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## The Surrey Research Park; A Case Study of Strategic Planning for Economic Development

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**Abstract :** The development of the Surrey Research Park by the University of Surrey is an addition to a number of existing strategies to collaborate with industry that it has developed over its 120 year history. The potential to undertake this development was based on owning a substantial land holding that the University acquired when the Borough Council for the town of Guildford invited the University to relocate from Battersea in London to its new location in 1966. Initial plans for the Park in 1979 were accelerated in 1981 in response to plans by the then government to reduce funding for Higher Education in the UK. Beyond a broad master plan for the site that was based on topography and access to the site the plans that were developed were based on a survey of 100 companies that were deemed to be in the target market for the site and a review of the other 7 science parks that were being developed in the UK in 1981. The findings from this proved to be important in developing the master plan for the site.

Another important influence on the project was the objectives that were defined for the 3 stakeholders in the project of the University, the tenant companies and the planning authority relate to economic development, a competitive advantage of tenant companies, knowledge transfer, the profile for the University and the capacity to generate income proved to be a valuable framework on which to develop a master plan. These details were underpinned by five objectives which served the three stakeholders in the site. Those for the University included commercial potential, knowledge transfer and image and reputation; those for the town primarily related to economic development and the plan was to help tenants gain a competitive advantage by locating on the site.

In addition a number of success indicators were defined for the project against which to measure performance and have remained as a useful set of parameters on which to base the assessment of the performance of the site. In combination with these indicators a further analysis deals with the success factors that are considered as important in influencing performance.

The paper sets details the history of the park and covers the success indicators and factors and reviews these in the context of the original objectives for the site.

### 1. INTRODUCTION

An important theme that runs through the 120 year history of the University of Surrey is the institution's strong links with industry and business. This long tradition has been important in steering the plans for the development of the

Surrey Research Park because the University was able to use its cultural heritage as a foundation for this project.

Battersea Polytechnic Institute was a purpose built college in the South London district of Battersea, which was founded in 1891 and opened in February 1894. The Institute took on a more scientific and technical leaning from 1920, leading it to be renamed the Battersea College of Technology in 1957. In 1966 it became the University of Surrey and moved out to premises in Guildford in 1968. (The Robbins Report 1963)

The original purpose for the Polytechnic was to provide higher education for the poor and offered courses primarily focussed on engineering, building trades and physical sciences as well as some arts subjects. During the years 1927 to

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1939 the Polytechnic consolidated with a growing emphasis on science, engineering and metallurgy.

During the mid to late 1800 a number of advanced technology companies of the day begun to move to the area of Battersea situated along the south bank of the River Thames in West London. These companies, which included the brewing company Guinness, Garton's Sugars, the Unilever company Princes and the heavy industrial company Morgan Crucible, all needed engineers to develop, manage and operate their respective complex plants. The links between Battersea College and these industrial complexes established an early foundation to the strong links that have endured between the University of Surrey and industry companies which eventually led to the creation of the Surrey Research Park in order to extend these linkages in the modern era.

In 1966 nearly three quarters of a century after the foundation of Battersea College of Technology was transformed into the University of Surrey through a Royal Charter. At the same time it relocated to Guildford which is the County Town of Surrey that lies just 50 km southwest of Battersea.

This transformation was in response to growing numbers of young people that were part of the post 1939-45 World War peak in birth rate and the national need for an increase in the number of places in full time higher education (The Robbins Report 1963) and the need to find a larger site on which to develop.

Guildford also has a long history as it has been a settlement of over 1,000 years during much of which it relied on its location as a cross roads between significant traffic travelling from London to the south coast naval port of Portsmouth and more minor traffic following an east west route across south of England as part of the Pilgrims Way. Although primarily a market town in the early 20<sup>th</sup> Century Guildford attracted some automotive manufacturing and established the first purpose-built motor vehicle factory in Britain<sup>1</sup>; however in the middle of the late 1950s and early 1960s both the automobile manufacturing and the agricultural market activities begun to decline and the Town Council saw the opportunity for a further period of development by attracting a university to the town and laying the foundation for its future as a knowledge based economy.

In 1966 in collaboration with Guildford's Town Council the University was able purchase 300 acres (125 ha) of land

which was the minimum area required by the UK government if it was to agree to fund the relocation of Battersea Polytechnic to Guildford and establish itself as a university town by hosting the University of Surrey. This minimum land allocation was required to ensure that the University would have sufficient land on which to develop in the future and prevent the problem faced by its pre-cursor organisation which had become land locked on a small site in the south west of London.

In 1966 the new University received its Royal Charter and following a land use planning enquiry which was supported by the town of Guildford and the County of Surrey, planning permission was granted for the University to be established its 300 acre site on the western edge of the town.

The legacy of the origins of the University of Surrey, of supporting an industrial base in London, came with it to Guildford.

Features of this legacy include: significant research links with industry; having in place a department that is dedicated to managing industrial research contracts, technology licensing, and managing a the University's business development outreach unit; and offering each student at the University the opportunity for a one year accredited industrial or professional placement as part of the any degree course. This tradition continues, although today the placement year is now no longer a compulsory part of all degree courses; however, its value is that it continues to connect the University to industrial companies and professional organisations across the UK and further abroad and helps the University maintain its leading position for graduate employment in the UK. The tradition of working with the business and industry has helped to build Surrey's reputation of a business focussed research led University.

## 2. SCIENCE PARKS – AN EMERGING TREND IN THE UK

As early as 1964 the British Government urged UK higher education institutions to expand their contact with industry with the objective of increasing the rate of technology transfer to the market place in order to increase the payback from investment in basic research in the form of new creating new technologies (Edgerton 1996). One impact was that the Mott

<sup>1</sup> <http://transportheritage.com/find-heritage-locations.html?sobi2Task=sobi2Details&catid=91&sobi2Id=631>

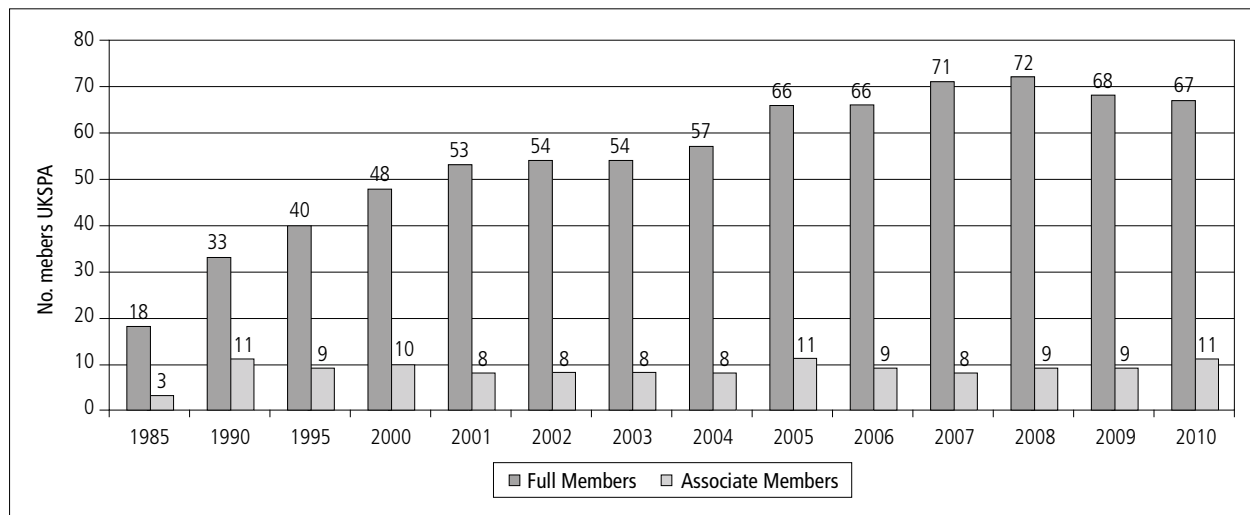


Fig. 1. Numbers of parks which are members of the UKSPA.

(Note: full members are parks with tenant companies on site, associate members are those parks that are at the planning stage of their development).

Source: UKSPA statistics. [www.ukspa.org.uk](http://www.ukspa.org.uk)

Committee,<sup>2</sup> in its report published in 1969, recommended an expansion of ‘science-based industry’ close to Cambridge to take maximum advantage of the concentration of scientific expertise, equipment and libraries and to increase feedback from industry into the Cambridge scientific community.

This change opened the way for creating the Trinity College backed Cambridge Science Park in 1979. The impact of the Cambridge Science Park was described in the Cambridge Phenomenon (Segal et al 1985) which was characterised by a surge in the formation and growth of high-tech firms and associated services which today employ over 23,000 people<sup>3</sup> and now forms the backbone of the sub-region’s successful knowledge based economy.

In 1979 the idea of extending the University of Surrey’s links with industry by creating the Surrey Research Park was promoted by the University of Surrey with the planning authority of Guildford in order to secure an allocation in the County Plan (Structure Plan) for the development of a 70 ac (28.5 ha) site.<sup>4</sup> Their support gave the University the necessary approval in principle to begin to develop the idea for the Surrey Research Park.

In 1981 the UK government reduced its funding for the UK

higher education system. This led to those universities which were worst affected by this reduction of state funding to look to other ways to protect their future using their own resources. The University of Surrey used this challenge to accelerate its plans for the development of the Surrey Research Park.

The University formed an internal committee which was chaired by an eminent industrialist and was tasked to oversee the development of the Park. The committee recruited a young academic to take on the position of the Director of the Park to drive the development of the site. The local land use planning authority in Guildford granted permission in 1983 for the initial phase of development of the Surrey Research Park.

In 1984, a wave of 7 science parks founded in the UK at that time set up the UK Science Park Association (UKSPA). The Surrey Research Park was one of these parks but is now one of 67 operational parks in the UK that are members of the UK Science Park. The membership numbers of the UK Science Park Association are noted in table 1.

The location and names of the UKSPA member parks are noted in Fig. 2 and Table 1.

<sup>2</sup> Mott Committee, a special Cambridge University Committee set up under the Chairmanship of Sir Nevill Francis Mott (then Cavendish Professor of Experimental Physics) to consider an appropriate response from Cambridge to an initiative of the Labour government following its election in 1964 published its findings in 1969 in the Mott Report.

<sup>3</sup> <http://www.cambridgefutures.org/futures2/report1.htm>

<sup>4</sup> Our Transport Heritage Rodboro Buildings, Guildford <http://transportheritage.com/find-heritage-locations.html?sobi2Task=sobi2Details&catid=91&sobi2Id=631>



Fig. 2. The location of the UK science parks that are members of the UK Science Park Association  
Source: Perse Comm-UKSPA 2012.

# Best Practice of Science / Technology Parks

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Table 1. List of members of the UKSPA 2012

UKSPA Member Parks			
1	Aberdeen Energy and Innovation Parks	29 Haverhill Research Park	56 Portsmouth Technopole
2	Babraham Research Campus	30 Heriot-Watt University Research Park	57 Queen Mary BioEnterprises Innovation Centre
3	Begbroke Science Park	31 Hethel Engineering Centre	58 Roslin BioCentre
4	BioCity Nottingham	32 The Imperial Incubator	59 Sand Hutton Applied Innovation Campus
5	BioCity Scotland	33 Institute of Life Science	60 Scottish Enterprise Technology Park
6	BioPark	34 Keele University Science and Business Park	61 St John's Innovation Centre
7	Birmingham Research Park	35 Kent Science Park	62 Stevenage Bioscience Catalyst
8	Birmingham Science Park Aston	36 Lancaster Science Park	63 Stirling University Innovation Park
9	Bristol and Bath Science Park	37 Langstone Technology Park	64 Sunderland Science Park
10	Brunel Science Park	38 Leeds Innovation Centre	65 The Surrey Research Park
11	Cambridge Biomedical Campus	39 Liverpool Innovation Park	66 Tamar Science Park
12	Cambridge Science Park	40 Longbridge Technology Park	67 Technium
13	Cardiff Business Technology Park	41 Loughborough University Science and Enterprise Park	68 Tetricus Science Park
14	CEME Innovation Centre		69 The Bridge, Dartford
15	Chesterford Research Park	42 Malvern Hills Science Park	70 University of Cambridge West Cambridge Site
16	Colworth Science Park	43 Manchester Science Parks	71 University of Essex Knowledge Gateway
17	Coventry University Technology Park	44 Milton Park Innovation Centre	72 The University of Nottingham Innovation Park (UNIP)
18	Cranfield Technology Park	45 MIRA Technology Park	
19	Culham Innovation Centre	46 NETPark - The North East Technology Park	73 University of Reading Science and Technology and Enterprise Centres
20	Daresbury Science and Innovation Campus	47 Newark Beacon Innovation Centre	
21	The Digital Media Centre	48 No.1 Nottingham Science Park	74 University of Sheffield
22	Edinburgh BioQuarter	49 Northern Ireland Science Park	75 The University of Southampton Science Park
23	Elvingston Science Centre	50 Norwich Research Park	76 University of Warwick Science Park
24	European Marine Science Park	51 Nottingham Science & Technology Park	77 Wellingborough Innovation Centre
25	Exeter Science Park	52 Nucleus Business and Innovation Centre	78 West of Scotland Science Park
26	Granta Park	53 Ocean Village Innovation Centre	79 Westlakes Science and Technology Park
27	Harwell Innovation Centre	54 The Oxford Science Park	80 The Wilton Centre
28	Harwell Oxford	55 Pentlands Science Park	81 Wolverhampton Science Park

Source: Data from UKSPA.org.uk 2012

The original 8 science parks in the UK were all hosted by universities. However, over the last 30 years other kinds of hosts in the UK have taken the science park model and adapted to suit their own objectives. These hosts now include government defence laboratories such as Porton Down chemical and biological defence laboratories which hosts the Tetricus Park, and the Malvern Hills Science Park which has as its host another UK defence agency complex. A

further important trend that is emerging is the location of science parks on corporate research facilities such as the Unilever R&D facility in Colworth Bedfordshire and the Motor Industries Research Association's research facilities in Nuneaton. This diversification of hosts demonstrates the versatility of the European science park model all of which are local initiatives that focus on building technology clusters around their local knowledge infrastructure.

The success of this strategy is noted by the number of companies located on UKSPA member's parks (Fig. 3).

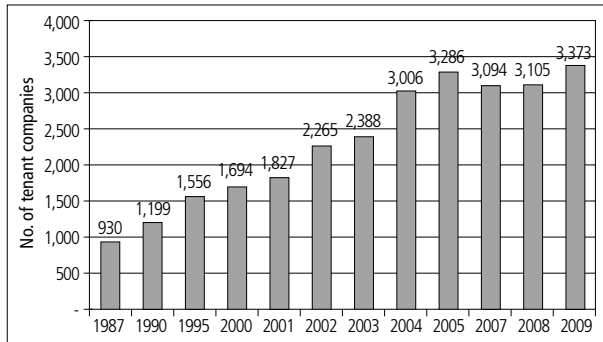


Fig. 3. The number of technology companies on science parks in UK by year  
Source: UKSPA.org.uk 2012

The number of employees in these companies are shown in Fig. 4.

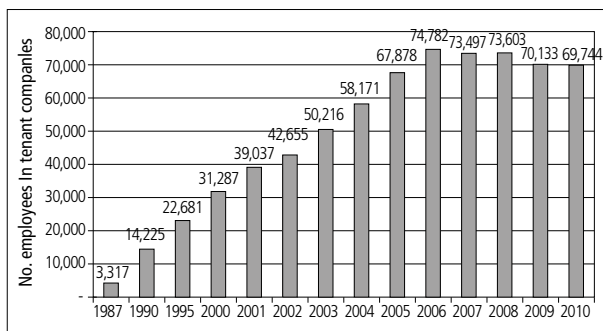


Fig. 4. The number of employee in UK Science Park tenant companies by year  
Source: UKSPA.org.uk 2012

### 2.1 Objectives

Typically the objectives for science parks combine the

interests of the three usual stakeholders of government, the host organisation and the tenant companies. However, a common theme that binds together these stakeholders in the projects is wealth creation.

The original objectives, or value propositions, for the Surrey Research Park that were set out in its business plan relate to its three stakeholders of: the local government, which is the planning authority; the University of Surrey as land owner, investor, developer and manager of the park; and the tenant companies that have a vested interest in the site providing benefits which lead to a competitive advantage for their business.

The broad strategic objectives for each of these stakeholders are noted in Table 2.

These conceptual objectives were then translated into a series of development objectives for the site which were based on an analysis in 1982 of the market for suitable accommodation for small technology companies in the region. This comprised a telephone based survey of 100 technology companies and research laboratories within 25 miles of the proposed park, and an assessment of the other 7 science parks that were being established in the UK in that period.

The findings from this study included:

- Access to the commercial property market at that time in the UK was a very significant barrier to entrepreneurs wishing to establish a small technology based company particularly where they had no trading record. All commercial property was offered on long leases of around 25 years and occupation required substantial rental deposits. In addition few if any small high quality units

Table 2. Strategic objectives for science parks

Stakeholder	Conceptual objectives for the Stakeholder
The University of Surrey	<p>To create some independent income for the University of Surrey and create the opportunity for academic staff to secure additional income by working with companies established on the park.</p> <p>To create an opportunity for technology transfer from the University and other sources into the commercial domain.</p> <p>To raise the profile of the University of Surrey as a centre of excellence in technology.</p>
Guildford Borough Council and Surrey County Council (the planning authorities)	To assist in the process of the economic development of the region and locality.
Tenant companies	To establish a business in an environment that favours the formation, development and growth in order to gain a competitive advantage through access to skills and technology.

were available for this emerging market of micro and small technology companies. This was recognised as a significant barrier to technology based SMEs establishing an office base from which to develop their activities. The Science Park movement pioneered short occupational leases and licences for high risk technology companies.

- The emerging personal computer revolution which significantly reduced the cost of computing created an opportunity for small science, engineering and technology companies to establish a business without the need for access to substantial capital resources. Access to low cost versatile computing not only supported business in existing markets but created a number of technology enabled markets for software which has for many years and continues to drive the ICT sector.
- Revising the received wisdom that the commercialisation of most R&D required very sophisticated laboratories. Most of the companies that were interviewed were looking for accommodation that would take technology beyond the discovery phase towards the market and it was not straight laboratory space that was required but rather a mixture of laboratories and office space for commercial activities or pure office space.
- New markets were emerging through the de-regulation of such industrial sectors as ICT and the financial sector; there was increasing regulation concerning the environment, the automotive industry and the energy sector; and the change in attitude by government to the release of intellectual property (IP) from its defence laboratories and the management of IP in universities were producing a raft of new technology enabled markets which were attractive to young technology entrepreneurs.

The study led to the conclusion that the facilities that should be built:

- Should be able to provide units of a number of sizes in order to allow companies to move to match accommodation with need.
- The accommodation should be planned to enable its use as wet (chemistry/biotech), dry (engineering laboratories) or for office accommodation.
- The nature of occupancy contracts should be able to be offered for lengths which suit high growth companies that need to be able to grow rapidly, or if they sell some of their business, to reduce in size.
- The Park should not restrict tenants to technologies in which the University was a leader because this would limit

the capacity of entrepreneurs that were seeking to merge new technologies to develop new markets: the decision was made to make the park technologically promiscuous.

## 2.2 Physical development and Master Plan

Part of the success for of the Surrey Research Park derives from the interpretation and translation of the conceptual objectives into a physical plan that would meet the needs of a new type of small technology company that could be established using the new business tools provided by access to lower cost computing.

The development objectives that were a response to the perceived market were used to establish a Master Plan. This Plan, which still works well after 30 years of developing the site is based on creating three distinct zones on the park. These were planned to accommodate:

- Small units for small start up companies or specialist parts of large companies; this offers units ranging in size from 25 m<sup>2</sup> (250 ft<sup>2</sup>) to 300 m<sup>2</sup> (3,000 ft<sup>2</sup>).
- Medium sized units: this is for companies with an annual turnover of between £ 15 and £ 40 million or for national research facilities of multinational companies.
- Large building to accommodate headquarters for technology businesses, research centres for large technology based companies and facilities for high value manufacturing activities such as building satellites.

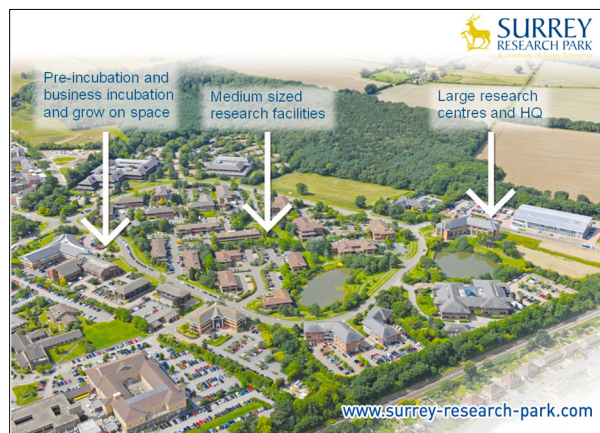


Fig. 5. Aerial photograph of the Surrey Research Park 2012

This shows the 3 zones of development for small, medium and large companies on which the master plan for the site is based.

In addition to this broad zoning plan which was proposed by the University a number of other planning criteria were imposed by the town's planning department as part of the

agreed Master Plan. This covered such matters as the width of access roads, parking ratios of 1 car space to 23 m<sup>2</sup> of gross space, building lines, architectural style, building materials, building heights, the density of development (25%), building footprints (15%) the principle of screening cars behind buildings and a landscape plan.

The total permitted area under the 1984 planning permission allowed 71,250 m<sup>2</sup> of gross external space. The original intention was to develop the whole site by 1991 but the University, by undertaking the development itself, has been cautious and has built at a lower rate. In 2012 the development had reach 90% completion. Between 1983 and 1994 the University developed the site by constructing a series of speculative projects for SMEs. The policy post 1994 has been to build to order rather than on as speculative developments. Part of the logic for this shift in strategy was that by 1994 the areas of the site allocated to small start up and grown on space had been fully developed.

Details of the rate of build of space on the Surrey Research Park are noted in Fig. 6.

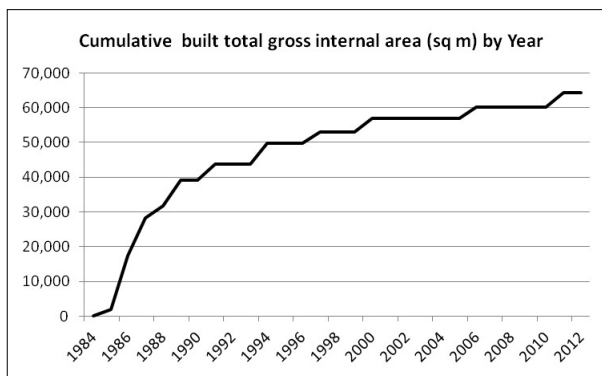


Fig. 6. Cumulative gross built space on the Surrey Research Park since its inception

The agreed plan has proved to be not only versatile but also gives comfort to potential occupiers as they can see that the Park provides accommodation for future growth of their companies.

### 2.3 Permitted uses

One of the features of science and technology park brand of development is the restriction on the permitted uses on these sites. The importance of this is that it maintains a standard of occupier and also prevents mission drift towards accepting tenant companies that may not be appropriate for the site. The permitted use agreed with the planning authority for the Surrey Research Park allows research, develop-

ment and design in any science including the social sciences and is complementary to the activities of the University of Surrey. This use clause reflects the difference between a science park and a research park. The former also allows some limited high value low volume manufacturing on the site.

In 2011 a 40,000 m<sup>2</sup> technical and production facility was completed for a spin out company (Surrey Satellite Technology Ltd – SSTL) from the University. It is now clear that the original planning use for the sites was too prescriptive as this failed to provide the flexibility to allow the complete cycle of laboratory to production in one location. This issue has now been resolved with a wider use being permitted on the Park.

The experience in Korea (Oh and Yeom 2012) is that for a long term economically sustainable activity to develop from a science and technology park there is a need to provide a land allocation to enable manufacturing to be developed from the activities on the Park as a development matures.

There is also evidence that when science parks are located next to a research hospital there is potential for establishing successful translational research clinics on these sites. Experience has shown that the location of the Surrey Research Park next to a National Health Service regional research hospital has attracted a number of hospital consultants to set up specialist clinics on the Park. The work in these clinics does not conflict with the permitted use because the kind of work done by medical consultants develops can lead to advances medical practice which can be justified as an acceptable use. The experience at Surrey is that a number of patents have been granted to clinicians working in these centres.

### 3. INTERNAL MANAGEMENT STRUCTURE

In 1983 the University of Surrey concluded that to undertake the development of the Surrey Research Park itself would be the best way to control the development and meet its stated objectives. The management structure that was selected is noted in Fig. 7.; however, the University also considered a second option which it may have had to adopt if it could not raise the funds itself for the development. This second option is noted in Fig. 8.

This structure was selected for the Surrey Research Park.

In selecting the right management structure the University reviewed the risks associated with the different ownership and management structures. The observations are noted in Table 3.

The Management Team and its Board operated under del



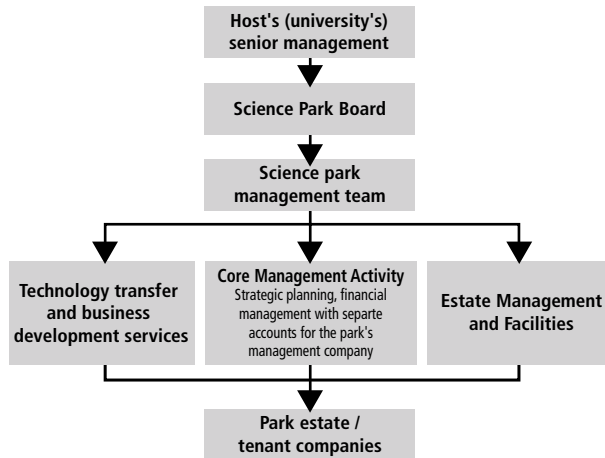


Fig. 7. Governance structure for single ownership science and technology parks

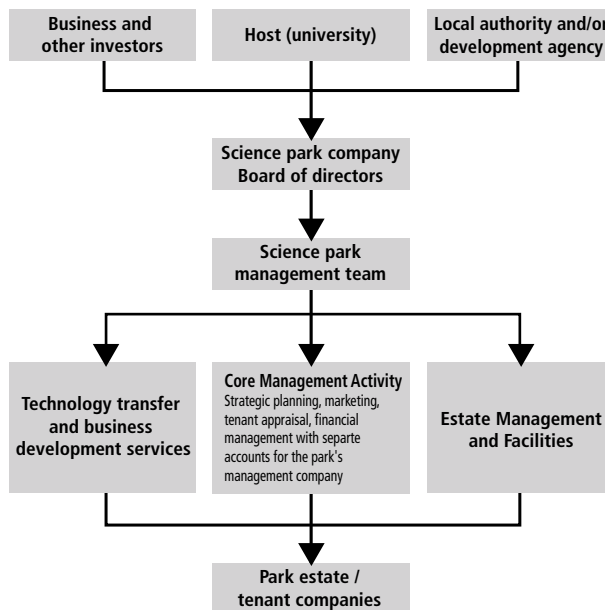


Fig. 8. Indicative management structure for Surrey Research Park based on a Joint Venture structure  
This Structure was not selected.

egated powers from the University's Finance Committee and was able to decide on investments in the Park and to authorise taking loans for development.

The Development Team that eventually changed into the

Management Team for the site was established as an Enterprise Group of the University rather than as a separate company. However, this Group operates a separate bank account from the main University account for operational purposes and any surpluses are transferred to the University at the end of each financial year.

### 3.1 Funding

The Surrey Research Park is one of the few self funded parks in the UK. In the initial planning stage two potential funding plans were explored. The first involved seeking joint venture partners with a commercial developer for each individual phase. The second option was a land sale (on a long leasehold arrangement – 125 years) to an anchor tenant which would secure a capital sum to enable the initial phase of the small units to be built.

The Board asked that before seeking a partner with which to create a joint venture an attempt should be made to identify an anchor tenant for the land sale option. A marketing campaign was put in place which was aimed at all UK based companies that were aligned to the University's strengths in chemical and process engineering, toxicology and pharmaceuticals.

This campaign identified the UK company, BOC Ltd (now BOC Linde) which acquired a long leasehold, in 1983, on a 10.25 ac (4.25 ha) for £2.5 million on which to base their UK HQ and R&D management activities. This transaction was sufficient to set out an initial phase of infrastructure and enable the first phase of buildings without the University taking a partner. All subsequent funding of buildings by the University Development Team has been based on loan finance from a number of banks and these loans have been secured against the income stream from let buildings.

### 3.2 Phased development

The Park has been developed in phases following the initial sale of land to its anchor tenant BOC. These subsequent phases of development were undertaken by the University on a speculative basis. The plan has been cautious and the University has not over built at any one time which has ensured high occupancy (averaging over 90%).<sup>5</sup>

This careful approach has been helped by the early development of the Surrey Technology Centre. This business

<sup>5</sup> University of Surrey Annual Accounts of the Foundation Fund.

Table 3. Details of responsibilities for costs, management control and involvement in tenant selection for single and joint venture ownership arrangements

Development Strategy	Financial Cost to University	Strength and Nature of Control over Science Park Policy	Involvement in Tenant Selection
Single ownership -University alone	High – needs funds for infrastructure, initial buildings and needs to guarantee any loan finance	High – University has complete control over management policy	High – sole arbiter
Joint Venture (JV) Company	Medium – shares costs with partners in JV arrangement	Potentially High – negotiable between partners but potentially strong where University takes a lead.	Usually high – significant or leading influence.

incubator has been instrumental in helping some 500 start-ups companies of which some, if they have not acquired by larger companies, have grown on site using the Research Park's flexible leases to "staircase" their way to quite large and suitable accommodation on the site.

### 3.3 Management team

The Research Park Management team is located on the Park. It comprises a core management group that is responsible for the overall planning, development and management of the site. The work streams of this group include: dealing with the estate from the perspective of the initial development, finding occupiers and then managing the estate. A second stream of work is concerned with providing the business development service package and links with the University of Surrey's Research and Enterprise Services.

In the UK there has been no formal government support for science and technology parks. To provide the various support packages Park operators have had to rely on building partnerships with those organisations that have from time to time been in place to support general UK businesses. These include the now defunct government funded Business Link programme as well as more specialist government funded group such as the Surrey Enterprise Hub,<sup>6</sup> and the Innovation and Growth team programme for the same area both of which programmes have been cut because of a change in government policy related to providing government support to business. The two latter programmes had their management teams based on the Surrey Research Park and were respectively concerned with helping high growth companies through a coaching and mentoring process and connecting micro, small, medium, large and multinational

companies in order to encourage innovation in the region's business community. These programmes proved to be highly effective and their closure was politically motivated following a change of government in May 2010.

In 1997 the UK government formally extended the responsibilities of all universities to extend beyond teaching and research to include business and community development. Grant funding has been made available to all universities to support this initiative. The University's Surrey Research Park Office in collaboration with the University's technology commercialisation office (Research and Enterprise Services) have secured a government grant from the Higher Education Innovation Fund to create a small pre-incubator, known as SET Squared,<sup>7</sup> in the Park's existing Surrey Technology Centre. In 2011 the University secured a further grant with which to develop a space technology incubator known as the International Space Innovation Centre.<sup>8</sup>

## 4. MEASURES OF SUCCESS AGAINST THE ORIGINAL DEVELOPMENT OBJECTIVES

The performance of science and technology parks is a topic which is of great interest to politicians because many of these projects are publicly funded and compete for public funding and in some instances for the land that is necessary for their development. Although the University of Surrey was not exposed to this political scrutiny there has been concern over time to assess the performance of the Park. In 1996 some broad qualitative and quantitative measures were developed for the measurement of the performance of the Surrey Research Park against its original five objectives of

<sup>6</sup> <http://www3.surrey.ac.uk/stc/sehub.html>

<sup>7</sup> <http://setsquared.co.uk/>

<sup>8</sup> <http://isic-space.com/>

income generation, technology transfer (now better described as knowledge transfer), profile, economic development, and supporting companies on the site in order to help to give them a competitive advantage. This system is still being utilised today to review progress.

***Creating some independent income for the University of Surrey and creating capital value of the assets of the park – success indicators***

**Rate of development:** the original timescale for the development of the Surrey Research Park was 10 years; however, it has taken nearly 30 years to achieve 90% developed. Only sites for larger building still remain undeveloped after this period. The areas originally designated to micro and small companies was completed within the original planned 10 years. The slower rate of developments for larger companies reflects the fact that today many larger companies are not locating their R&D effort in single large buildings but are looking to deploy their research activities as small specialist groups close to specific host organisations that have defined technology competences.

Evidence of this is shown by the presence on the Surrey Research Park over 19 years of the Mitsubishi Research Centre and for research centres for Kobe Steel, Canon and Hygiene International. The initial Master Plan for the site enabled the Park to develop sites as phases. This flexibility has proved to be important feature of the site.

Capital value and rental income for the University: The developed area of the park has been valued as a property asset at £80 million (2006).<sup>9</sup> The rental income generated for the University of Surrey over the period of the development is noted in the Fig. 9.

This rental income has generated surpluses for the University of in excess of £65 millions which have been used to support scholarship and the Park's capital value has enabled the University to use this as collateral for borrowings to support the development of the University.

**Occupancy rates:** the historic data collected by the Park for its annual accounts and financial planning has shown that the park operated at a level of between 90% and 97%.

***Creating some independent income for the University of Surrey and creating capital value of the assets of the park – success factors***

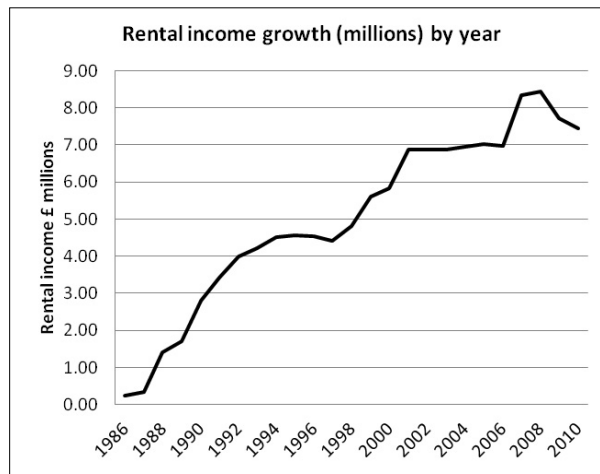


Fig. 9. Rental income growth (millions) by year

**Location and product offered to the market:** the University of Surrey is located in a high property value area where there are few other commercial property projects that offer either the flexibility of short-term rental contracts or the level of support for businesses when compared with those provided by the Surrey Research Park. The development of the Surrey Research Park addressed the issue of market failure in relation to the provision of this kind of accommodation which is favoured by fast growing, venture capital backed technology companies which need, if they are to respond to the market potential of their technology, flexible leases. There is a demand for this kind of space as statistics show that six of the 11 districts and boroughs in the County of Surrey are in the top 25 areas for numbers of knowledge-based businesses in the UK. In 2007, Surrey had 58 business registrations per 10,000 adult population compared to a figure of 40 for the wider area of the South East of the UK. (Surrey Economic Partnership Ltd. 2010)

**Brand value of science and technology parks:** an informal survey of the companies on the Park in 2009 indicated that the image and reputation of the Surrey Research Park is considered as important for the micro and SME companies that have located on the site. It is clear that science and technology parks have developed as a brand of property development that matches the needs of the types of companies that tend to found on these sites. (UKSPA 2003)

**Presence of business of pre and full incubation facilities:** the statistics for the Surrey Research Park show that 40% of

<sup>9</sup> University of Surrey Foundation Fund Annual Report 2010- 2011

the occupiers in space on the Park, other than in the Surrey Technology Centre business incubator and its two pre-incubators, have grown out of this Centre. This system has helped the park maintain an occupancy rate of between 90% and 97% for over 20 years. High occupancy rates translate into rental income and value.

***Raising the profile of the University of Surrey – success indicators***

The University of Surrey is a relatively small university with just over 13,500 full time equivalent students<sup>10</sup> which in terms of international comparisons is a relatively small university. However, in addition to the quality of its courses the University has become well known through the success of the Surrey Research Park and its impact in terms of economic development and from the formation and growth of its satellite business, SSTL, which is now located on the Park.

*Origin of tenant companies:* the indicators are that nearly one third of the tenants on the Park are from overseas.

*International visitors:* the Park also receives on average one international visitor per week that is seeking an understanding of how the project has been developed and its impact on the regional economy.

*Membership of international organisations:* the Surrey Research Park was invited to be a founder member of the World Technopolis Association in 1994 that is based in Daejeon, Republic of Korea and it is also active in both the National UK Science Park Association (UKSPA) as well as the International Association (IASP), of Science Park. (IASP)

*Business incubation:* the Surrey Technology Centre (STC) has been in operation as a business incubator since it was opened by the University in 1986. Over that time over 500 companies have taken contracts in the business incubator.<sup>11</sup> The success of this building has supported the University's application to government for a grant of in excess of £ 10.5 million to support a pre-incubator. This pre incubator is now established as Surrey SET Squared and is part of a consortium of the universities of Surrey, Southampton, Bristol, Bath and Exeter.<sup>12</sup> The Surrey SET Squared programme occu-

pies 105 m<sup>2</sup> in the STC and provides a range of mentoring, coaching and business development services to entrepreneurs that are trying to build global reach technology companies.

The success of the Surrey Research Park and the SET Squared operation also attracted a grant of £ 0.96 million to support an International Space Innovation Centre (ISIC) which is a sector specific pre incubator.<sup>13</sup> This also operates from the Surrey Technology Centre. The objective for the ISIC is to support the development of companies that have a focus on space related technologies which also include remote sensing applications by drawing together academic research partners, international businesses and SMEs into a 'cluster,' stimulating an entrepreneurial environment for uniting the upstream and downstream space industry.

***Raise the profile of the University of Surrey – success factors***

*Links with business:* the University's long tradition of supporting business and industry through its research activities, its record for graduate employment<sup>14</sup> by creating a pool of well qualified and readily employable people. The University's industry and business facing philosophy has been an important as this has helped the Park's development team to promote the Park as a good location for accessing skills and technology.

*Tenant company success:* the success of the tenant companies themselves has helped to raise the profile of the Park. The database of tenants that has been assembled since 1986 has shown over 585<sup>15</sup> tenants that have taken contracts on the Park. The success of many of the Park's tenant companies has helped to raise the profile of the Park and the University. This has been extended because the global reach of products of the majority of the tenant companies and discussions with a number of our major occupiers has revealed that in excess of 50% of their turnover comes from exports. Examples include the sale of computer games by: Lionhead (subsidiary of Microsoft), IDBS the leading database software company for pharma sector which has won a number of Queens Awards including for export, SSTL which

<sup>10</sup> [http://portal.surrey.ac.uk/portal/page?\\_pageid=719,333086&\\_dad=portal&schema=PORTAL](http://portal.surrey.ac.uk/portal/page?_pageid=719,333086&_dad=portal&schema=PORTAL)

<sup>11</sup> Data from the Surrey Research Park tenant occupancy records.

<sup>12</sup> <http://www.setsquared.co.uk/home/contact-us/surrey-guildford>

<sup>13</sup> <http://www.isic-surrey.co.uk/>

<sup>14</sup> <http://www.telegraph.co.uk/finance/jobs/8138447/Best-and-worst-universities-for-graduate-jobs.html>

<sup>15</sup> Perse Comm. Director of the Surrey Research Park 2012 after analysis of the contracts for occupation.

designs, builds, launches and sells satellites to governments around the world, ReNeuron which sells stem cell products to the international market, TMO Renewables which has developed, patented designs and sells bio-fuel fermentation plants around into the international market, and Detica which has grown from 30 staff to in excess of 1,400 and has a turnover in excess of £ 200 million.

*International promotion:* the Park's management is active in promoting the Park and its tenant companies through the UK's extensive national and regional inward investment initiatives which is currently the managed through UK Trade Investment (UKTI).

### *Technology transfer (knowledge transfer) – success indicators*

One of the most difficult objectives to measure with any success is the level of knowledge transfer to companies on the site. Initial measures were concerned with the transfer of technology from the University to companies on the Park; however, experience has shown that a number of the companies on the site have based their business on technology that has been licensed from other sources such as research hospitals, defence laboratories, corporate research laboratories, and by developing business ideas from their own technology consultancy activities. This broader reach of companies seeking technology and the wider scope of knowledge transfer has increased the potential impact from this objective.

*University spin – out companies:* around 10% of the companies on the Park are spin-out enterprises from the University. This includes SSTL which is itself a £ 100 million business and employs in excess of 465 people.<sup>16</sup>

*University linkages:* nearly 70% of the companies on the Park have links of some form with the University of Surrey. These range from soft links that include attending training courses, using University facilities including the library, and using students for project work, to hard links that include formal research contract, co-purchase of equipment, and running Knowledge Transfer Partnerships.<sup>17</sup>

Funded through the University's Research and Enterprise Unit with Higher Innovation Fund (HEIF) money the University runs pre-incubators (SET Squared and ISIC) which have created pathways for entrepreneurs looking to

develop their ideas into commercial enterprise.

*Staff and student transfers:* since the park was established there have been a number of members of faculty that have been recruited by companies on the Park and conversely some current members of faculty have been recruited from the companies on the Park. A high proportion of tenant companies on the site employ University of Surrey graduates.

In addition to knowledge transfer from the University to business there are a number of other examples of knowledge transfer from other "discovery" organisations in the region into successful technology companies. Examples of these are set out in the table 4.

### *Technology transfer – success factors*

*University of Surrey's research rating:* the quality and reputation of the University of Surrey as a research university has been instrumental delivering the potential for companies building working relationships with the University. The University has a good overall research activity rating. In 2011 it improved its position from 33 out of 116 institutions in the UK to 28<sup>th</sup> position. In 2008 the government's Research Assessment Exercise indicated that 88% of Surrey's research activity was rated either 'world class' or 'internationally recognised' with 4 areas of research activity in the top 10 and a total of 9 areas ranked in the top 20. The activities of 425 researchers from across all four faculties were submitted in 14 subject areas. Results show that almost half of Surrey's assessed research staff work in areas that have been ranked in the top 10. 55% of Surrey's units of assessment were rated as 'internationally excellent' or 'world class', with a further 44% ranked as 'recognised either nationally or internationally'.<sup>18</sup>

The government's Research Assessment Exercise has been replaced by the Research Excellence Framework. To improve its level of excellence the University of Surrey established a research strategy in 2011 which runs to 2017 (University of Surrey 2011). The strategic decision has been made to improve the ranking of the University in the Academic Ranking of World Universities<sup>19</sup> (ARWU), which provides an annual global research ranking.

The fit of technical subject in the University of Surrey with the interests of tenant companies is high. This was not a deliberate policy but has been important in driving success.

<sup>16</sup> SSTL 2011 published accounts.

<sup>17</sup> <http://www.ktonline.org.uk/>

<sup>18</sup> <http://www.surrey.ac.uk/research/rae/>

<sup>19</sup> Commonly known as the Shanghai Jiao Tong Index.

Table 4. Examples of companies on the Surrey Research Park which have been founded on technology from centres in the region

Company	Origin	Technology	Funding
ReNeuron	Kings College Hospital, London	Stem Cell technology	Venture Capital (VC) backed
Themotech	University of Surrey	Thermodynamic properties of materials	Funded by consultancy and revenue from product
Stingray	QinetiQ	Laser technology for oil technology	VC backed company developed warrantable product which was then acquired by Norwegian company that specialises in geoscientific data products for the oil industry
SSTL	University of Surrey	Satellite Engineering and manufacture	Acquired from the University of Surrey by the Dutch company European Aeronautic Defence and Space Company EADS N.V. (EADS)
Bullfrog Computer Games	Local start up from business community-technology developed by locally developed skills	Computer games (synthetic environments)	Acquired by Electronic Arts
Lionhead Studios	Local start up from business community	Computer games (synthetic environments)	Acquired by Microsoft
Omniperception	University of Surrey	Biometrics company	Investor backed
Parsortix which is a company developed by ANGLE Technology	Leading Cancer Research Centres across the world	Cancer diagnosis	Backed by ANGLE Technology
Criterion Software	Criterion Software Ltd created in 1993 to commercialise 3D graphics rendering technology from within Canon's European Research Lab on the Park	Computer games systems	Initially spun out as a majority Canon-owned start-up but then acquired by EA Ltd which is based in Guildford.
TMO Renewables	University of Surrey and University of London	Bio fuels	VC backed fermentation technology company
Actica	Spin out from Detica which is another company on the Park	High level consulting	Funded by consultancy
Gold-I	Foreign Exchange Trading Software	Spin out from City of London Banking Sector	Funded by revenue from product
DBS	Data acquisition and storage for pharma sector	Developed idea when undertaking consultancy for the Pharma sector	Funded by consultancy and revenue from product
Medpharm	Drug formulation and delivery	A spin-out of King's College London from the Department of Pharmacy.	Contract Research Organisation

The University of Surrey has put in place the necessary management structures in its Research and Enterprise Services which support links with tenant companies.

*To assist in the economic development of the national, regional and local economy – success indicators*

Commonly used indices of the economic impact of companies on science and technology parks include a change in the number of companies on a park, numbers of employees, the nature of the activities of the employees, salary levels and turnover per employee.

*Employee numbers:* the tenant companies on the Surrey Research Park together employ over 3,500 staff well qualified staff. A significant proportion of the employment offered on the Park provides new jobs that have been created as a result of company growth. The most significant growth has been by Detica which has increased employee numbers from 30 staff in 1986 to over 1,200 today in 2012, the majority of which are located on the Park.

*Employment:* it is estimated that based on discussions with key companies that at least 35% of these are routinely engaged in R&D activities.

*Wages:* the mean salary in 2012 was \$85,000<sup>20</sup> this is against the national mean wage of \$36,200<sup>21</sup> in the UK as a whole. A significant number of employees have been drawn from the local community as companies have expanded. Many of the posts are higher added value compared with the regional average, salaries are also higher than the regional average and the level of qualification of the employees is higher than comparable companies not on the Park. This is consistent with the finding of the UKSPA study on the performance of science parks<sup>22</sup> which was based on a study of matched samples of over 800 companies that clearly showed companies on science parks had better qualified staff compared with their equivalent non park based companies.

*Numbers of companies on the Park:* the current number of companies on the Park is currently 180; however, this includes those in SET Squared and ISIC pre-incubators. The number of those with contracts for occupation of space on the Park is 123 and a proportion of these operate a number of subsidiaries which are developing a range of technologies

giving in the region of 140 companies. This includes new companies in the pre-incubation phase. The number of companies that have signed contracts directly with the Research Park Office, which does not include those in pre-incubation, is over 580 since 1986.

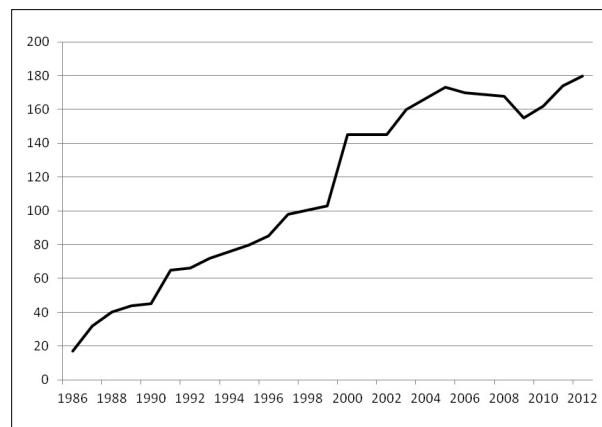


Fig. 10. Growth of the number of tenants companies on the Surrey Research Park by year.

The growth of tenant companies on the Park is shown in Fig. 10. This includes some companies that have technology based subsidiaries operating from the site and those in the pre-incubation programme with SET Squared and the ISIC pre-incubators.

Tracking companies over time has proved to be difficult because many companies are acquired by larger companies or competitors in their sector. In this process they lose their identities very quickly.

A number of the original occupiers of new buildings constructed on the Park remain and have renewed their occupancy contracts. This demonstrates that the companies are stable and that they are able to secure the skills that are necessary to continue to develop their business.

*Length of life:* 80% of the companies on the Surrey Research are more than five years old. The survival rate of Surrey companies is 80% which is much greater than the UK five-year business survival rate of 44.4%.<sup>23</sup>

*Capital raised:* including IPOs and acquisitions it is estimated that around £ 1 billion of investment has been made

<sup>20</sup> Data from a sample of accounts of companies on the Surrey Research Park.

<sup>21</sup> [http://www.ons.gov.uk/ons/dcp171766\\_264246.pdf](http://www.ons.gov.uk/ons/dcp171766_264246.pdf)

<sup>22</sup> UKSPA 2002 The evaluation of the past & future economic contribution of the UK Science Park Movement.

<sup>23</sup> <http://www.ons.gov.uk/ons/rel/bus-register/business-demography/2010/stb--business-demography-2010.html#tab-Business-survivals>

in the companies that currently operate or have operated from the park in the period since its creation.

**Company turnover:** a study on the turnover (gross sales / number of employees) per employee of the companies on the Surrey Research has shown that the average figure is in excess of £ 150,000 with some companies such as SSTL having a turnover per employee of in excess of £ 225,000. A count of the number of employees working on the Park in June 2012 showed just more than 3,500 staff on site. A calculation based on this figure (turnover per employee x number of companies) indicates the gross sales of the tenant companies of over £ 475 million. A review of the purchase ledger of two large tenants revealed that 60% of the company spend was within a radius of 65 km. This figure is influenced by the fact that many of the companies on the Surrey Research Park are still in the development phase of their businesses which is more labour intensive than in companies that are involved in manufacturing. The spend on the purchase ledger of these more labour intensive companies is higher than for manufacturing so there tends to be a greater local impact.

It is estimated that, based on the collective turnover of the companies on Park, their “spend” in the region and the multiplier effect on this spend figures, they contribute in between £ 350 million to £ 450 million annually to the region’s economy.

***To assist in the economic development of the national, regional and local economy – success factors***

The success factors for the Surrey Research Park are based around the location, the offering to tenant companies, the package of business support services offered to occupiers and the attitude to supporting micro and SMEs, of the University that is reflected through the management of the site.

A study by the now closed Regional Development Agency for South East England (SEEDA) noted that the region in which the Surrey Research Park is situated conforms to its designation of an “knowledge heartland economies,” in which all the elements and linkages in the sub-regional economy model (SEEDA and Huggins 2001) (Fig. 11) were fully established and working well. Evidence from the UKSPA (2003) study showed that Parks in these location were more likely to succeed than those parks in areas which that have “developing knowledge economies” where most elements

and linkages are already established; however, some pathways or capacity restrictions hinder the connections, and those areas denoted as “economic development priority areas” where all major elements and/or pathways between the various levels in the model were missing or constrained.

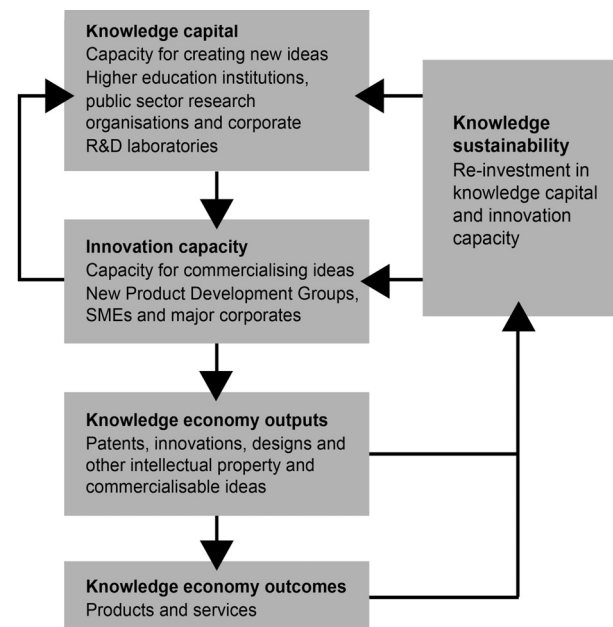


Fig. 11. Model of the Sub Regional Economy (UKSPA 2003 ; SEEDA and Huggins 2001)

The Surrey Research Park operates in a business environment in which there is substantial “knowledge capital” which provide the capacity to create new ideas. Those organisations that contribute to this include universities, public sector research organisations, and private R&D organisations such as corporate research laboratories and contract research organisations.

The County of Surrey has over 250 major corporate HQs that operate from the County.<sup>24</sup> Data from 2001 showed that the region in which the Park operates has the highest R&D spend which when associated with the level of connections gives some indication of a potential success factor for the site.

The region also contains substantial innovation capacity if measured by on the five pillars that have been used by Lopez-Claros and Mata(2011) for analysis of this capacity. This system weights the following in its measure: the institutional environment; human capital, training and social inclu-

<sup>24</sup> Perse Comm Surrey County Council Data 2012.



Table 5. Percentage of R&D expenditure in the UK per region (Year 2001)

Regional Development Agency region UK	% of UK R&D expenditure in each region
South East (businesses in south east spent £ 3.7 billion on R&D in 2001)	25.7%
Eastern	19.1%
London	10.4%
Northwest	10.2%
Southwest	7.8%
Scotland	6.7%
East Midlands	6.6%
West Midlands	4.9%
Yorkshire and Humber	3.5%
Wales	1.8%
North East	1.5%
Northern Ireland	1.2%

Source: Perse Comm SEEDA Regional Development Agency.

sion; regulatory and legal framework; research and development; and the adoption and use of information and communication technologies. The UK also benefits from having a political regime which is classified as a full democracy as opposed to others which include flawed democracies, hybrid regimes and authoritarian regimes within which there is likely to be diminishing innovation performance.

Knowledge based economic outcomes (Fig. 11) represents the warrantable products and services that are delivered successfully to market. There is no specific data on these outputs for the companies on the Surrey Research Park; however, the rate of growth of companies on the site is an indicator that they are successful. The “gateway policy” for companies coming onto the site, which limits activities to research, development and design in science (including social science), technology and engineering also helps to narrow the likely outcomes to those that contain some proprietary elements.

The final two pathways in the model noted in Fig. 11, which denote feedback loop, if successful, result in re-investment in “knowledge capital” and “innovation capacity” that in turn leads to a “virtuous circle” of success. It is clear from the experience of the Surrey Research Park that many of the entrepreneurs that build and then “exit” from their companies return to the park as serial entrepreneurs and create further new companies. The presence of a science

park as a physical asset and focal point for this process helps to build local technology entrepreneurship capacity.

The location of Park on the campus of the University of Surrey in Guildford, which is part of an economic heartland region, has helped attract the right type of tenants which are in high technology businesses with good quality of products and services with strong opportunity for growth and development in global markets. This is further supported by the marketing regime adopted by the Park in relation to the promotion of the services it offers business, its location in terms of the economy and the quality of international air communications which enable companies to link with international markets, and the focus on technology companies that are working on innovation.

Over time the success of the regime of supporting pre and full incubation and grow-on space on the Park has supported a number of companies which have been successful in developing technologies which have then been acquired by large corporations. Examples include the acquisition of Bullfrog by Electronic Arts in 1994 and then the further acquisition of Criterion Software.

The Surrey region is overall an attractive location and appears to have a well qualified workforce. The most recent available National Census data for 2001<sup>25</sup> reveals Surrey’s residents as highly qualified. In 2001, 27.2% of 16 to 74 year olds (209,100 people) had a degree or diploma (level 4/5) qualification, compared with 21.7% in the South East and 19.9% in England. The trend is also the same younger age groups with 10.1% of Surrey’s over 16 year olds are qualified at level 3 (2 or more A levels) compared with 8.3% nationally and 21.6% of 16 – 74 year olds in Surrey are qualified at level 2 (5 or more GCSEs at grade A to C) compared with the England average of 19.4% qualified at this level.

The statistics also showed that there were 28,763 full time students (aged over 18) living in Surrey in 2001. Guildford had 7,004 students (9.6% of its 16 - 74 population) and Runnymede had 5,731 students (11.8%). 4.3% of England’s 16- 74 year olds are students, compared with only 3.7% in Surrey. This suggests that many Surrey 18 year olds go to universities elsewhere in the UK.

***To help European based industry maintain its competitive edge through fostering innovation – success indicators***

The performance of companies on the Park is best

<sup>25</sup> <http://www.surreycc.gov.uk/environment-housing-and-planning/surrey-data-online/2001-census/2001-census-qualifications-and-students>

demonstrated through case studies of some of the high growth companies on the site.

The range of high growth companies that have developed on the site include technology consultancies, companies that have licensed technology from government laboratories, companies that have developed their own intellectual property, companies that have taken advantage of new technology platforms such as low cost and high storage computing power as well as R&D teams working as small specialist parts of large corporations which themselves have spun out companies that have had an economic impact.

*Smith Associates:* the consulting firm Smith Associates which located on the Park 1986 employed 26 well qualified staff. The company grew very substantially, the founder left after a management buyout and it was renamed to Detica in 2001. Today the company has grown to in excess of 1,400 employees, turnover per employee in 2008 was over £ 150,000 and the company remains a leader in data and IT security. The company's best known products are anti-fraud software Detica NetReveal®, Detica DataRetain®, which is software that enables businesses to comply with data retention regulations, and internet security software Detica StreamShield®. In 2008, Detica was acquired by BAE Systems (Holdings) limited, which is part of BAE Systems plc, and it remains wholly owned by the company. Detica's headquarters remain on the Surrey Research Park in Guildford where they are continuing to consolidate. The majority of staff are located on the Surrey Research Park.

There have been three spin-outs from Detica of which the fastest growing is the privately owned company Actica which has achieved a turnover per employee of three quarters of a million per employee. The ability for the company to find, recruit and retain the best staff because of the location of the site, the flexibility of the University as a landlord that at one time made a loan of £ 250,000 to the company to assist with trading and the quality of its management are all important in this company's progress.

*Stingray:* Stingray which started on the site in the Surrey Technology Centre in 2007 was founded by an entrepreneurial team of two technologists who licensed an array of laser technologies from the UK Defense Agency QinetiQ. This technology was developed for listening to submarines in the north Atlantic during the "cold war" era. The entrepreneurs adapted the technology for use in the oil industry for geophysical data collection. Funded by venture capital the company grew to a team of 11 while in the Surrey Technology

Centre. During that time they developed the technology through a proof of principle, proof of concept, and then developed prototypes which were subjected to field trials and were eventually offered as a fully warrantable product. The company's innovative technology prompted its acquisition by the Norwegian geophysical data company. This company is an example of where locally based entrepreneurs used the Surrey Research Park to develop a technology that was transferred from a government funded defence laboratory into a commercial based civilian use.

*Bullfrog:* in 1991 two entrepreneurs started the computer games company Bullfrog and moved to the Surrey Technology Centre. Eventually outgrowing the services of the building the company moved to self contained non managed space on the Park. Growth was driven by the commercial success of both the company's own games of which they established the now well known genre of "god sim games" and by working as games developers for other providers such as Nintendo, Sega and Sony. The commercial success of Bullfrog led to its acquisition by Electronic Arts (EA UK) for an undisclosed sum. EA UK then continued to invest in the company. EA now employs over 300 people in Guildford. One of the founders of the company left EA UK and returned to the Park to establish a new games company Lionhead Studios. The company proved to be highly successful with its Black and White and Fable range of computer games and was eventually acquired by Microsoft in order to build content for its Xbox games console. The founder left Microsoft in 2012 to found a new computer games company and returned to the Surrey Technology Centre to develop this new business Can22 which is a games company that is to focus on the new mobile platform. The development of these companies and the games related spin-out, Criterion Software, from Canon Research have created a foundation of a computer games (media cluster) which now has extended to include games testing companies, media related legal services and games related recruitment companies.

There are many other examples of companies that have achieved significant growth. The majority of these have been involved in new commercialising technologies such as stem cells, bio-fuels, internet protocol security, ICT for security systems, building Satellites, as well as some patents for the health care sector.

**To help European based industry maintain its competitive edge through fostering innovation – success factors**

*Physical infrastructure and support package:* the factors that have influenced the success of the Park as a centre for economic development not only relate to the physical infrastructure but also to the support service package and management philosophy of the Park.

The market led approach of providing appropriate accommodation and grow-on space for start up companies has provided a valuable opportunity to these companies to become established. The range includes pre and full incubation as well as space in which to grow companies. The approach of using short term contracts has helped companies that are fast growing to make the necessary moves to adjust their space to their needs.

The presence of the Surrey Technology Centre business incubators since 1986 and more recently since 2004 the presence of the SET Squared pre incubator have supported the development of a number of technology entrepreneurs which together have helped to raise the levels of competence in technology entrepreneurship. The employment of an entrepreneur in residence and the operation of an Angel Finance Club are both valuable contributors to the growth of more technical companies.

The support of companies in emerging technologies and promoting these has helped to create clusters of companies involved in new innovative fields. An example is the emergence in Guildford of a cluster of computer games companies that are among the world's leaders.

The companies on the Park have been surveyed and there is a high level of awareness of the capabilities of the University of Surrey and the availability of technology services to companies when required.

*Skills:* the quality of the work force on which the companies on the Park can draw that has been established because of the presence of the University of Surrey in Guildford for over 40 years has helped to build a well educated community that are available for recruitment by companies and enable to employ staff that are capable of absorbing and commercialising new ideas.

*Innovation:* the emergence of a number of leading edge technologies from companies that have established on the site, such as satellite engineering, media technology, clean technologies, ICT including bio-informatics, and health care all of which have developed intellectual property have been able to be developed because of the incubation programme offered on site.

*Strong business community:* Guildford's has a strong

business community that has been supportive of the companies on the Park as they have developed.

*Good communications:* the Park is well located to gain easy access to international market because of the close proximity to international nodes of communication.

*Active management of University links:* the University of Surrey has developed an active programme of support for business through its Office of Research and Enterprise Services that have helped companies connect with the intellectual and technology base in the University. The image and reputation created by the Park as a good place to carry out business. Added to this the management of the Park has had a progressive approach to dealing with emerging technology companies. The University of Surrey has helped to share some of the risk for developing companies by adopting a light touch in relation to its activities as a landlord.

## 5. CONCLUSIONS

The Surrey Research Park was first promoted in 1981 in the tradition of the University of Surrey and pre-cursor institutions which had historically worked closely with industry and business since 1896.

Careful definition of the objectives for the Surrey Research Park project provided a valuable framework for developing the master plan, funding, governance and then operational model.

Critical to the Park's success from the University of Surrey's perspective was the successful raising of the initial capital through a land transaction. This enabled the University to control the development of the site and letting policy.

The objectives defined for the 3 stakeholders which respectively relate to economic development, competitive advantage of tenant companies, knowledge transfer, profile for the University and the capacity to generate income have been critically important in guiding the development; however, their value is diminished without defining success indicators that drive performance and understanding and trying to develop the success factors that assist with achieving a good performance.

The Surrey Research Park defined these parameters in the 1990s as a way of measuring performance of the Park.

The lesson to be learnt from the project is that it has always had a clear set of objectives, supportive management throughout the University and the University of Surrey has

undertaken the development of the project from a commercial perspective with a very business like response to the market. It is important to ensure that the academic priorities of a host university are taken into account in a development but do not stifle the enterprise and the market because without the support of the academic infrastructure the foundations for the project cannot be sustained.

The result of adopting a commercial approach to the planning, development and operation of the Park has meant that it has had a significant impact on the economic development of the region in which it is located.

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