student fees payable to the University valued at £1,850 per PTY placement.

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Table 3. Details of company size, % of these that had interaction, types of links and value over the period 2018 to 2019 between the University of Surrey and Tenants on the Surrey Research Park.

| | Large companies > 50 employees | Small and Medium sized companies between 10 and 50 employees | Micros companies < 10 employees | Totals £ are, 000 |
|---|---|---|---|---|
| Number of companies | 10 | 31 | 132 | 173 |
| % of companies with which interaction took place | 81% | 19% | 34% | |
| Value of Research | £1,134 | £32 | £194 | £1,360 |
| Value of Consultancy | £N/A | £N/A | £N/A | £92 |
| Value of Studentship | £ | £ | £ | £N/A |
| Value of Professional year placement | £ | £ | £ | £22 |
| Total value of links over period 2017-2018 | | | | £1,474 |

Table 4. Sector engagement 2014 -2017 and annual average and 2018-19 values

| | 2014-2017 £,000 | Average pa 2014-2017 £ ,000 | 2018-19 £,000 |
|---|---|---|---|
| Aerospace and defence | £835 | £209 | £588 |
| Software and IT | £1,114 | £278 | £134 |
| Education | - | - | £7 |
| Life Sciences | £914 | £228 | £621 |
| Engineering and Environment | £54 | £13.5 | £65 |
| Media and Digital Games | £13 | £3.25 | £8 |
| Other | £184 | £184 | £47 |

The first part of the study involved detailed analysis of the links over the period 2014 to 2017 and are shown in Table 2. Then a further study for the year 2018- 2019 academic years was conducted with results in Table 3.

The study revealed that between 2014 and 2017 £3.1 m of interaction giving an average of £775,000 per annum.

In 2018-2019 academic with the increasing focus of government grants and funding programmes available to companies and with an expanded University team that has specialised knowledge on these grants the relationship has been strengthened.

The data on 'value of research' against company size suggests that micro-companies were more active in the initial period 2014 -2017 that was surveyed but in 2018-2019 this demand diminished.

The very high level of competition for these Innovate UK awards means winners are likely to be high impact businesses and suggests that the policies adopted by the Park and the R&I team on campus that manage links and the government programme are now working at higher levels of research risk with the University.

The data in Table 4 shows a strong alignment with the regional strength in digital enabling technologies that are associated with bioscience, AI, advanced engineering and digital communications that emerged from a regional science and

Table 5. Details of company faculty links by sector for 2014-2017 – note the data for Faculty – Park links 2018 – 2019 is not available.

| University Faculty | % of links associated with technology sectors |
|---|---|
| Faculty of Arts and Social Sciences - FASS | 36% IT, Software and Data |
| Faculty of Engineering and Physical Sciences – FEPS | 31% IT, Software & Data, 25% Aerospace & Defence |
| Faculty of Health and Medical Sciences | 63% Life Sciences |

innovation audit (Ritchie, 2018, *Perse Comm*). It is also clear that some of these technologies are important tools in 'artificial revelation' research which is founded on technologies that reveal science that cannot be seen or heard but drive natural phenomenon.

These data growth show a significant increase in company - university links in the aerospace and defence, life-sciences and engineering and environment. To assess the underlying reasons for these trends will require this project to become a longitudinal study that is now being developed. The value of this is grounded in the growing demand by the UK government and other funding bodies for research to demonstrate socials and/or economic impact particularly when the UK government is trialling, with the intention of launching, a Knowledge Exchange Framework (KEF) program.

The intention of this KEF programme is to increase efficiency and effectiveness in use of public funding for knowledge exchange (KE), to further a culture of continuous improvement in universities by providing a package of support to keep English university knowledge exchange operating at a world class standard (UK Research England, 2019).

To capitalise on the growing opportunities of working to the increasing demand by government of driving impact related research the University of Surrey has also published a new Research and Innovation Strategy. The main thrusts of this strategy include:

- To increase the scale and excellence of its research capacity by increasing the number and status of those involved creating the foundation to Surrey's research activities.
- To improve the University's research infrastructure. This will require improved access to research facilities and monitoring its use. It will need the University research support services to continue to become increasingly research centric. To this end the scale and scope of staff appointments over the last two years has increased the level of expertise on campus to support collaborative research with industry.
- This has required growing the University's postgraduate, post-doctoral and early-career research community by creating a Doctoral College.
- Creating a more innovation ecosystem through which to contribute greater economic, environmental, health and social benefit to society through enhancing the University's impact and level of innovation. To achieve this it is planned to increase the direct contract income, increase the value of each link, increase the number of industry links, increase the level of executive education, increase the level of patenting and licensing, grow the number of staff engaged with building partnerships as well as consultancy and incubation.

The Surrey Research Park has proved to be a very valuable asset to the University in terms of achieving four of its major objectives. The capacity of developing collaborative research with tenants remains as an area that has significant potential. The new focus on the Research and Innovation is an imperative if this is to be achieved. The initial surveys of the existing links has been an important benchmarking activity and needs to be extended so its value can be measured across the wider spectrum of science and technology parks in the world wide movement.

## 6. CONCLUSIONS

The lack of data on the financial value of the three levels of relationship of consultancy-research-placements between tenant companies and their host institutions from members of both the UK Science Park and the International Association of Science Parks makes it difficult to benchmark the performance of the Surrey Research Park – University of Surrey relationship that is recorded in this project. However, if Parks are to continue to develop strategies with their host universities there is a strong argument that this kind of financial data is collected.

It is suggested that the methodology adopted in this project is

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Table 6. Sector engagement 2014 -2017 and annual average and 2018-19 values

| | 2014-2017 £,000 | Average pa 2014-2017 £ ,000 | 2018-19 £,000 |
|---|---|---|---|
| Aerospace and defence | £835 | £209 | £588 |
| Software and IT | £1,114 | £278 | £134 |
| Education | - | - | £7 |
| Life Sciences | £914 | £228 | £621 |
| Engineering and Environment | £54 | £13.5 | £65 |
| Media and Digital Games | £13 | £3.25 | £8 |
| Other | £184 | £184 | £47 |

refined and it is proposed that it is adopted by the Science and Technology Park movement in order to help with the development of both traditional and new ways of supporting knowledge transfer from host to tenants in these locations.

More detailed conclusions come from a comparison between the data collected between 2014 and 2017 with the later year of 2018-2019. The initial survey period produce data that showed high levels of interaction and associated value between micro-companies and the University. The data from the second period shows a significant decrease in this value. An initial reflection on this change is that over the period of the studies, the R&D phase of the product development, seen in the collaborative research income in 2014-2017 was coming to an end in the period 2018 to 2019 as the products and services being developed had been moved up the value chain and the marketing and sales phase of the companies activity expanded. Also another potential conclusion from the 2014-2017 data is that these micro companies are taking advantage of the UK Research and Innovation grants to start their product development closer to the research phase, i.e., further back along the TRL (technology readiness); however, to add nuance to this conclusion this type of study needs to be developed as a longitudinal study.

In addition, it is suggested that the relatively high value of knowledge transfer between the micro companies and the university reflects growing co-ordination of the 'science' – entrepreneurship. The importance of this relationship is now widely recognized in driving economic development and sits at the heart of many arguments as to the value of science and technology parks as instruments of economic development.

The measurement of these changes is likely to gain momentum over time as regions try to build their impact on economic development and raise their profiles as centres of research that can drive the knowledge economy because the fundamental and applied research is needed to continue to support social and economic sustainable development.

The data that this study has collected gives some indication that in adopting this new set of overarching goals it has gained momentum in the context of developing research, consultancy and student placements across the Surrey Research Park-Campus axis.

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