

# **Spinning out quality: University spin-out companies in the UK**

Edition 2 Published 3<sup>rd</sup> May 2007  
Originally Published 8<sup>th</sup> March 2007

**A briefing by Library House to accompany the  
event 'Meet the Spin-Outs'  
Central London, March 8<sup>th</sup> 2007**

## 1. Introduction

In addition to carrying out most of the world's basic research, universities have also been the source of some of our greatest technological inventions including DNA sequencing, computer memory and, most recently, web search. In the United States universities have not only managed to develop exceptional technology but also create world beating companies. Examples include the Stanford University spin-outs Google and Sun Microsystems.

Given that UK universities have been at the forefront of scientific research for generations, there is a perception that we are failing to adequately commercialise the fruits of this research. This perception is not a new one:

*'the small band of British scientific men have made revolutionary discoveries in science yet the chief fruits of their work have been reaped by businesses in other countries, where industry and science have been in close touch with one another'* Alfred Marshall (Economist) 'Industry and Trade (1919)'.

What was true in 1919 in the fields of engineering and physical science is still true in other areas. British scientists have made important, sometimes crucial, contributions to computer science, the world wide web, consumer electronics (it was a British scientist who invented the television) and aerospace engineering, yet the economic benefits deriving from these advances have largely been enjoyed by foreign companies.

In biomedical science many of the key discoveries that have led to the molecular biology revolution originated in the UK. For example, the structure of DNA, DNA sequencing and monoclonal antibody production were all discovered or invented in UK universities. Again, the economic benefits of these discoveries have largely been felt in California and Massachusetts.

The current Government (and its predecessor) has sought to rectify this weakness at translating science into business and have put this agenda at the heart of the country's economic strategy:

*'Harnessing innovation in Britain is key to improving the country's future wealth creation prospects...we must invest more strongly than in the past in its knowledge base, and translate this knowledge more effectively into business and public service innovation'*. HM Treasury, 'Science and Innovation Investment Framework 2004'

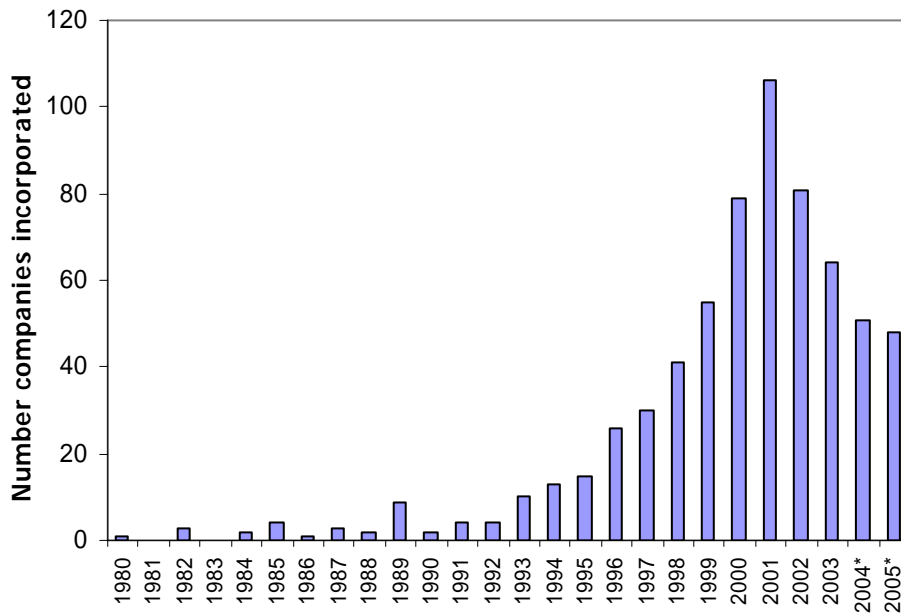
As part of this agenda, the Government established the Higher Education Innovation Fund (HEIF) in 2001, building on previous attempts to stimulate the commercialization of university knowledge and technology (the 'third stream' agenda). The latest HEIF round is providing UK universities with £238m over two years for 'third stream' activity.

The 'third stream' agenda seeks to encourage four types of university activity:

- Formation of university spin-out companies
- Licensing of university technology to industry
- Academic collaborations with industry and contract research
- 'Knowledge Transfer' activities including entrepreneurial teaching, student industry placements, encouragement of student start-up companies and university interaction with local SMEs

The first two of these are concerned with supporting technology transfer, the second two with more general notions of knowledge exchange.

There is broad consensus that in the technology transfer arena, these policies have been a success. Figure 1 shows the incredible growth in spin-out company formations since the early 1990s. There are now over 590 university spin-out companies in the UK which attract approximately 12% of all the UK's substantial venture capital finance. To date these companies have raised a total of over £2bn in external investment and many have floated at substantial valuations. Given that prior to 1990 there were only a handful of university spin-out companies in the UK, this is a substantial achievement.



\*estimated, based on formations at a sample of universities

**Figure 1: University spin-out formation activity (UK) (Library House Analysis)**

Despite these clear signs of success, there has been much criticism of the UK spin-out portfolio. The most common criticism has been that there are now too many poor quality spin-out companies and that these have been formed at the expense of more lucrative licensing agreements with industry. We believe that these criticisms are harsh and inaccurate- especially when true comparisons are made with the US.

This briefing will assess the current state of the UK spin-out portfolio, the basic research and technology transfer process which underlies its development and prospects for the future.

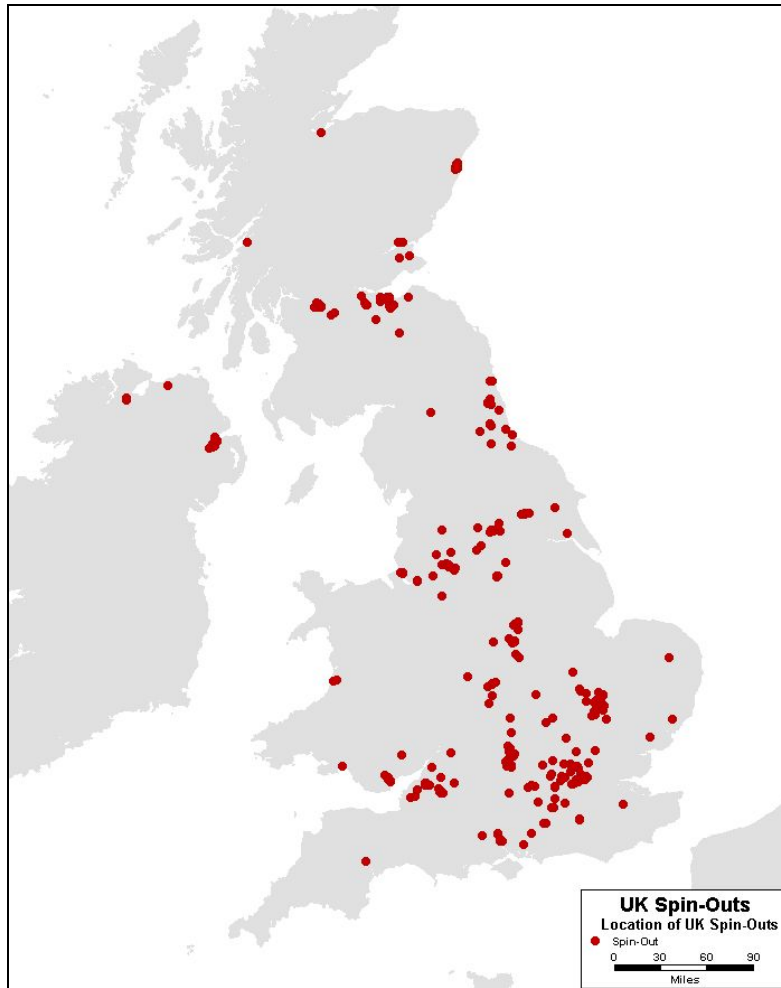
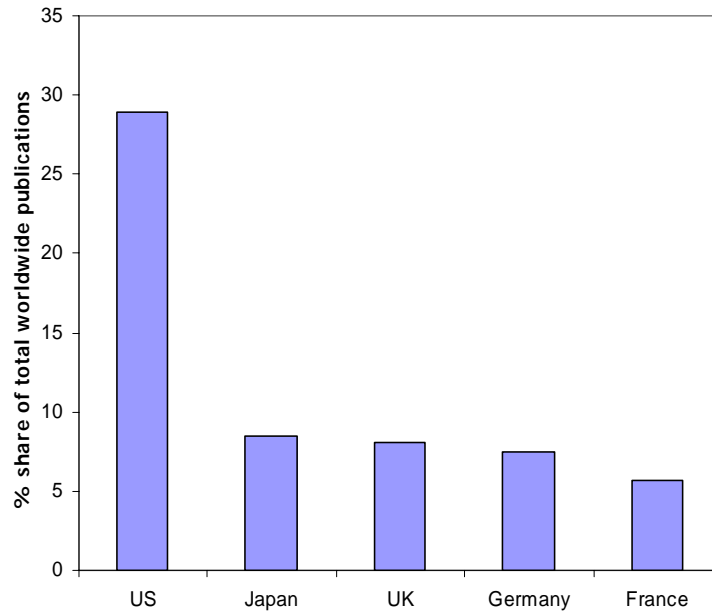


Figure 2: Location of UK spin-outs (Source: Library House Analysis)

## 2. University Research in the UK

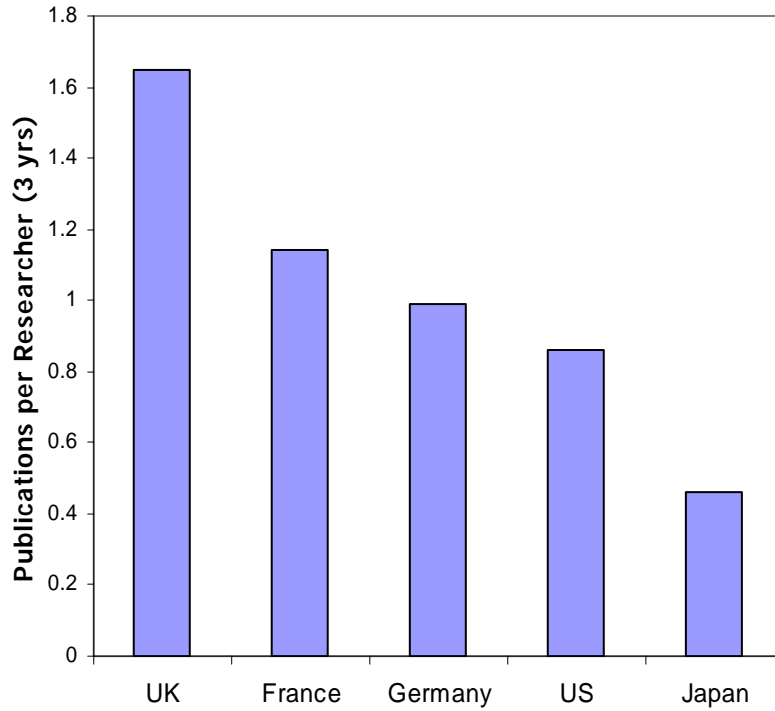
High quality academic research is the raw material for the generation of spin-out companies. Without great technologies and great ideas, no amount of investment in technology transfer will deliver results. So how does the UK perform in academic research?

On a multinational level Figure 3 shows that the UK has the third highest share of worldwide scientific publications after the United States and Japan.



**Figure 3: Scientific Research by Country (Source: European Commission)**

In addition, UK researchers are very efficient, producing over 1.5 times the number of papers per head than their counterparts in Germany or the US and three times the number per head in Japan (Figure 4).



**Figure 4: Research Efficiency (Source: European Commission)**

In research terms, the best UK universities are comparable with the world's top institutions. The most commonly used worldwide university ranking system is the Shanghai Jiao Tong University Ranking. In this ranking (Table 1), the University of Cambridge is ranked second only to Harvard, beating Stanford into third place. One other UK university, Oxford, is ranked in the top 10 in a list dominated by US universities.

World Rank	Institution	Country
1	Harvard University	USA
2	University of Cambridge	UK
3	Stanford University	USA
4	University of California - Berkeley	USA
5	Massachusetts Inst Tech (MIT)	USA
6	California Institute of Technology	USA
7	Columbia University	USA
8	Princeton University	USA
8	University of Chicago	USA
10	University of Oxford	UK

**Table 1: University World Rankings (Source: Shanghai Jiao Tong University)**

This performance is in stark contrast to the rest of Europe. Not a single European university outside the UK makes it into the world's top 20 by this ranking. In Asia, only one university (Tokyo) achieves this and comes 19th.

---

Nobel Prizes are another measure of exceptional scientific achievement and again, the UK performs well by this measure. Only the US has received more Nobel Prizes in Science and Medicine. Cambridge University alone has received more Nobel Prizes than any country except the US and UK.

Overall, the UK research base is very healthy by comparison with our competitors both historically and in the present. This represents an excellent raw material for technology transfer activity.

### 3. Technology Transfer

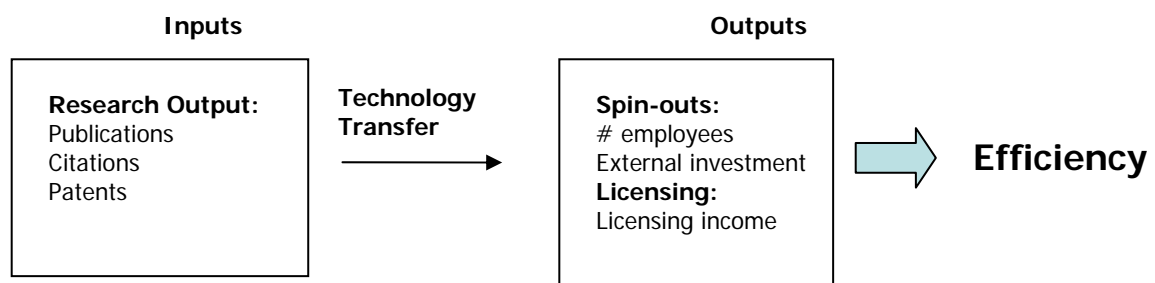
#### (a) Models of Technology Transfer

Most research intensive UK universities set up technology transfer offices in the 1990s, or soon after 2000, with the objective of better commercialising their research. Since then several different models of technology transfer have emerged largely dependent on how this operation is organised. These fall in to one of four categories:

1. Public Limited Company – The technology transfer operations of a university are managed by a separate publicly quoted company. This company owns the intellectual property generated by the university and profits from its commercialisation either by spin-out company formation or licensing
2. Wholly owned limited company – The technology transfer operation is carried out by a separate company which is wholly owned by the university
3. Department within university – The technology transfer operation is managed by a department entirely integrated into the university structure, much like any other department of the university
4. Team within a university department – Technology transfer is handled by a group within a department, usually research services or similar

There has been much debate about which of these models is most effective. Public policy decision makers are keen to identify best practice so that the UK's technology transfer efficiency can be maximised overall.

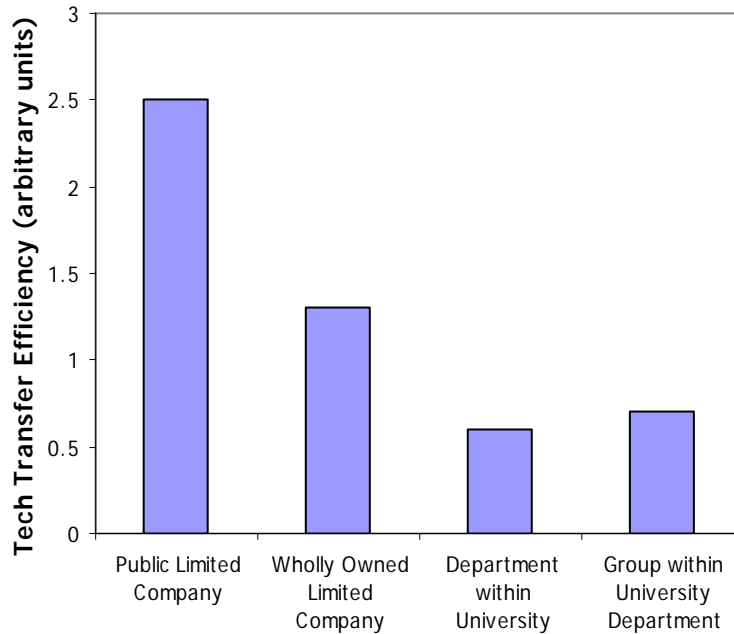
To do this we have extracted the technology transfer aspects of our 'University Economic Impact Matrix' (see Appendix 1) to measure technology transfer performance (Figure 5). Based on a model developed by Dr Kevin Cullen, Director of Research and Enterprise of Glasgow University, this looks not at absolute output values (such as number of spin-out companies formed or aggregate investment attracted by these companies) but quantifies both the inputs and outputs of technology transfer activity to derive a figure for efficiency.



**Figure 5: The Technology Transfer Framework**

Using this framework we have been able to compare the efficiency of technology transfer across a range of universities and look for organisational best practice. Although there are limitations in this approach, our findings

indicate that universities with floated or wholly owned limited companies managing technology transfer activity are more effective at converting research into spin-out companies (Figure 6).



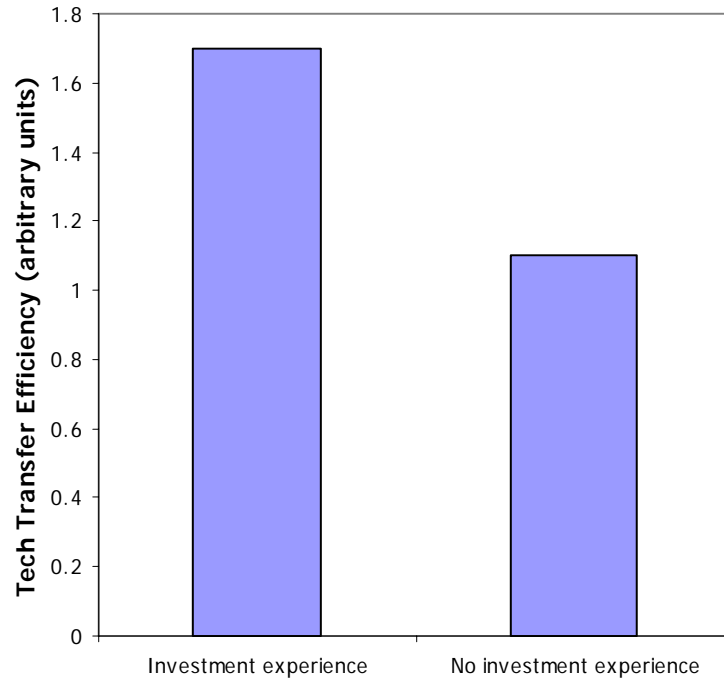
**Figure 6: Organisational Structures of Technology Transfer (Source: Library House Analysis)**

It is important to note that, as our analysis reflects the ability of a university to convert its research into ventures, the results are not dependent on the absolute size of a university or the amount/quality of research it produces. A university which produces less research (or research which is cited less often) would be expected to produce equivalently less in terms of venturing output (external investment or employment in spin-out companies).

Why might technology transfer operations incorporated as separate companies be more effective at converting research into ventures? There are several possible reasons for this including:

- Flexibility in pay structures
- Ability to attract quality personnel (related to pay structures)
- Investment expertise and credibility with investors

Further analysis indicates that investment expertise is a key factor. The effectiveness of technology transfer was found to be highly dependent on whether any staff had first hand investment experience (Figure 7).



**Figure 7: Technology Transfer and Investment Experience (Source: Library House Analysis)**

Having a member of staff with investment experience confers just over 50% extra technology transfer efficiency on a university. This is presumably because the presence of these individuals delivers spin-out companies a hugely improved chance of receiving external investment. A clear message is that technology transfer organisations should seek to employ at least one member of staff with significant investment experience.

**(b) Technology Transfer Outsourcing**

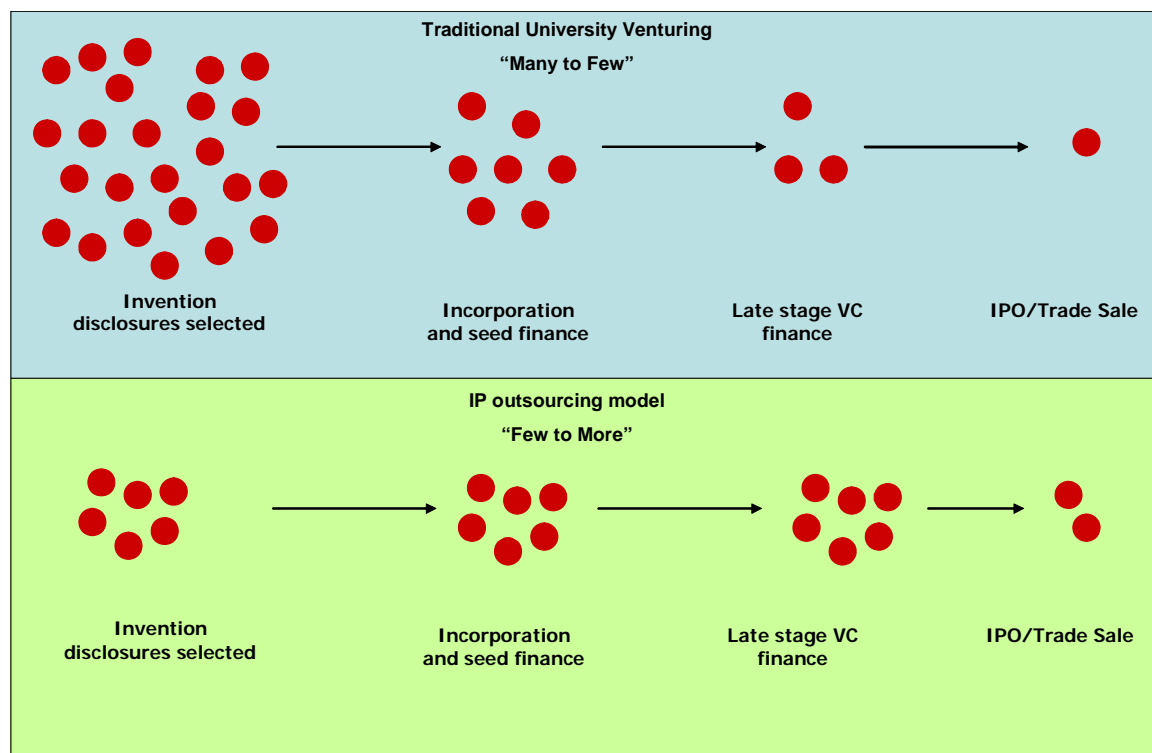
The last five years have been characterised by many small and medium sized research universities signing deals with Intellectual Property commercialisation companies. One driver for this may be the inability of these universities to achieve optimal technology transfer without external assistance.

The large research universities, such as Cambridge and Imperial College, have been able to develop in-house technology transfer operations of considerable scale and sophistication. One reason they have been able to do this is that the technology transfer throughput in these universities is sufficient to recruit, retain and reward high calibre staff and develop reciprocally valuable relationships with investors, analysts and serial entrepreneurs. Anecdotal evidence suggests that smaller universities may not have the deal flow to

support such an infrastructure and so chose to partner with external commercialisation companies.

The most obvious examples of this tendency are the fourteen universities which have signed deals with IP commercialisation companies (see Table 2).

Although the details of these deals vary between universities, the principle is that the commercialisation company obtains the exclusive right to invest in the spin-out companies of a given university. In return the commercialisation company provides expertise in the identification of intellectual property with commercial value and delivers seed capital finance. Through the deal flow generated by their partner universities, the commercialisation companies can, at least in principle, deliver the benefits of a large technology transfer operation to small and medium sized universities.

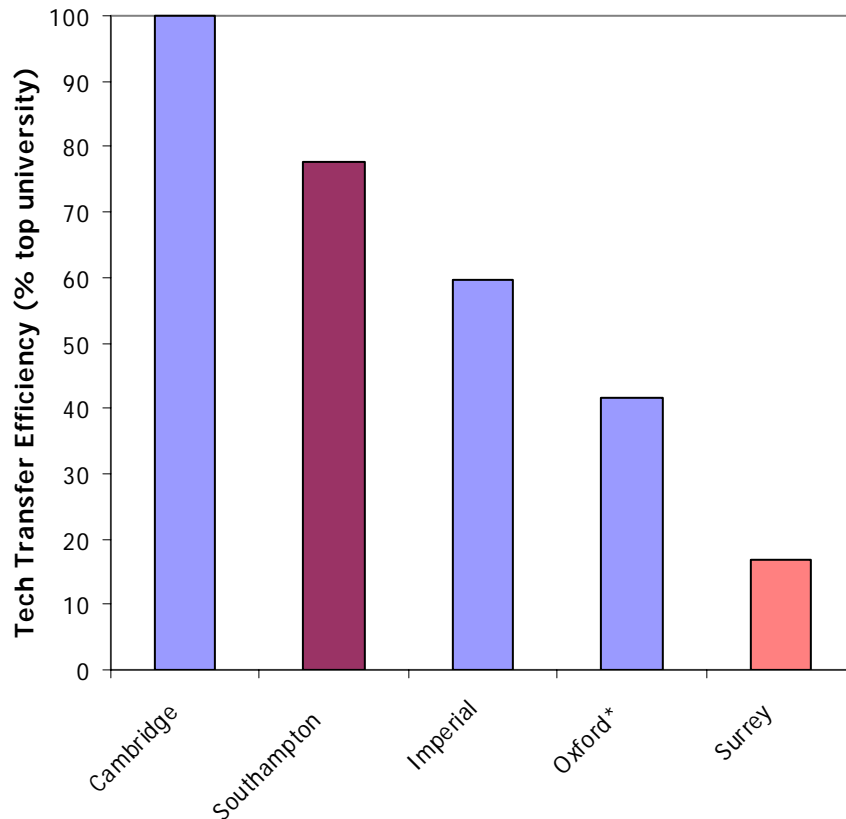


**Figure 8: The effect of IP commercialisation companies on the technology transfer process**

However, the IP commercialisation company model is not solely about delivering the benefits of scale. Instead it represents a fundamentally different approach to technology transfer. As shown in Figure 8, IP commercialisation companies seek to focus their energies on fewer, higher quality propositions rather than support a broad range of companies, many of which will fail. Companies are selected and supported on the basis that they provide a clear path from formation to exit.

We investigated whether this model has been successful in stimulating technology transfer using the framework described in Figure 5. In this analysis, we compared the external investment received by the spin-out companies of twenty of the UK's top universities to the number of publications

generated by that university. The ratio obtained was expressed as a percentage of the top performing university (in this case Cambridge) - see Figure 9.



\*Oxford Chemistry Department, but not the rest of the university, signed a deal with IP Group in 2000

**Figure 9: The outsourcing effect? (Source: Library House Analysis)**

Strikingly, the University of Southampton (in purple), a partner of the largest IP commercialisation company, IP Group, performs exceptionally well in this analysis, coming second out of all the universities included in the analysis. Southampton’s ability to convert research into ventures is exceeded only by Cambridge University which has a long history in this area and benefits from an advanced cluster effect. In contrast, the University of Surrey (in pink), which signed with IP Group in only February 2006, comes in 11th place in this analysis behind Newcastle, Bristol, Edinburgh and others.

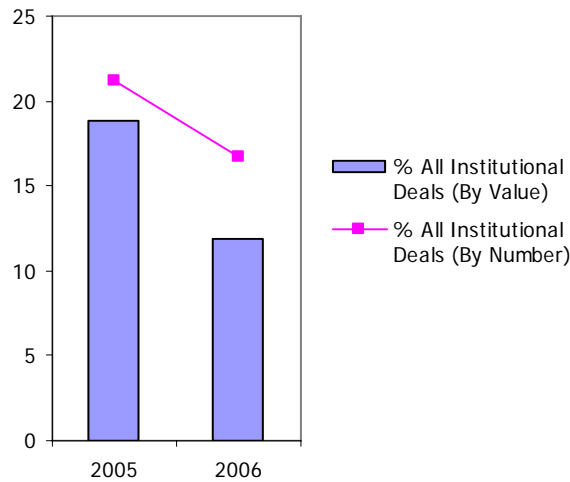
Clearly there are limitations to this analysis. In the first place, many partnerships between IP commercialisation companies and universities are young, the fruits of which are yet to emerge. However, notwithstanding this caveat, IP commercialisation companies do seem to have at least the potential to deliver efficient technology transfer in partnership with small and medium sized universities. It will be interesting to follow the fortunes of IP Group, Biofusion and Angle Technology, and their partner universities, over the coming years (see Table 2).

University	IP Commercialisation Company
King's College London	IP Group Plc
Queen Mary, University of London	IP Group Plc
University of Bristol	IP Group Plc
University of Bath	IP Group Plc
University of Glasgow	IP Group Plc
University of Leeds	IP Group Plc
University of Oxford (Chemistry only)	IP Group Plc
University of Southampton	IP Group Plc
University of Surrey	IP Group Plc
University of York	IP Group Plc
University of Reading	Angle Plc
University of Sheffield (Medical only)	Biofusion Plc
University of Cardiff	Biofusion Plc
University of Loughborough	IPSO Ventures
University of Oxford (Biomedical Eng)	Technikos (Sloan Robinson)

**Table 2: University IP commercialisation partnerships**  
 (Source: Library House Analysis)

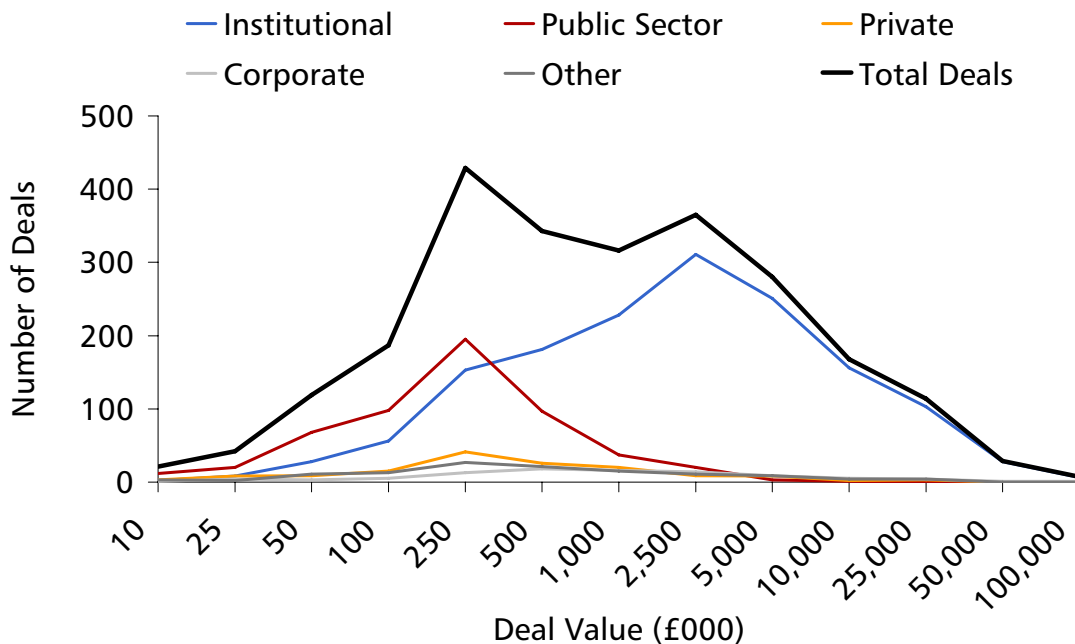
#### 4. Funding Spin-Outs

University spin-out companies attract a significant proportion of the UK's venture capital. In absolute terms, university spin-out companies raised a total of around £160m in institutional investment during 2006, representing almost 12% of all venture capital investment in the UK. Over 16% of all venture capital deals targeted university spin-out companies making them a crucial source of deal flow for venture capitalists (Figure 10).



**Figure 10: University spin-outs: Share of UK Venture Capital**  
(Source: Library House Analysis)

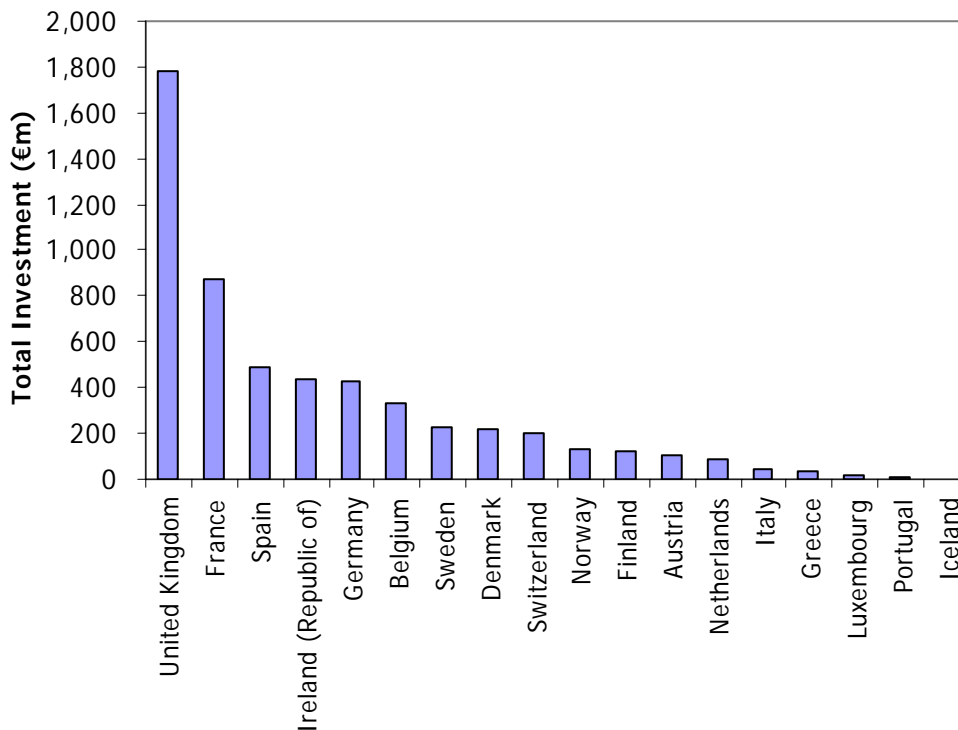
Despite this healthy share of the UK venture capital market, there are continuing suggestions that there is an equity gap preventing spin-outs and other start-ups from receiving the investment they require in the sub £2m range.



**Figure 11: Number of deals by value** (Source: Library House 'Beyond the Chasm: The Venture Backed Report – UK 2006)

As discussed in our previous publication 'Beyond the Chasm: The Venture Backed Report – UK 2006' there is little evidence to support the notion of an equity gap in this range (particularly in the £100-500k range). Figure 11 demonstrates that there is significant deal activity in the £100-500k range from both private sector venture capitalists and public sector funds.

It is also important to note that the UK is Europe's most active venture capital market and so university spin-out companies here should benefit from a strong funding advantage over their continental counterparts. Data from Library House VenturePedia demonstrates that UK companies received just over twice as much venture investment in 2006 as their counterparts in France, the UK's nearest competitor (Figure 12). Total venture capital investment in Europe was €5.5bn in 2006, of which the UK attracted a massive €1.8bn.



**Figure 12: Venture Capital Investment in Europe (2006) (Source: Library House VenturePedia)**

Anecdotal evidence suggests that a more serious funding gap for university spin-out companies exists at the proof of concept stage before equity finance becomes appropriate. In our discussions with technology transfer professionals, many cited the lack of availability of proof of concept funds as a major bottle neck for company development.

This is an area which has not been sufficiently addressed by recent policy initiatives. The drive to promote technology transfer has thus far primarily focussed on the establishment of technology transfer infrastructure and seed stage funding rather than proof of concept grants. However, the US

---

experience suggests that these grants are absolutely crucial for the development of successful spin-out companies.

The US Small Business Innovation Research fund (SBIR) and related STTR programme provide over US\$2bn annually in grants to proof of concept projects in small businesses. This compares to the current budget for the DTI's Research and Development Grants programme of £27m annually (equivalent to US\$52m per year). The US federal government is therefore spending far more than the UK government on proof of concept related activity- far in excess of the expected additional expenditure given the relative populations of the two countries.

Aside from sheer scale, the US SBIR programme aids the development of small companies by linking grant funding to public procurement processes. In this way companies not only receive funding for proof of concept stage research but also gain a potential route to market for their nascent products. Several high profile companies have benefited from the SBIR scheme during their early stage development- most notably Sun Microsystems, a spin-out company of Stanford University.

There is now a consensus of opinion that additional proof of concept funding is required in the UK. A key policy challenge is to develop a stable and sustainable scheme, similar to SBIR, in order to ensure that promising technologies make it past the very early stages of development, pre equity investment.

However, the overall picture is one of a vibrant early stage finance environment from which university spin-outs derive substantial benefit.

## 5. The UK Spin-Out Portfolio: Quality or Quantity?

There is no question that the 'third stream' agenda being pursued through the Higher Education Innovation Fund and its predecessors has put pressure on universities to commercialise the fruits of their research. However there have been suggestions that there has been undue focus on the formation of spin-out companies with the result that too many poor quality companies have emerged.

The Government-sponsored Lambert Review of Business-University Collaboration, published in 2003, explicitly makes this point and suggests that UK universities focus more attention on technology licensing and less on spinning out companies. The Lambert Review presents data showing that UK universities spin out approximately three times as many companies per research dollar spent as US universities but obtain only just over 1% of their research income from licensing. In contrast, although the US spins out fewer companies per research dollar, it generates almost 3% of research income from licensing.

The review further states that, as licensing is a more efficient means of commercialising technology than company formation, the former should be encouraged.

### (a) Poor Quality Spin-Outs?

The key question is how one arrives at the conclusion that the UK spin-out portfolio is 'poor quality'. Poor quality compared to what? There are few other countries which have significant activity in this area and so can serve as fair comparators. What is actually meant when critics say the portfolio is poor quality is that it is worse than in the US. It is our opinion that this value judgement derives from a perception based knowledge of a few very successful spin-out companies formed from US universities. It is of course true that Stanford and Harvard have spun out truly world beating companies such as Google and Sun Microsystems and have been associated with other hot companies like Yahoo (a graduate start-up from Stanford). However, in order to fairly compare the US and UK spin-out portfolios a broader and more quantitative analysis is required.

To do this we selected three top US universities for study and compared their spin-out portfolios with a cross section of UK universities. In the US we chose:

- **Stanford University**- historically recognised to have produced the world's top spin-out companies and located at the heart of Silicon Valley- the world's most active venture capital market.
- **University of Wisconsin at Madison**- the world's 16th best research university according to the Shanghai Ranking system and with a technology transfer operation dating back to 1925.
- **University of Washington, Seattle**- the world's 17th best research university and located in a state which receives over four times as much venture capital finance per head as the UK.

We compiled lists of the spin-out companies formed from these universities and their UK counterparts since 2001. We then determined the amount of external investment each of these companies attracted as a proxy for quality.

Following this data collection we calculated the aggregate external investment that the spin-out companies of each university collectively attracted. In addition we calculated the average amount of external investment each spin-out company received.

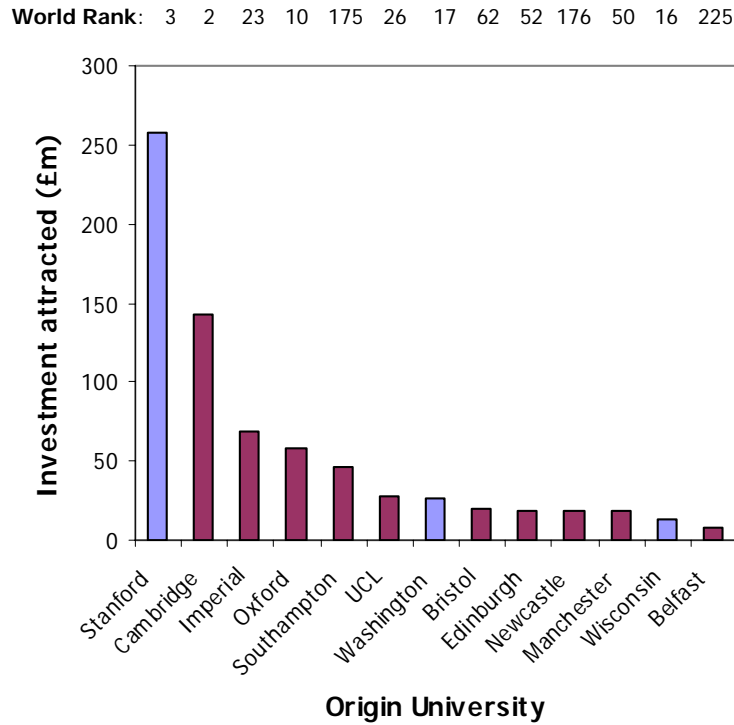
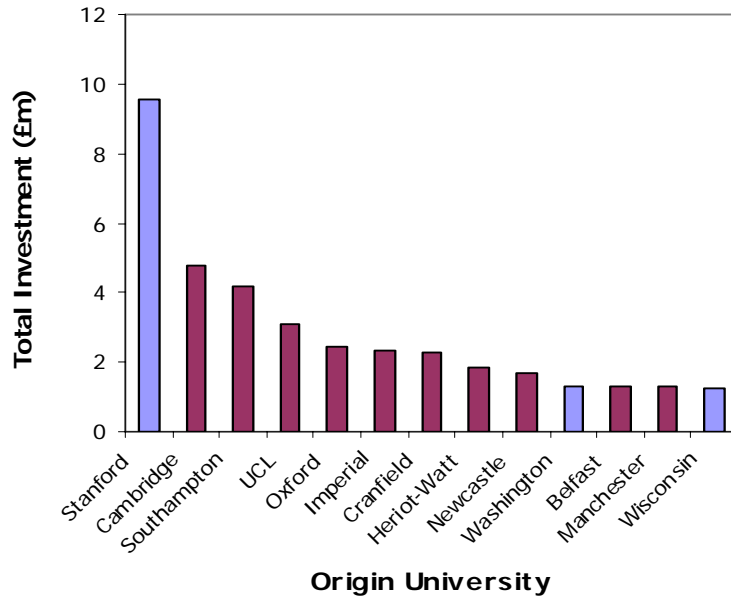


Figure 13: External Investment per University (Source: Library House Analysis)

As shown in Figure 13, although Stanford University spin-outs attracted the most funding, most of the UK universities studied performed better by this measure than both Washington and Wisconsin.

Figure 14 shows that the average investment received per company was also higher in most of the UK universities than at either Washington or Wisconsin.

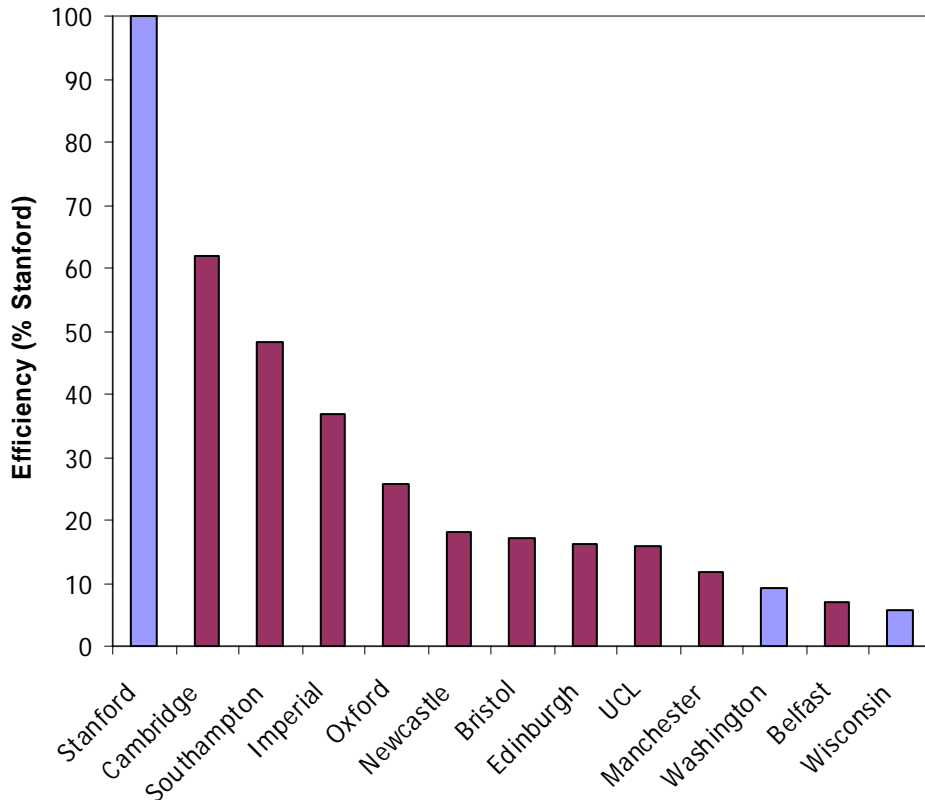


**Figure 14: External Investment per spin-out company (Source: Library House Analysis)**

This suggests that, in terms of how spin-out companies are viewed by investors, the UK spin-out portfolio is not of a generally poor quality. Instead, UK universities are generating companies of a quality substantially higher than would be expected from their worldwide research ranking. Perhaps the most striking example of this is Southampton University which comes third in this analysis despite being ranked over 100 places lower than both Washington and Wisconsin in the Shanghai Jiao Tong Ranking system.

At the high end, it is interesting to note that Cambridge University spin-out companies managed to attract over half the aggregate investment of Stanford spin-outs. Given that Stanford is classically seen as the world's most prolific source of innovation-based companies and is located in a state which receives over eight times as much venture capital per head as the UK, this is a significant achievement.

These data suggest that UK universities are exceptionally efficient at commercialising their research- at least by the venturing mechanism.



**Figure 15: Venturing Efficiency (Source: Library House Analysis)**

To directly test this we carried out an analysis based on the framework described in Figure 5. The efficiency of technology transfer- derived from the ratio of external investment in spin-out companies to research output (number of publications)- was determined for each of the three US universities selected and a cross section of UK universities.

The results of this analysis (Figure 15) show that UK universities are in general more efficient than two of the three selected US universities in venturing activity- in other words they are more effective at converting their basic research into investable ventures.

Overall, our analysis refutes the suggestion that the UK spin-out portfolio is poor quality- even in comparison to the US. It also suggests that UK universities are generally very efficient at converting research into spin-out companies.

**(b) Too Little Licensing?**

The Lambert Review's other criticism, that undue focus on spin-out companies has negatively affected technology licensing, has been addressed in a 2005 article by Ederyn Williams of Warwick Ventures. He demonstrates that the poorer performance of UK universities in generating licensing income can be entirely attributed to the higher average age of US university license portfolios. Indeed, when correcting for this factor, UK universities are performing ahead of expectations in licensing. It is therefore unlikely that

whatever focus there has been on spin-out companies has detracted from licensing activity.

### **(c) Changing Perceptions**

In public policy terms these results are gratifying as they support anecdotal evidence that the push towards the 'third stream' knowledge transfer agenda has been a success. Many UK universities now have technology transfer operations of a sophistication and scale rarely seen elsewhere. The formation of floated technology transfer vehicles with market capitalisations in the hundreds of millions of pounds is a clear demonstration of this.

So how to change the perception of the UK spin-out portfolio and silence the critics? Ultimately this will depend on the emergence of a spin-out which goes on to dominate its market (or indeed create a new market for itself entirely) and achieve a market capitalisation of many billions of pounds.

The last two years have already seen the sale of three UK spin-out companies for significant sums. Cambridge Antibody Technology and Domantis (both located in Cambridge but spin-outs of the MRC Laboratory of Molecular Biology) were sold for £702m and £230m respectively whilst Kudos, a spin-out of Cambridge University, was sold for US\$210m. Other UK spin-out companies which have achieved significant valuations include:

- Imperial spin-out Ceres Power, developing fuel cell technology, floated in 2004 and has a current market capitalisation of over £130m
- The gene therapy company, Oxford Biomedica, is quoted on the London Stock Exchange main market and has a current market capitalisation of £215m
- UCL spin-out Ark Therapeutics has a current market capitalisation of over £200m
- Wolfson Microelectronics, an Edinburgh spin-out, is currently valued at over £320m and generates annual revenues in excess of £100m from the sale of mixed signal semiconductors to customers including Apple and Microsoft

However, the university spin-out company with perhaps the greatest chance of achieving a multi-billion pound valuation, and revolutionising an entire sector, is the Cambridge spin-out, Plastic Logic. The company, formed in 2000, is developing technology enabling semiconductors to be made from plastic rather than silicon. This could cut the price of electronic circuitry by up to 90% and, perhaps most remarkably, allow them to be 'printed' onto thin substrates in a process similar to ink-jet printing. The company has recently raised US\$100m to build the first manufacturing facility for these plastic electronics.

---

## 6. Conclusions

The size and health of the UK spin-out portfolio suggests that public policy focus on translating research into business has been highly successful in reversing the UK's historical weakness in this area. UK universities are now producing spin-out companies of equivalent number and quality to some of the US's top institutions. Many of these companies have achieved substantial valuations and the best promise to revolutionise key areas of the technology sector.

However, we should not be complacent. There are many ways in which UK universities could improve their technology transfer operations. This report has identified proof of concept funds as an area where more could, and perhaps should, be done. In addition anecdotal evidence suggests a mismatch between the availability of funding for technology transfer activity (including proof of concept and seed funding, as well as funding for technology incubators and science parks) and research activity. This mismatch likely results from the inappropriate conflation of the development and technology transfer agendas. If it is to be maximised, funding for technology transfer should match the research activity which provides its raw material- this means concentrating funding in areas of the country where top research is done.

In more general terms, as we have argued in our previous report 'The Super-Cluster Question', the UK should aim to create a cluster of innovation-based businesses of a scale to compete with Silicon Valley and the Boston area. Our analyses indicate that the majority of UK spin-out companies which leave the home town of their origin university move to Cambridge, Oxford or London. We believe that this trend should be encouraged, not stopped, and should eventually allow the area between these three cities to develop into a genuine technology 'super-cluster' of the first rank. From such a cluster could emerge the UK's first multibillion dollar university spin-out.

## Appendix 1: The University Economic Impact Matrix

Dr Kevin Cullen of the University of Glasgow, has derived a framework for analysing the performance of universities in a number of different areas of activity including academic research, collaborative research, licensing, venturing and consultancy. Library House has extended this methodology.

Through these activities, universities convert private and public money into economic and societal impact. The framework allows the efficiency of these processes to be analysed at the university or faculty level.

In addition, universities can be analysed according to the absolute volume of outputs produced or the quality of these outputs.

Together these approaches allow an assessment of a university's absolute performance as well as its efficiency relative to financial inputs.

Area	Academic Research	Collaborative Research with Industry	Licensing	Venturing	Consultancy	Supporting Outreach Activities
Input	Combined Input (total income excluding tuition)					
	Total Research Income	University's Research				
Output	<ul style="list-style-type: none"> <li># Publications</li> <li># Patents</li> </ul>	<ul style="list-style-type: none"> <li># Contracts</li> <li>Industrial Income</li> </ul>	<ul style="list-style-type: none"> <li># Licenses</li> <li>Surveys or interviews</li> </ul>	<ul style="list-style-type: none"> <li># Spin-outs</li> </ul>	<ul style="list-style-type: none"> <li># Projects / Quality</li> <li>Surveys or interviews</li> </ul>	Conferences organised for: <ul style="list-style-type: none"> <li>SMEs / Industrial Partners</li> <li>Academics</li> <li>Business Representation on University Board</li> </ul>
Impact	<ul style="list-style-type: none"> <li># Citations</li> <li># Highly Cited Researchers</li> </ul>	<ul style="list-style-type: none"> <li>Surveys or interviews</li> </ul>	<ul style="list-style-type: none"> <li>Surveys or interviews</li> </ul>	<ul style="list-style-type: none"> <li># Employees</li> <li>Revenue</li> <li>External Investment raised</li> <li>Exit Values</li> </ul>	<ul style="list-style-type: none"> <li>Consultancy Income</li> <li>Surveys or interviews</li> </ul>	Sources: <ul style="list-style-type: none"> <li>Public Data</li> <li>Surveys or interviews</li> </ul>

Appendix Figure 1: University Economic Impact Matrix

---

**Authors:**

Dr Roger Franklin, Associate Consultant, Library House  
Martin Holi, Analysis & Consulting Manager, Library House  
Dr Jens Lapinski, Vice President Analysis and Consulting, Library House

With thanks to Dr Kevin Cullen of The University of Glasgow for his help in deriving the Economic Impact Matrix. Kevin is Director of Research & Enterprise, a member of the UNICO Committee and Vice President – Membership of AUTM.

If you have any questions about this briefing please contact Library House on:

+44 (0)1223 500550

Or

[roger.franklin@libraryhouse.net](mailto:roger.franklin@libraryhouse.net)

**About Library House**

Essential intelligence on tomorrow's companies

Our objective is to be the essential source of comprehensive information on the fastest growing, most innovative ventures around Europe.

We discover, research and profile fast-growth, innovation-led companies, their people and investors. This provides a unique insight into the leading enterprises of the future that are the investment and business partnership opportunities of today.

We provide our intelligence through a suite of intuitive online products, in-depth consultancy, comprehensive reports, regular news briefings and stimulating senior-level events. Our audience comprises the entire investor community, corporations, professional services firms, academia, public policymakers and forward-thinking entrepreneurs.

If you are involved with, or have an interest in enterprise and innovation join the fast-growing Library House community and gain access to essential intelligence. Our aim is to provide you with the intelligence you need in the form you want it, easily and quickly. We have well-established products and services that make our data easily accessible and instantly usable.

We are also equally capable of providing tailored solutions to meet urgent or long-term strategic and commercial information needs, within required timescales and budgets.

Put simply, our goal is optimizing your time and maximizing your return.