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TENANT COMPANIES: LESSONS LEARNED FROM THE PLANNING, DEVELOPMENT AND MANAGEMENT OF THE SURREY RESEARCH PARK

PLENARY SESSION 5

The impact of STPs/AIs today and tomorrow

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Tenant companies – the lessons for the planning, development and management of science and technology parks from an analysis of 29 years of data on tenant companies on the Surrey Research Park.

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Abstract

The Surrey Research Park has been operating for over 25 years. It is a carefully planned and purpose built facility. It has supported over 500 companies in that period. Of the three stakeholders (government, university and tenants) in the Park the tenants are the most important because of their role in driving innovation and building competitiveness; however, they are also the most fragile.

This paper reports on data collected from 488 of the tenants that have located and developed on the Park since it opened.

It covers some of the principles on which it has been planned, developed and managed and how tenants have responded positively to this offering. It is clear that it has had a very significant impact on regional economic development because of success of the tenants.

The broad conclusions of the project are that performance of the Park has been influenced by the way it has been planned and managed and more importantly the prevailing local and sub-regional economic conditions which have influenced tenants. In addition the paper sets out some generic lessons that have been learnt from the study.

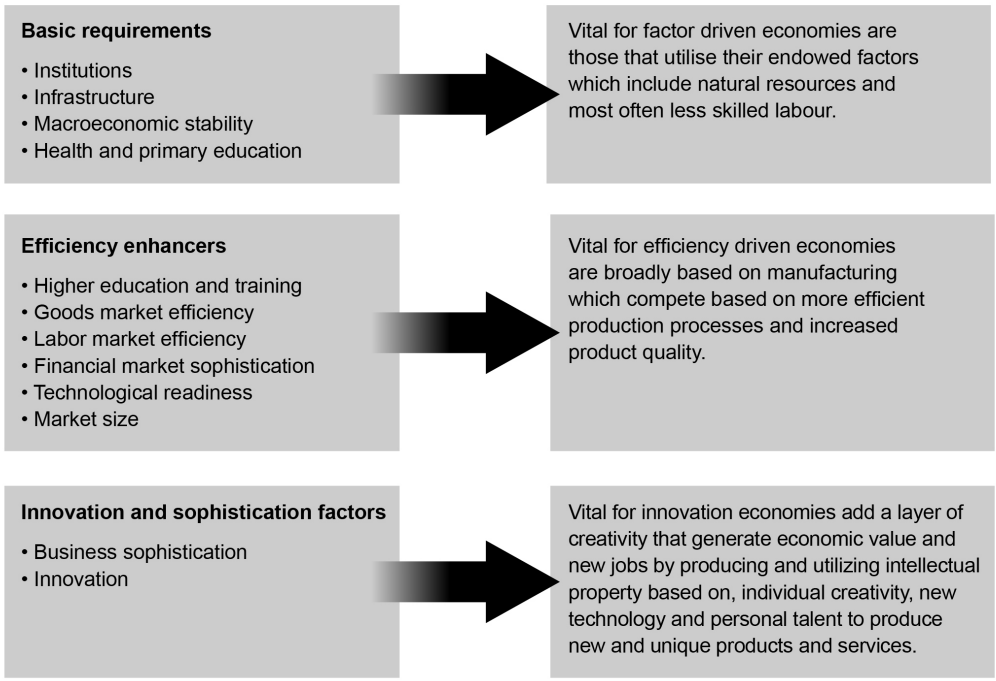
Introduction

The need for all countries to improve the levels of prosperity for all their citizens has meant that they must continue to widen their base of economic activities and increase their competiveness in the market in which they are active while also connecting economic systems with global production.

The factors that influence both the economic base and competitiveness have been the subject of research and debate which has reflected the prevailing relationships through-out history between raw materials, labour (skills), technology and supply and demand.

Today the widely held view[1] is that the ability for economies to compete derives from the level of investment of what the Global Economic Forum describe as the 12 pillars of economic competitiveness. It is clear that today most countries are trying to create the social, business and technology environment which is necessary to traction in an innovation economy.

Figure 1 – the 12 pillars of competitiveness



Reference: Global competitiveness report 2008-2009

Some practical elements of the sophistication factors include business, technical and social inputs into the economic mix. Examples of some of the influences include:

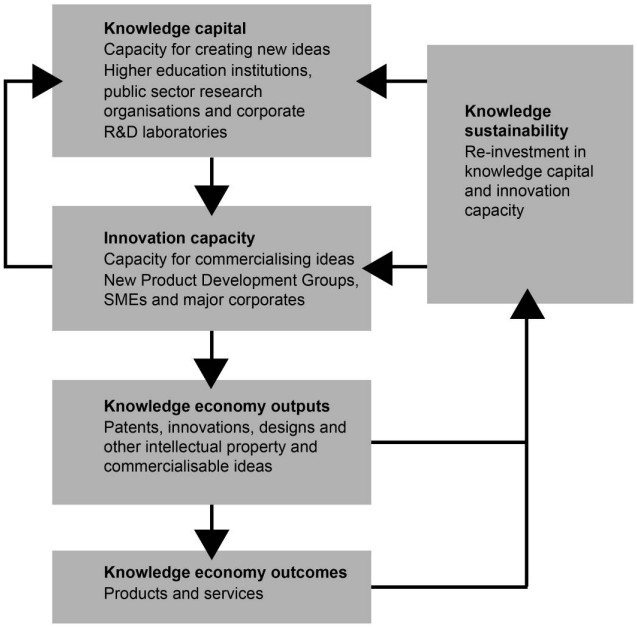
Table 1 – inputs to create innovation and sophistication factors

Social inputs	Business inputs	Technology inputs
Appropriate fiscal structures that encourage and support business formation and growth.	Quality and availability of business advice.	The extent and quality of the research environment and access to universities and other research centres for R&D collaboration.
Social respect for technology led entrepreneurship and a culture that support enterprise.	Availability of risk and loan capital.	Existing regional science base that gives a location a level of technological competence.
Removing regulations that might restrict competition and the development of markets.	The extent of the regional, national and international customer base available to companies.	Availability of relevant skills science, engineering and technology base that recognises a need to support innovation.
Effective transport and communications.	The extent of business skills base and perhaps the availability of relevant business education.	An active commercially founded R&D and design community.
Quality of life in a region.	Access to business incubation.	Product innovation leading to improved product range.
A supply of the right level of entrepreneurial talent to drive innovation.	A critical mass of existing knowledge based companies.	
Effective professional	Innovation of all typologoies	

networks that link the knowledge capital with innovation capacity and markets	leading to greater efficiency and improved quality.	

Based on these inputs the top priority for innovation economies is the generation of new value-added jobs which link imagination and creativity and accelerate industrial convergence. Science Parks like the Surrey Research Park regard supporting this process as their most important objective. To do this most focus on supporting tenant companies by helping to establish the connections that link the social, business and technology factors that are the foundation of the sophistication factors that are necessary to the kind of sub-regional economy noted in Figure 2.

Figure 2 Model of the Sub Regional Economy[2]



A study by UK Science Park Association (UKSPA[3]) in collaboration with the UK governments Small Business Service showed the value of science parks in supporting opportunity led entrepreneurial companies because of their role in providing innovation capacity.

The experience of operating the Surrey Research Park for 30 years is that the most fragile and elusive of its three stakeholders is the tenant companies.

The location of the Surrey Research Park is in Guildford in the County of Surrey which is home to 1.135m people and is the most densely populated non city region in the South East of the UK. Over half (57%) of all jobs in Surrey are in the top occupational categories (managers and senior officials; professional occupations; and associate professional and technical occupations) and over the next 20 years, there is expected to be a further shift towards higher end occupations, as knowledge based sectors drives innovation and enterprise.

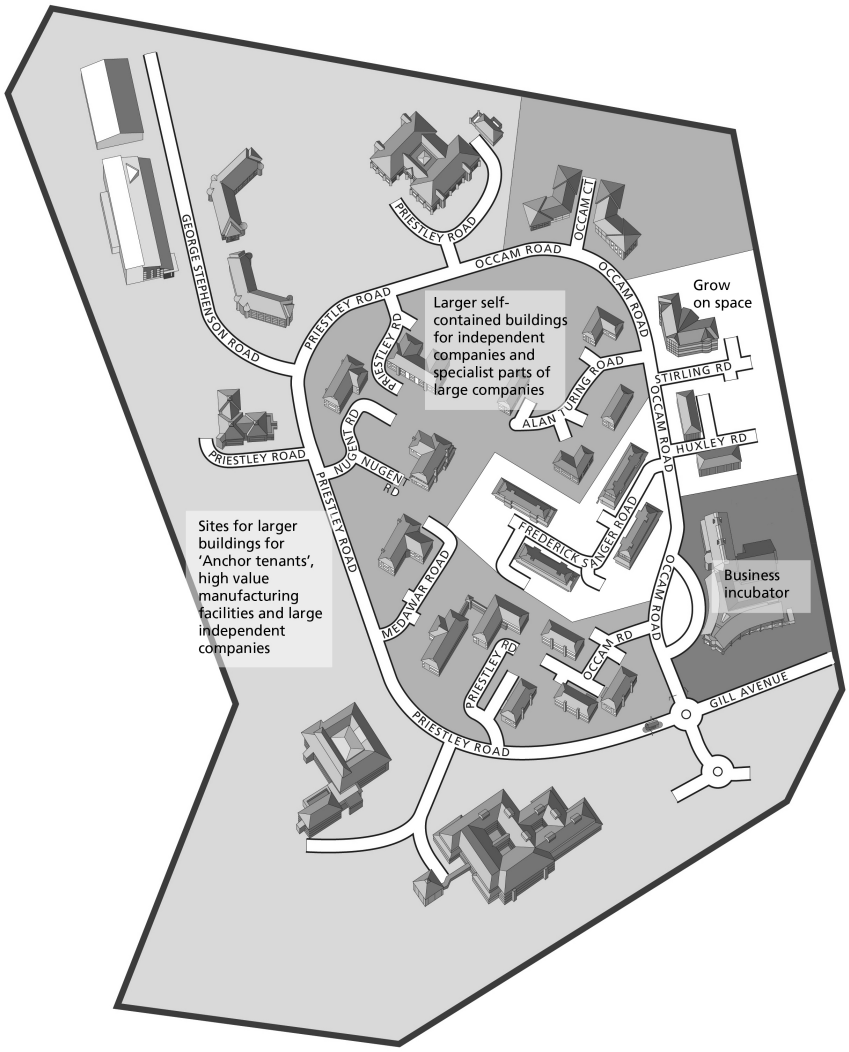
Tenant companies on the Surrey Research Park

This paper looks at a sample of 488 companies that have located on the Surrey Research Park since the first tenants located on the site in 1985.

The initial and still extant and guiding objectives for the development of the site by the University include creating some an independent income for itself, raising its profile as a centre of excellence, supporting technology and knowledge transfer, helping tenant companies gain a competitive advantage by locating on the Park and supporting economic development by developing the 28.5 ha site.

The physical plan developed by Surrey to deliver these objectives is based on offering tenant companies the opportunity to locate on the park at any stage of their development. The details of this property offering in noted in figure 3.

Figure 3 showing the 4 zones of the Park comprising an incubation facility, "grow on" space, larger buildings for independent companies and an area allocated for attracting large facilities R&D facilities or high value manufacturing activities.



The pre and full incubation programme is offered in the Surrey Technology Centre (Business Incubator) which was opened in 1985 and was the first operational building on the site. Its success has resulted in being extended twice and it is now 7,400 sq m. Occupation is based on a monthly licence that provides for a range of business support services to help companies establish with low capital costs. Units range from 15 sq m to 90 sq m.

The units offered for growth range from 120 sq m to 500 sq m and has been designed to create independent self-contained units that can be let on short term contracts from 12 to 60 months with break options.

To attract larger companies buildings range in size from 600 sq to 6,500 sq m in areas designated as "grow-on", medium units and areas for larger companies. It is interesting to note that the zone which has been slowest to attract occupiers was designated for large companies. The Park has adapted to prevailing economic conditions and is now building smaller units and manufacturing space for high value products such as satellites, in this zone.

The Park is also self-funding: the rents cover building and operational costs but the land was bought at agricultural land prices and has had its value raised substantially through the permission from the local government to build on the site.

The business development services offered to individual companies reduces as they grow and take responsibility for more of their own operations. Initially this service was organised by using locally based management consultant that were willing to participate in the project for the goodwill it

provided. Today this is much more extensive and sophisticated and now receives government support for a pre-incubator which occupies just 240 sq m of its 7,400 sq m, but the mentoring programme is still organised through the a network of mentors, coaches and investors that have been supportive of the project for the last 30 years.

Today the Park also has its own Angel Club that is thriving with over 60 investor members which is linked to other Parks in the UK and meets for "pitch sessions" every 6 weeks. The Club not only relies on the companies on the site: it has built a reputation in the region which brings in potential companies that pitch for investment from a wide catchment. Data shows that it draws interest from as far as 50 miles as well as recruiting companies from those parks with which Surrey collaborates.

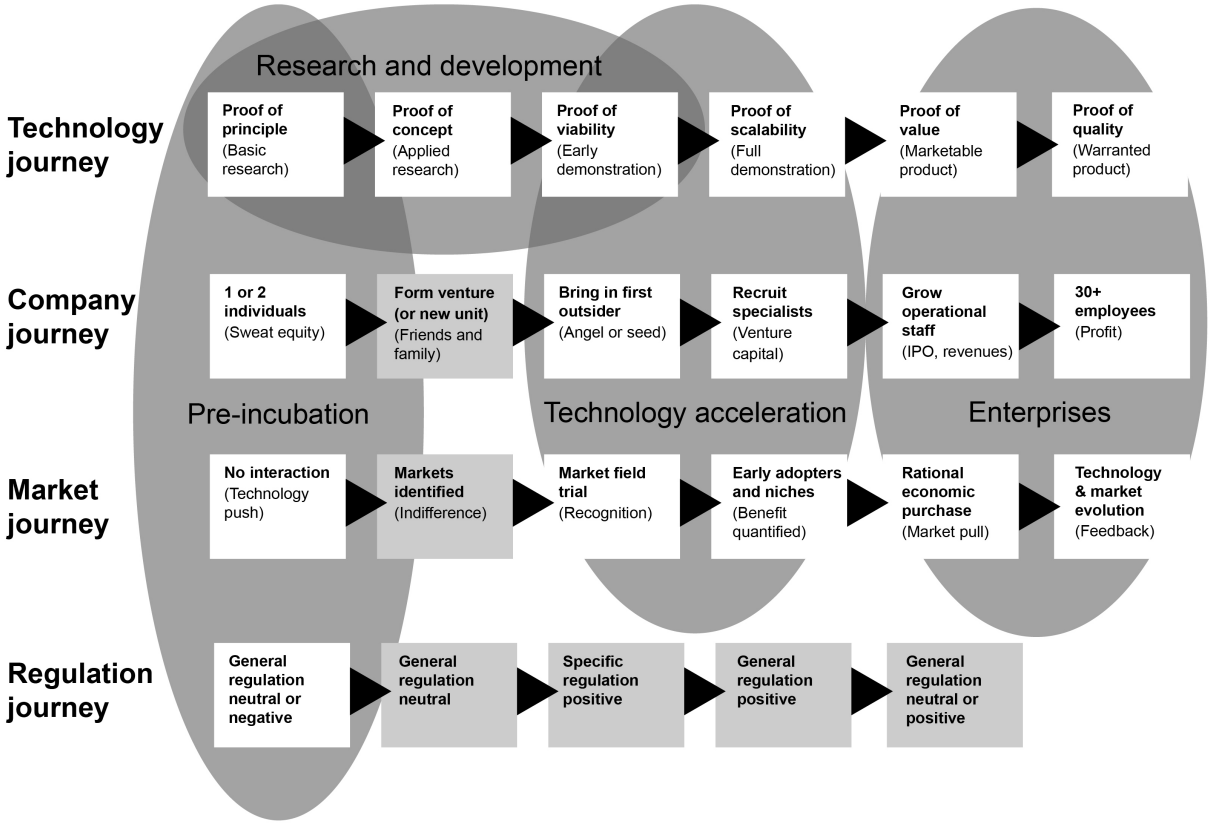
A focus for tenant companies

The experience of developing the Surrey Research Park over 30 years is that companies develop through a number of phases. These were reported in a paper to the IASP conference in 2011[4].

Figure 4 characterises these journeys which operate under the influence of regulatory frameworks that create and control markets as well as influence the ease of doing business. One of the positive factors in relation to the regulation journey is that today the UK ranks in the top 10 of 189 countries on the ease of doing business index[5].

The other journeys are influenced by entrepreneurial, technical and business skills. The capacity to drive along these journeys is influenced by access to the necessary funding. Access to funding has not proved to be a significant barrier to progress for companies that have developed effective business models which demonstrate how they are intending to integrate an understanding of their market and customer segments, revenue streams, channels to market, the value of their proposition to customers, what resources and activities are needed to deliver the proposition, what partners and what costs are needed to secure the revenue stream.

Figure 4 – the stages of development of companies on the Surrey Research Park developed from observations on a significant sample of businesses which have located on the site over the last 25 years



One of the important factors of any S&TPs is the restriction, normally by regulation, of the permitted use of the site by companies.

Throughout the period of development of the Surrey Research Park the national regulations on doing business have been supportive. However, at a local level the activities of tenant that the University has been permitted to sign up for occupation has been restricted to what is described by the local government as research, development and design in any science, including social science, and complementary to the activities of the University of Surrey.

Experience has shown that the original permitted imposed by the planning authorities when mapped onto the development journeys (Figure 4) reveals that most companies fall outside the formally permitted use. The commercial imperative for all tenant companies is, as quickly as possible, to move technology from proof of principle to a warrantable product or service.

To overcome this problem judgement has been applied for the last 25 years based on allowing occupation by tenant companies that are concerned with developing and commercialise products and services based on science, technology and engineering and allowing them to operate across the full spectrum of innovation typologies[6 7] necessary to support the cycle from discovery to market for any innovation based output.

Tenant companies that have located on the Surrey Research over the period 1986 to 2013.

The first tenant company recruited to the Surrey Research Park moved into the Surrey Technology Centre in 1985. Since then just over 500 tenant companies have located on the site; however, this review is based on data collected from just 488 of these companies of which 59 are, or have been, in a government funded pre incubation programme that was opened in 2007.

The following data has been collected about these companies locating on the site:

- Details about the back ground and age of the principals of the companies locating on the site and the reasons for their interest in the site.
- Their origin, i.e., whether they were independent single site, independent headquarters of multisite, subsidiaries of UK, subsidiaries of overseas companies, or from a HEI or a government research centre.
- The distance from which they were drawn.
- Whether they were a start-up, i.e., less than 3 months old when they moved to the Park and were set up to exploit a new product or service.
- A question about which of the three journeys (technology, company or market) has dominated the decision of start-up companies to move to the Park.
- The technology sector relating to their market focus.
- The activity in that technology sector. The very wide range of the markets at which companies focus their commercial offering in which the companies are involved precluded fine grained analysis of the data.
- Longitudinal observations about those companies which have proved to be high growth.
- Some measures of economic impact of the Park on the regional economy.

The intention of this review and analysis is to provide both a quantitative and qualitative insight into the nature of tenants companies and their interest with the view to helping those planning, developing and managing parks understand this less well defined but essential stakeholder.

Origins of companies

One of the common questions about tenants on science parks is their origin.

Table 2 – catchment area of companies recruited to the site.

Catchment of company and units on site – miles from park at the time of recruitment	Number of companies	Start-up	
		No	Yes
From within 6 to 30 mile radius	144	34	110

From within a 5 mile radius	202	19	183
From Overseas	65	52	13
From rest of UK	34	8	26
HEI or other Centre of Research - some are from within 6 to 30 mile but others come from all over UK	22	1	21
University of Surrey - not included in the 5 mile radius number - the University is adjacent to the Research Park	21	3	18
Total	**488**	**117**	**371**

The results show a very strong localised impact of the site with more than 80% of its tenants from a catchment area within 30 miles of the park including the spin off, spin out and operational units from the University, which is less than 1 mile from the campus.

Contrary to a commonly held misconception that host institutions produce the majority of tenants it is quite normal as, in the case of Surrey, that the host produces tenants in low numbers.

Details about the entrepreneurs starting companies is that their average age when starting their businesses is greater than 30 years of age and that many have significant commercial experience in a technical market that they bring to bear in developing their new business.

The status of the companies recruited to the Surrey Research Park is set out in Table 3.

Table 3 – the status of the companies attracted to the site

Status of companies or unit on site at the time of locating on the Park	**Number of companies**	**Start-up companies[8]**	
		No	**Yes**
Independent single site company - all activities carried out on site – cover full range of activities from discovery /initiation of innovation to sales in one location.	360	26	334
Subsidiary of overseas company - not including dedicated R&D facilitates but cover business activities closer to market.	65	61	4
Subsidiary of overseas company where primary use is R&D centre – strong focus on discovery.	10	10	
Subsidiary of UK company - not including dedicated R&D facilitates but on cover business activities closer to market.	26	11	15
Subsidiary of UK company where primary use is R&D centre – strong focus on discovery.	3	3	
Spin out and spin off companies from the University of Surrey – commercialising ideas generated while working at the University of Surrey.	13	2	11
Operational unit of University of Surrey – includes taking in departments and R&D units - park used as overspill space or housing commercial units selling University services such occupational health services to the business community.	8	1	7
Headquarters of multisite company – all science, technology or engineering based and cover all business activities.	3	3	
Total	**488**	**117**	**371**

The details reveal the significance of independent single site companies in the development of the Park and highlight the importance of being able to support technology focused opportunity based entrepreneurs who have the ability to not only recognise opportunities but can develop the opportunities for commercial gain.

The records on the number of employees of the companies at the point of recruitment shows that only 18 of the 117 pre-existing companies on the site had more than 20 employees on moving to the site. Of these 18 companies only 6 remain on site but the buildings they have vacated have been filled by other companies that have grown from within the Park. This means that the growth in numbers of employees on site, which is now in excess 3,250 staff, has come from the growth of start-ups.

Since the Park was established 10 overseas companies have set up dedicated R&D facilities on the Park. These have included 4 from Japan, 1 from Spain and 5 from the US; however, only two of these, when recruited, employed more than 20 staff. The other 8 units grew through recruitment. All of these R&D activities were established in the 1990's but all but 1 small unit have closed. This is a result of the trend of large companies to reduce the number and often the size of dedicated R&D facilities while developing open innovation strategies.

The Park has also attracted 3 so called "anchor tenants" to the site each of which took leases on buildings of over 6,500 sq m. All were involved in technology and were interested in locating on the Park because of the benefits of recruiting young talented engineers which they had found was a constraint in their original location. Two of these anchor tenants have been acquired by international businesses and the R&D service they provided have been moved to the US or Switzerland. In both cases their buildings have been re-occupied and one of these occupiers is a tenant that has grown from within the Park from 30 people in 1986 to now over 600 employees on site.

Types of companies and categories

The companies that have been attracted and recruited to the Park fall into a number of technology sectors and within each of these sectors there is a broad range of different roles or activities which have been recorded at the time of recruitment. The breadth of the activities is noted in table 4.

Table 4 – indicative details of trading sectors and activities of companies in the analysis

Technology Sectors PT	Examples of Company Activities-
Biotechnology: - the focus of this sector is on renewable energy	R&D on fermentation and renewable energy.
Bio-medical: - the services run from R&D in medical devices and pharmaceuticals through testing and safety to deployment as services or products in the sector.	Contract research for pharma including drug discovery, development, clinical trials, registration and drug safety; diagnostic technology including gene-chip technology; and bio-informatics for big pharma; providing specialist research based health care clinics that also collect epidemiology data for research; R&D into stem cell technology; medical services such as pathology labs; and developing hardware to support health care.
Support services for business: – the services offered are all related to business development.	Advice and support on: Intellectual Property; funding for company development; technology, company and market development; branding, design and media services, market research services, technology focussed HR, marketing and sales of technology products and finance for technology development, and industrial psychology as a service to business to manage change.
Computer and telecoms related: – the major focus of companies in this sector is the development of software and hardware for the changing technology environment with the view to deliver IT	R&D and design of software, middleware, hardware and telecoms communication for the majority of business and industrial sectors as well as the gaming sector; sales and supply and fitting of IT hardware, developing software solutions and for mobile communications related technologies; R&D in communication protocols, relevant

solutions.	consultancy and deploying IT solutions. These cover computer games, data/ business intelligence and bio-informatics, healthcare, business and traffic modelling, finance, control systems, image processing, logistics, media, education, market research, networking control, e-commerce, social media, general bespoke business systems and telecoms.
Consultancy (technical): - the change of business from vertical to horizontal integration has created the opportunity for a raft of consultants to support business development.	R&D from discovery to development and design of products and services for nearly all business and industrial sectors. This includes prototyping to developing technology solutions and includes companies involved in all branches of engineering, defence, internet protocol security, CRM, and healthcare as examples. These technical consultancies among other sectors serve the civil, hydraulics, automotive, mechanical, energy, transport and logistics, materials, manufacturing sectors, and defence with research, development and design services.
Education: – the technical nature of business has resulted in a number of companies providing CPD and products for the sector.	Providing training and Continuing Professional Development in technology sectors and business education.
Energy related: –this sector has created a significant market opportunity for small technology companies that service this sector	Developing services for the energy sector including R&D and design, developing IT solution for the energy sector, training and teaching for the energy sector including nuclear technology.
Environment related: – the imposition of regulations associated with environment has created a significant market for technology companies.	Consultancy in environmental related activities, R&D and design of new products relating to carbon, emission technology, remote sensing.
Industrial technology and engineering: – the need for specialist services by industry has supported the development of companies that address this market	R&D and design, product testing, technical support, product registration, materials development for manufacturing and construction sectors in agri-business, chemical, satellites, building products, materials, and pharma.

The sectorial focus of the activities of the 488 companies is noted in Table 5

Table 5 - Companies by sector in which companies operate

Sectors in which companies operate	Number companies by sector	Start up	
		No	Yes
Bio - medical/ pharmaceutical / technology	69	18	51
Commercial/Financial/Legal/Support Services for tenants or for technology sector	21	1	20
Computer/telecom related	216	46	170

Consultancy (technical)	75	13	62
Education related	9	3	6
Energy related	19	5	14
Environment related	9	4	5
Financial, business, or non-technology related companies	30	6	24
Industrial technology	40	21	19
Totals	**488**	**117**	**371**

The sectors that dominate have been computer and telecoms related, with technical consultants, which represent specialist in a range of technologies, and bio-science companies being moderately represented.

In each of these sectors start-up companies dominate; however, the in the case of industrial technology there is a more even split between start-ups and pre-existing tenants.

The relevance of understanding the size of the cohorts of companies in these different sectors has helped to:

- Give direction to the kinds of resources needed to support the growth of the market driven technology cluster that has been established.
- Guide the development of specialist services and courses that related to supporting company development.
- Guide decisions on the kind of space and the size of units that have been built.
- Assess the topic and contents of events that might be launched to support start-ups.

A review of more detailed information (Table 6) about the companies shows that the majority are active in the computing related sector and again are start-up businesses.

Table 6 - Sectors by start-up – since the Park opened

Sub –Sector	Number companies by sub-sector	Start up	
		No	Yes
Aerospace	2	1	1
Business Support Services	62	10	52
Computer	205	41	164
Construction related products	2	1	1
Consultancy (technical)	65	13	52
Education	8	2	6
Energy related	17	4	13
Environ. Related	8	4	4
Industrial technology	30	11	19
Material science	11	9	2
Bio – Medical	37	7	30

Mobile communications	1	1	
Bio – Pharma	29	11	18
Sales, Distribution and Warehouse	1		1
Bio – Technology	3		3
Telecommunications	7	2	5
Total	**488**	**117**	**371**

A cross-tabulation analysis of the activity of companies against Sector (Table 8) shows the largest proportion of companies on the site as active in innovation through their work on R&D and design. This suggests that the companies on the site make a useful contribution to innovation capacity in the region and that a substantial part of this comes from start-up companies which emphasises the importance of "entrepreneurs of opportunity" that drive this process.

Experience has also shown the importance of specialist technical consultants to economic development because they are a group of companies that support other companies as they develop through their respective company, technology and market journeys. Their presence also supports the transmission of ideas across technologies and platforms which together provide essential networking capacity.

The results of an assessment of the stage in the development of companies at which they joined are noted in Table 7.

Table 7 - The stage of development of companies at recruitment.

Start-up company	Total number of companies	Journey stage at recruitment		
		Company	Market	Technology
No	117	49	17	51
Yes	371	143	53	175
Totals	**488**	**192**	**70**	**226**

This indicates that the largest cohort of companies is concerned with driving their technology to a warrantable product. This emphasis on developing technology suggests that the region is rich in accessible technology that helps to form the basis of an innovation focussed community and that the Park with its physical provision of the right space serves this process effectively.

When analysed by sector the level of research, development and design (Table 8) being undertaken also shows the level of interests by companies trying to establish new products and services. The sector that is most actively trying to innovate is computing by a substantial margin; however, a number of bio-science (technology, medical and pharma) and industrial technology companies, which includes the University of Surrey spin-out Surrey Satellite Technology, are also forging their respective futures through innovation.

Table 8 Activity by sector

Sector / Activity	Bio Med, Tech, Pharma	Commercial/Financial/Legal/Support Services	Computer/telecom related	Consultancy (technical)	Education	Energy related	Environment related	Financial, business, non -technology related	Industrial technology
Business support	1	12	4	1					
Commercial/Legal/ Financial/Support	1	2		2				8	2
Computer/Telecoms						1			
Design and media			5	1					
IT Solutions			35	14				1	
Manufacture				1					3
Middleware			1						
R&D & design	48	2	122	19	1	14	5	3	29
R&D Clinic	8								
Sales/Distribution /Warehouse	1		9					1	1
Service			1					1	
Technical consultancy	4	5	36	33	1	2	4	12	4
Testing/Analysis	3		1	2		2			1
Training/Teaching	3		1	2	7			4	
Totals	**69**	**21**	**216**	**75**	**9**	**19**	**9**	**30**	**40**

Economic impact

A highly visible metric for measuring economic impact is in the number of jobs created by companies. The details of the exact number of staff, over time, have not been measured but details of companies moving on and off the site have been recorded.

Growth based moves on the Park have been recorded for 138 companies; however, not all remain on site since that move as some have moved to larger premises in the town, some have been acquired and relocated to the current owners offices and a proportion have sold some of their business and then downsized on site.

Of the companies that have moved on to accommodate growth 105 have been start-up companies. This figure does not show the whole picture of growth of companies because a proportion of the 371 start-up companies have been acquired by an early stage and have been relocated to the offices of the acquiring company of which a number have been on the park.

Based on an average occupancy of 16 sq m per person, currently the firms on SRP are employing 3,250 to 3,400 people, of which, based on post code data, around 22% are likely to live within the Guildford Borough and a further 32% from elsewhere in Surrey.

In addition, 310 firms have left the Research Park since it was opened. On their departure, in total, they occupied around 67,419 sq m, and were thus employing around 4,300 people at the time when they relocated. Of these companies a significant proportion tended to be very small. Around 75% of all leavers were occupying less than 100 sq m and employed between 2-5 people on departure from the Research Park.

On this basis it is estimated that the Research Park is likely to have contributed at least 4,830 high quality jobs (3,200 from existing tenants and 1,630 from those that left). A high proportion of people employed have been graduates, on above average salaries and working in companies with inherently above average GVAs per head. This figure does not take into account changes in employment of the firms after they left the Research Park or multiplier effects.

The economic impact of the Park

The Research Park has come to play an increasingly important role in the economy of Guildford and Surrey, both as a high profile centre of knowledge based businesses and as a strategic location for attracting inward investment.

An independent review of the Surrey Research Park in 2012[9]identified that during the 25 years since the setting up of the Research Park, there has been a substantial increase in employment in knowledge based sectors of the economy in Guildford and Surrey as a whole, as set out in an 2009 Guildford Economic Development Study[10].

Whilst the Park does not operate a formal sectoral based letting policy a number of clusters of companies, in a number of overlapping technologies, have built up on the Park through the use of a letting policy that is price based to encourage sectoral growth.

Based on employment data on the Park and data on employment creation in the region[11] [12]there is evidence of the influence that the Park has had on local and regional economic development.

Other data on the changes in high tech employment in the region 1999-2008 shows that Guildford's increase in high tech employment is above the average of Surrey County as a whole in the periods 1999-2004 and between 2004 and 2008[13] [14]. Also in 2010 the UK Competitiveness Index ranked Guildford as the most competitive 'city' in the UK outside London[15] and it is likely that the presence of the Surrey Research Park tenant base has made a substantial contribution to that ranking.

For a number of years detailed data was collected annually on the turnover of tenant companies using Companies House records but with the change to the reporting obligations of companies this has been made more difficult; however, using the available data on employee numbers and estimates of the average turnover per employee of the companies on the Park (3,200 staff currently and an average turnover of £140,000 to £150,000 per employee[16]), and a multiplier of 1.3 gives an estimate of the annual economic activity created by tenant companies is between £580m and £625m in the regional economy.

The companies on the Park that have been acquired by foreign companies have attracted significant foreign direct investment into the region. A few examples include the purchase of Bullfrog by EAUK for an estimated $50m, Lionhead by Microsoft for an estimated $40m, of Stingray by TSG for $75m and SSTL for in excess of £45m all indicate a significant level of success.

In addition the park has played a role in the formation of a games cluster in Guildford by helping the initiating company during its early growth and subsequently giving support to spin-out companies from the other studios that have developed on the site. The Park over time has supported 19 of these studios as they have been established and grown. Today the presence of Microsoft on the Park as owners of Lionhead Studios, the presence of EA UK, and Media Molecule which is owned by Sony and some 25 other games studios in Guildford can be traced back to the presence of the Park and the role of the Surrey Technology Centre in supporting the sector.

Another major successes has been the growth of what is now BAE Systems Applied Intelligence Systems from a company that moved to the Park in 1986 with 30 staff and grew through a flotation on the Stock Exchange to 1,200 staff and a turnover of £200m and was then taken private again by BAE Systems for an investment of £568m to now have 600 staff on site and is one of the an intellectual powerhouse for the site.

In 1991 IDBS located in the Surrey Technology Centre and from employing 4 staff has grown to be the world's leading supplier of big data management systems to the pharma sector. It is now expanding beyond that market as it builds it international reputation. It has offices in 10 countries, is debt free and continues to expand.

In all three of these cases the companies have been led by highly skilled opportunity entrepreneurs or teams of entrepreneurs that have been the key ingredient in driving success.

University links

One of the important objectives for the Park was to create the opportunity for knowledge transfer for the University. Recorded details of the kinds of linkages include the following

Table 9 - Actions to enhance support knowledge transfer

Examples of activity	Notes
Shared equipment	An International Research Centre on the site contributed towards equipment for the University's Faculty of Engineering.
Departmental prizes	A number of tenants have funded student prizes in faculties relevant to their business.
Academic links	A number of the Medical Research Clinics on the Park have joint appointed Professors running these and this work feeds into the "one health[17] agenda" that is being pursued by the University.
Education programme	A number of teaching contracts have been put in place with tenant companies and a number of employees of Park companies have enrolled in post graduate courses and professional development programmes.
Spin-out and spin-off companies set up by University staff or based on University IP.	Examples include: Surrey Medical Imaging System from Physics, Hyperion Consult, Gnosis and Imaginer from Electronics and Electrical engineering, Advanced Showers, SSTL from the Centre for Space Engineering, Thermoset from Material Science and Engineering and Food and Veterinary Science from the Faculty of Biological Sciences.
Spin outs from other universities, research institutes or governmental research organisations	Medpharm is spin-out from Kings College London, ReNeuron is a spinout from Kings College Hospital, EMRAD spun out of the Electrical Research Association labs (ERA) in Surrey, Stingray which has commercialised some laser technology from QinetiQ.
Spin outs from other companies	At least 15 companies that have located on the Park have been from other tenant companies on the site.
Staff and student links	A number of students find Industrial and Professional Training Year Placements (internships for an external year) each year with tenant companies. There are a number of Surrey graduates as well as those with post graduate qualifications employed on the Park.
Joint R&D projects	There have been a number of research contracts signed between the University and the tenant companies.
Informal working links	An important minority of companies on the Park in particular fields have and are actively working on an informal basis with research staff in the University.
Links with the Library	All companies on the Park are entitled under a special arrangement to join the University Library.

Conclusions and lessons

The review of the data about companies has provided a number of insights that have been important in developing the performance of the Surrey Research Park and in guiding future development.

The numbers of tenants that have been attracted to the site as technology based start-ups has shown the importance of the Surrey Technology Centre and its services in helping to realise the potential of the regions technology assets.

This asset base is worked by individuals who have the skills, technology, market knowledge, access to funding, and the capacity to act as an entrepreneur to drive innovation.

This asset base is not limited to one technology as the sectors attracted to the site cover a wide range of markets; however, as would be expected in an era of the digital revolution there is a higher preponderance of companies in this sector.

The pre and full incubation programme allied to the work of the entrepreneurs in residence, the Park's mentor group and the Angel Club are all important factors in giving momentum to enterprise and entrepreneurship.

The planning of the site has enabled those companies that are successful and want to grow to remain on the site. The technologies and activities in those technologies which includes significant levels or R&D and design means that the space on offer needs to be sufficiently adaptable to be able to accommodate a range of wet and dry laboratories if they are to be able to support growing technology businesses.

The breadth of activities that are taking place in companies and the point in the business cycle of the wide range of companies that have located on the site has meant that defining a formal planning use is not possible and the conclusion is that permitted uses should not be defined in terms of discovery of ideas nor in terms of sales alone but should enable a wider range of uses which could be effectively defined in terms of innovation.

The planning of the site so that it can accommodate growth has provided the capacity for 105 start up to move on site which has helped build on the single site significant momentum to maintain occupancy levels of between 90 and 95% in the 7,400 sq m incubator and around 90% of the larger buildings on the site.

The age and experience profile of entrepreneurs on which the park relies suggests that the location of a park in an existing community of companies, which helps entrepreneurs gain experience and confidence, is critically important. Where these elements are missing then there needs to be a significant level of investment to support opportunity led entrepreneurship.

The high level of R&D and design in the start-up companies means that there needs to be a supportive funding offering to companies. In the case of the Surrey Park this has been created in part through government programmes but the level of funding raised by companies through the Angel Club has shown the importance of this investor group for young companies.

The change in the innovation strategy of most large companies has created an exit route for many entrepreneurs which means that fewer tenant companies in the future are likely to grow to any significant size before being acquired. This places a challenge on Parks as they plan to accommodate the growth of companies on site.

The average size of units taken by start-up companies is 60 sq m, taking account of all companies in this category; however, a number have located on the site and required laboratories in which to develop their companies and these users have taken units from 300 sq m. to 800 sq m in which to base their start-up. This has increased the property related risks on the University because if they fail and need to leave, the cost of removal of their fit out is higher than for dry laboratory operations.

Some generic lessons that have been learnt from the last 25 years of operation are set out below.

- Managers should track tenant performance in order to have access to common datasets over a period of time. This is an essential precondition of understanding the performance and impact the park is having on the local, regional and national economy.
- Understanding and analysing the patterns of company growth in different sectors helps to guide the development of specialist services, guide building planning decisions.
- Entrepreneurism is critical to success because of the role these people play in driving innovation which means there needs to be a focus on developing this trait in scientists, technologists and engineers.

- There is an important role for specialist consultants in supporting tenants because these people are usually well qualified, well connected and understand markets and can provide valuable insights for tenant companies.
- Changing the adage of location, location, location to Location, location, and networking expresses the sentiment of the importance of this role in the development of the Surrey Research Park. Innovation is an increasingly complex and global activity, and it is important to strive to facilitate local, regional and international networks at all costs.
- An important question is whether to specialise or not to specialise? A technology focus can be beneficial to aid the development of business clusters around a particular sector. In the case of SRP some clusters have developed organically, and not as a result of the initial strategic vision for the park. If the intention is to build a cluster based on public sector investment it is very important to work closely with the private sector to understand their view and how they can take the active role through entrepreneurship to drive success.
- If there is sufficient space available, and the master plan allows, offer a range of pre-incubation, incubation, grow on and "own front door accommodation" for anchor tenants.
- A basic rule of supporting subsidised pre-incubation is to be selective. Companies with high levels of R&D and design activity that are focus on innovation are important because they tend to increase the innovative capacity of a region more than others that do not invest in these activities.
- Focussing on the tenants is more important than government funding or intervention, which although often critical as are academics; remain the critical ingredient of success..

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[11] NOMIS official labour market statistics www.nomisweb.co.uk

[12] http://www.ons.gov.uk/ons/about-ons/products-and-services/idbr/index.html

[13] NOMIS official labour market statistics www.nomisweb.co.uk

[14] NOMIS official labour market statistics www.nomisweb.co.uk

[15] UK Local Competitiveness Index, 2010 (Centre for International Competitiveness)

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

[17] One Health' or 'One Medicine' proposes the unification of the medical and veterinary professions with the establishment of collaborative ventures in clinical care, surveillance and control of cross-species disease, education, and research into disease pathogenesis, diagnosis, therapy and vaccination. The concept encompasses the human population, domestic animals and wildlife and the impact that environmental changes ('environmental health') such as global warming will have on these populations.