

# **University spin-out companies: Starting to fill the evidence gap**

*A report on a pilot research project  
commissioned by the  
Gatsby Charitable Foundation*

**Tim Minshall and Bill Wicksteed**

**January 2005**

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## Note on sources of data

Data relating to metrics currently used for commercialisation activities in the UK as given in Chapter 2 of this report are drawn from a combination of sources including those given below:

Charles, D., and C. Conway (2001). *Higher education business interaction survey*, A report by the Centre for Urban and Regional Development Studies, University of Newcastle upon Tyne, [www.hefce.ac.uk](http://www.hefce.ac.uk).

HEFCE (2003). *Higher education business interaction survey 2000-1*, [www.hefce.ac.uk](http://www.hefce.ac.uk).

HEFCE (2004). *Higher education business interaction survey 2001-2*, [www.hefce.ac.uk](http://www.hefce.ac.uk).

Wright, M., A. Vohora and A. Lockett (2002). *Annual UNICO-NUBS survey on university commercialisation activities: Financial Year 2001*, UNICO / NUBS, [www.unico.org.uk](http://www.unico.org.uk).

Wright, M., A. Vohora and A. Lockett (2003). *Annual UNICO-NUBS survey on university commercialisation activities: Financial Year 2002*, UNICO / NUBS, [www.unico.org.uk](http://www.unico.org.uk).

1	Introduction .....	1
	Aims.....	1
	Method.....	1
	Thanks.....	2
2	UK Context for University Spin-outs 1998 - 2002 .....	3
	UK Higher Education Institutions.....	3
	Emergence of the ‘third mission’ for UK HEIs .....	3
	Government schemes to support HEI spin-off activities .....	4
	Emerging issues .....	5
3	Synthesis of findings.....	8
	Types of spin-outs .....	9
	Numbers of spin-outs .....	9
	Characteristics of spin-outs .....	11
	Qualifications to the data .....	12
	When to go the spin out route .....	13
	Four notes of caution from our discussions.....	13
	Other observations .....	14
	Our overall views .....	15
	Conclusions on the practicality and value of systematic measurement .....	15
4	Further readings .....	17
	Appendix A - Proposed data to be collected on university spin-outs .....	18
	Appendix B: Individual university case studies .....	19

# 1 Introduction

## Aims

- 1.1 At the time that this work was first proposed in 2003 there was a concern that spin-outs were being given undue prominence in consideration of university performance in research commercialisation.
- 1.2 Prompted by this, our concern was that whilst numbers of spin-outs could readily be counted there was little sense of what reality lay behind the numbers and, therefore, what weight of interpretation should be put on spin-out data. In addition we wondered whether it would be feasible to build a time series of key data on spin-out performance that would be useful to national policy bodies and to the universities themselves.
- 1.3 An approach was made to the trustees of The Gatsby Charitable Foundation for funding to undertake a pilot study that would explore these issues and help decide whether, and if so how, an ongoing exercise to track spin-outs would be worthwhile.

## Method

- 1.4 In discussion with the Foundation's expert advisers it was decided to:
  - approach 10 universities to ask whether they would be prepared to collaborate in this work, selected as follows:
    - the four universities with the largest research budgets – Cambridge, Imperial College London, Oxford, University College London
    - three other large universities in major cities – Edinburgh, Newcastle and Southampton
    - three universities with significantly smaller research budgets, reflecting in part their lack of medical research activities, but each with a high proportion of research funds coming from UK industry – Cranfield, Loughborough and Strathclyde
  - focus narrowly on spin-out companies in which the university had an equity stake
  - analyse spin-outs formed in the 5 year period from the beginning of 1998 to the end of 2002.
- 1.5 All the ten universities generously agreed to help us with this work and we are most grateful to them for doing so. Each spent time explaining the context for their spin-out activity within the university's mission and its wider commercialisation activities, and in providing lists of companies that met our criteria. Whilst we have deliberately not sought to present any

comparative analysis that identifies individual universities, an overview is given for each institution as an appendix to the report.

1.6 Having obtained the lists of companies and such information (necessarily limited) that the commercialisation offices felt could be provided without breaching confidentiality, we then approached each company by mail and telephone to gather information from them covering:

- age (year of incorporation)
- originating department(s) within the university
- area of activity (description and SIC code(s))
- size (number of employees)
- financial history (equity investment received, revenues, valuation)
- location (region, type of accommodation)
- on-going links with the university.

1.7 Despite our seeking only a limited range of information and undertaking as much secondary research as possible (i.e., web and news archive searches) to reduce the range of information requested, not all companies were willing to co-operate with the work. This we expected as (a) despite giving a confidentiality undertaking, we offered them no tangible benefit in return and (b) there are numerous surveys and research projects each year looking at university spin-outs and this is leading to a growing sense of ‘research fatigue’. To ensure that the replies we did obtain were not likely to give a false overall impression, we cross-checked with the university commercialisation teams whether the balance between non-respondents and respondents was, in their judgment, likely to give a fair overall picture. In the light of their responses we made further efforts to obtain information from a small number of companies. Consequently we feel that the cautious generalisations offered in this report should be reasonably free from bias.

### **Thanks**

1.8 We are most appreciative to The Gatsby Charitable Foundation for their financial support, to the university commercialisation officers for the information and insights they provided and to the companies that took the trouble to provide information. We appreciate that they all have many competing demands on their time and resources and hope they will find this report of assistance to their deliberations.

We would also like to thank Céline Druilhe, Andrea Kells, Michael Lynskey and Jelena Siraliova for their assistance in collecting the evidence for this project.

## 2 UK Context for University Spin-outs 1998 - 2002

### UK Higher Education Institutions

- 2.1 The UK has over 170 Higher Education Institutions (HEIs) that vary in size between student enrolments of over 30,000 down to just a few hundred<sup>1</sup>. External research income to HEIs ranges from over £160 million<sup>2</sup> per annum for the top tier institutions, down to zero for those that focus only on teaching activities.

### Emergence of the 'third mission' for UK HEIs

- 2.2 Commercialisation activities have long suffered from a poor image in the UK, particularly when compared to the US. Significant progress has, however, been made in recent years both in the volume of activities and in the implementation of structures and frameworks supporting research commercialisation. In 1985, the termination of the British Technology Group's monopoly on the ownership of intellectual property rights generated by academics provided universities with the right to exploit their own inventions. In 1993, the UK Government White Paper "Realising Our Potential: A Strategy for Science, Engineering and Technology"<sup>3</sup> reflected a growing policy interest in innovation from the science base, a theme developed steadily since then.
- 2.3 Before examining these developments, it is worth placing them in the context of the evolution of the higher education sector in the UK. Since the birth of the medieval university, the roles attributed to academic institutions have evolved according to two main perspectives on teaching and research:
- the 'classical university' generates and transmits knowledge through research conducted for its own sake, and teaching aiming to develop the full potential of students
  - the 'technical university' focuses on training students with knowledge and skills that are useful for society and on creating knowledge of direct societal benefit<sup>4</sup>.
- 2.4 In many respects, these two perceptions of a university's functions in society colour current views on what a 'third mission' means for UK HEIs. This third mission is, in broad terms,

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<sup>1</sup> Higher Education Statistics Agency (<http://www.hesa.ac.uk>). Note: Not included in this upper figure is the Open University which is by far the largest HEI with over 150,000 students enrolled on its distance learning programmes.

<sup>2</sup> Excluding core funding.

<sup>3</sup> Realising Our Potential: A Strategy for Science, Engineering and Technology, May 1993, Cm 225. "Realising Our Potential' led to a complete overhaul of the organisation of government support for science and technology in the UK, including the Office of Science and Technology's move from the Cabinet Office to the Department of Trade and Industry (DTI) in 1995." - <http://www.britishcouncil.org/science/gost/rop.htm>

<sup>4</sup> Martin, B. R., and Etkowitz, H. (2000), *The origin and evolution of the university species*. Science and Technology Policy Research (SPRU), Electronic Working Paper Series, Sussex University; Druilhe, C. (2002). *The emergence and process of academic enterprise: Cases from the University of Cambridge*. PhD thesis, University of Cambridge Judge Institute of Management.

one that seeks the explicit integration of an economic development mission with the traditional university activities of scholarship, research and teaching.

- 2.5 Current developments have also been seen as the emergence of a new ‘social contract’ between science and the university on the one hand and society and the state on the other. The simple social contract that emerged in the 1950s drew on a dissemination model of innovation whereby publicly-funded basic research flows to the economy through a linear process. The progressive awareness of the inadequacy of this model and the constraints on public funding for research led to the suggestion that a new social contract should be drawn up. It would reflect the social accountability of scientists, engineers and technologists and the requirement for these disciplines to address social and economic needs<sup>5</sup>.
- 2.6 Third mission activities are now taken to encompass a wide range of ‘interaction’ or ‘collaboration’ programmes that include both socially and commercially focused activities. The emphasis of this report is to examine the role one specific type of commercialisation activity – the spin-out of a new business entity from a university.

### **Government schemes to support HEI spin-off activities**

- 2.7 Since 1998, the Government has launched a number of funding schemes to support HEIs in developing their capacity to commercialise knowledge generated through research activities. The most important are summarised below in Table 1.

**Table 1: Example UK Government funding streams to support ‘third stream’ activities**

<b>Year</b>	<b>Initiative</b>	<b>Purpose</b>	<b>Details</b>
1998	Higher Education Reach Out to Business and the Community (HEROBaC)	Funding to support activities to improve linkages between universities and their communities.	£20m per year allocated to provide funding for the establishment of activities such as corporate liaison offices.
1999	University Challenge Fund (UCF)	Seed investments to help commercialisation of university IPR.	£45m was allocated in the first round of the competition in 1999, (with 15 seed funds being set up) and £15m in October 2001. 57 HEIs now have access to this funding.
1999	Science Enterprise Challenge (SEC)	Teaching of entrepreneurship to support the commercialisation of science and technology.	SEC initially provided £28.9m in 99/00 for up to 12 centres. Additional funding of £15m increased the number of HEIs participating to 60 <sup>6</sup> .
2001	Higher Education Innovation Fund (HEIF)	Single, long term commitment to a stream of funding to “support universities’ potential to act as drivers of growth in the knowledge economy”.	HEIF was launched in 2001 to bring together a number of previously independently administered third stream funding sources. This was then extended (HEIF2) in 2004 with £185m awarded.

<sup>5</sup> Guston, D. H., and Keniston, K. (Eds.), (1994), *The Fragile Contract: University Science and the Federal Government*, MIT Press: Cambridge, MA.

<sup>6</sup> Centres formed through this initiative now have their own network (UKSEC). More information at [www.enterprise.ac.uk](http://www.enterprise.ac.uk).



## Emerging issues

### *Metrics for commercialisation activities*

2.8 With the support provided by funding schemes such as those in Table 1, UK HEIs have developed new central structures to manage commercialisation and collaborative activities, such as industrial liaison offices, and policies to manage intellectual property rights. Research commercialisation activities have increased, whether through patenting/licensing, spin-outs, or consulting<sup>7</sup>. The expenditure of Government money on supporting such activities has been linked to a desire to measure its effectiveness and efficiency. The Government has been keen to show that third stream funding activities have led to a marked increase in activity. Data used so far include the following<sup>8</sup>:

- **Number of spin-outs:** There were 248 new spin-off firms in 00/01, compared to 203 in the previous year, an increase of 22 per cent. However, this figure went down to 158 in 01/02.
- **Patent filings:** Total new patents filed increased from 743 in 00/01 to 1,098 in 01/02.
- **Licensing income:** In 01/02, 635 licences were held by UK HEIs that yielded income. These were translated into income of £24 million giving an average of £200,000 per HEI that responded to the survey. Comparable figures for 00/01 are 483 licences generating £16.3 million giving an average of £217,000 per HEI. These figures are highly skewed as the bulk of this income comes from a small number of large deals.
- **Spin-offs/research expenditure:** In 01/02, UK HEIs identified one spin-off firm for every £8.9 million of sponsored research expenditure, while in the US the ratio was one for every £88 million.

2.9 It is has, however, been argued that these measures may not be the most appropriate and should certainly not be applied uniformly across all HEIs. Such data do not necessarily give a useful indication of the on-going effectiveness of commercialisation activities appropriate for the wide range of different situations facing HEIs in the UK and, if used in league tables, may lead to universities channelling resource into inappropriate activities. For example, research on knowledge transfer in Germany shows that simply encouraging universities to increase the numbers of spin-out ventures can lead to ideas being prematurely packaged into new ventures that have little chance of attracting funding and hence growing to make a positive contribution to the economy<sup>9</sup>.

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<sup>7</sup> Wright, M., A. Vohora and A. Lockett, (2002), *Annual UNICO-NUBS survey on university commercialisation activities: Financial Year 2002*, UNICO / NUBS.

<sup>8</sup> Data drawn from Wright, M., A. Vohora and A. Lockett, (2002), *Annual UNICO-NUBS survey on university commercialisation activities: Financial Year 2002*, UNICO / NUBS.; and Wright, M., A. Vohora and A. Lockett, (2001), *Annual UNICO-NUBS survey on university commercialisation activities: Financial Year 2001*, UNICO / NUBS.

<sup>9</sup> Gill, D., Minshall, T., Rigby, M., (2003), *Funding Technology – Germany: Better by Design?*, Wardour Communications.

## ***Licensing and spin-outs***

- 2.10 The economic boom of the late 1990s, coupled with funding for new innovation support mechanisms, resulted in an upsurge in spin-out activity from UK HEIs. In part this was driven by an implicit (and many cases explicit) belief that spinning-out ventures based around HEI-owned intellectual property could generate significant direct returns to the host HEI. Examples of the returns generated by spin-outs from MIT were often used as an example of such<sup>10</sup>. During this buoyant period, commercialisation offices within UK HEIs were strongly encouraged to create spin-outs. However, the bursting of the Internet-driven economic bubble in 2000, coupled with closer examination of data on US university spin-out activity, led to a realisation that the likelihood of spin-outs generating significant direct returns to the parent HEI was extremely remote<sup>11</sup>. There is now a more balanced appreciation that there are many indirect benefits to HEIs from supporting spin-out activities; such as enhancing the HEI's enterprise agenda, making a local economic contribution, and laying the potential for long term relationships with research-focused firms.
- 2.11 Improved understanding of how difficult it can be to generate direct returns from spin-outs has increased the interest in licensing technologies to established firms. However, this strategy for commercialisation also can be problematic. For example, research from the US shows that universities which are over-aggressive in negotiating licenses can harm their own efforts to raise other sources of funding from industry<sup>12</sup>. The extent to which universities are able to form the types of relationships with industry required to develop a strong portfolio of licenses depends very much upon the university's perceived prestige. There are also the 'demand deficiency' issues raised by the Lambert Review (i.e., highlighting the fact that while universities have made good efforts to increase their openness to industry, many companies do not yet have the capability to get best value from working with universities)<sup>13</sup>.
- 2.12 UK HEIs that seek to commercialise the outputs of research have been through a period of experimentation over the past 5 years. This experimentation has been fuelled by Government initiatives that have allowed the HEIs to apply resource to existing and new activities to bring technologies to market. Inevitably, during this learning phase, Government support for differing types of commercialisation activity was delivered through separate programmes. In some cases this has led to a fragmented approach within HEIs and rationalisation is now underway.

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<sup>10</sup> BankBoston (1997), *MIT: The impact of innovation*, BankBoston.

<sup>11</sup> The report of a 1998 Committee of Vice-Chancellors and Principals (CVCP, now Universities UK) mission to the US funded by the Gatsby Charitable Foundation; "*Technology Transfer the US Experience*" provided a balanced picture of activity and experience at leading US universities.

<sup>12</sup> British Consulate-General of San Francisco (2003), *Key lessons for technology transfer offices: Viewpoints from Silicon Valley*, Note produced by the Science and Technology Section.

<sup>13</sup> [www.lambertreview.org.uk](http://www.lambertreview.org.uk)

2.13 HEIs realise that initiatives that have been pump-primed through soft money need either (a) further external funding, (b) to generate their own funding or (c) to become centrally funded. At the same time, the Government has merged many of the previously disparate funding streams for HEI commercialisation activities under the ‘Higher Education Innovation Fund’ (HEIF) - which provides a long term commitment from the Government to support third mission activities within HEIs. These two factors, one internal the other external, are encouraging HEIs to formulate strategies that provide them with a means to build a balanced portfolio of ‘third stream’ activities appropriate to their distinctive academic strengths and to their particular regional context. We hope that the synthesis of findings presented in section 3 (and suggestions for on-going data collection) will be helpful to such strategy formulation.

### 3 Synthesis of findings

3.1 This section draws together two strands of work: the review of spin out activity and experience at the 10 universities (described in the Appendix B case studies); and findings from the data on individual companies provided by the technology transfer offices and by the spin-out companies themselves. Descriptive data on the ten universities are given in Table 2 in which we show full time equivalent (FTE) figures for academic staff and postgraduate research students, together with a breakdown of research funding. Most of these data come from the Higher Education Statistics Agency (HESA) and, for the sake of consistency, we show the most recent year for which comparative data are available for the period of our research. The penultimate column, giving an estimate of the proportion of research funding accounted for by the medical and life sciences, is less precise and comes from our interviews.

3.2 The figures in the final column, for numbers of staff engaged in the commercialisation of research, also come from our interviews. They should be regarded as indicative rather than definitive, as some staff (lawyers for instance) also provide expertise to other aspects of research services.

**Table 2: Descriptive data on ten universities**

		Academic Staff & Research Students (a)		Research Funding (a)				Commercialisation Staff	
		FTE Academic Staff	FTE PG Research Students	Total / Em	% from Research Councils	% from Charities	% from UK Industry	% Medical & Life Science (b)	FTE Staff Engaged in Research Commercialisation (d)
Universities with largest research budgets	Cambridge	3,620	4,401	214	39.6	30.7	8.6	55 (c)	24
	Imperial	2,982	1,824	210	307	31.3	13.4	67	25
	Oxford	3,463	3,195	219	32.9	37.9	7.9	70	35
	UCL	3,494	2,156	212	30.9	45.4	6.5	75	32
Other large universities in major cities	Edinburgh	2,354	1,434	120	33.4	28.1	6.1	60	7 (e)
	Newcastle	1,753	1,353	79	24.5	26.3	7.9	50	8
	Southampton	1,930	1,250	95	45.6	13.9	12.8	30	20
Universities with smaller research budgets	Cranfield	726	675	46	18.7	0.6	38.6	Life science only (low %)	4
	Loughborough	930	1,014	39	33	5.1	24	none	6
	Strathclyde	1,246	744	40	34.5	11.6	18	Pharma only (low %)	10 (f)

**Notes:**

(a) Data from Higher Education Statistics Agency ([www.hesa.ac.uk](http://www.hesa.ac.uk)) for 2001-2002.

(b) Estimates obtained from interviews at end 2003.

(c) Cambridge data do not include MRC-funded research but spin-outs will be influenced by it as many senior researchers have dual appointments.

(d) Data from interviews at end 2003.

(e) The total staffing of Edinburgh Research and Innovation Ltd is 44.

(f) Total staffing of the research and consultancy services office is 25.

### **Types of spin-outs**

3.3 Perhaps the most crucial conclusion from our discussions with the university commercialisation offices is that any analysis of spin-outs which implicitly assumes that they are a generic class of new business is inherently flawed. There are three quite distinct categories of spin-out companies<sup>14</sup>:

- spin-outs with identifiably high growth potential, even if there are considerable risks that the potential will not be realised
- spin-outs that are likely to be serious businesses in that they create employment and generate profits, but which may have limited or slower growth potential
- spin-outs that are legal vehicles for the commercial development of a technology which, in due course, is likely to be commercialised through the licence or sale of the IP.

### **Numbers of spin-outs**

3.4 A second key finding is that at some universities there were considerably more start-ups (i.e., companies originating from the university but where the university has no claim on the IP) than spin-outs. Start-up activity is likely to depend on the relevant university policies (including those relating to IP) and the overall 'culture' of the university in relation to enterprise. Start-ups may well be difficult to identify, categorise and track systematically. They may, however, form a significant area of activity for a university's commercialisation office.

3.5 Moreover, the number of spin-outs will depend in part on university decisions on resource allocations to the commercialisation effort and subsequently on the commercialisation office's view on the priority that should be given to spin-out formation. Amongst the universities we covered there were significant differences on both these variables.

3.6 There are two key conclusions from these observations:

- first the number of spin-outs should not be interpreted as a free standing indicator of the relevance of the university's research to the commercial world
- second it should not be used uncritically as an indicator of the level of entrepreneurial enthusiasm amongst staff and other researchers.

3.7 Bearing those caveats in mind, Table 3 shows the key quantitative survey findings on spin-out activity and performance for the period 1998 – 2002; analysed by the three university groups as described in paragraph 1.4.

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<sup>14</sup> The issue of categorising spin-outs is topic of growing research interest, e.g., Clarysse, B., *et al.*, (2004). "Spinning out new ventures: a typology of incubation strategies from European research institutions." *Journal of Business Venturing*, In press; and Nicolaou, N. and S. Birley (2003). "Academic networks in a trichotomous categorisation of university spinouts." *Journal of Business Venturing*, 18(3): 333-359.

**Table 3: Summary data on spin-outs from three categories of universities<sup>15</sup>**

Indicator		Average per institution for universities with largest research budgets	Average per institution for other large universities in major cities	Average per institution for universities with smaller research budgets (h)
Total number of spin-outs (1998 - 2002)		24.8	12.0	12.5
Life science+clinical (a)	Number	11.8	3.7	2.0
	%	47%	31%	16%
Physical sciences (a)	Number	10.0	7.0	10.0
	%	40%	58%	80%
10 or more employees (b)	Number	6.8	4.0	3.0
	%	27%	33%	24%
£250k or more of revenue (c)	Number	4.3	2.3	4.5
	%	17%	19%	36%
Equity financing (d)	Number	17.8	8.3	5.0
	%	72%	69%	40%
	Total raised/£K	86,143	40,602	9,356
	Average per spin-out with equity/£K	4,853	4,872	1,871
Stayed in sub-region (e)	Number	17.3	10.3	10.5
	%	70%	86%	84%
In university accommodation or incubator (f)	Number	6.0	5.0	8.5
	%	24%	42%	68%
On-going links to parent university (g)	Number	16.3	6.0	8.0
	%	66%	50%	64%

**Notes:**

- (a) Classified by founders' university department(s). Spin-outs from departments other than physical-, or life-science, or clinical are not included in this table.
- (b) Most recent figures available at time of research (end 2003).
- (c) Most recent figures available at time of research (end 2003).
- (d) Over life of company from start-up to end 2003.
- (e) Top level of postcode of company is same as university.

<sup>15</sup> This table summarises information drawn from a combination of public sources, from the university commercialisation offices, and from the spin-out companies themselves.

## **Characteristics of spin-outs**

### ***Origin***

- 3.8 The first two rows in Table 3 show the numbers of companies that originate, respectively from researchers in the life/clinical sciences and from the physical sciences. Together these account around 90% of total spin-outs, the remainder coming from the arts, social sciences and humanities. There is a clear difference between the three groups of universities in terms of the proportion of spin-outs coming from the life/clinical sciences – which is understandable given their share of the research budgets at Cambridge, Imperial, Oxford and UCL.

### ***Growth and equity finance***

- 3.9 Growth performance was considered in terms both of employment and revenue. There are shortcomings in both measures. Revenue depends crucially on the nature of the business as it masks considerable variations in value added, whereas employment can encompass widely different qualification requirements and salary levels. What the figures show are, assuming that there has been a fairly even level of start-ups over the 5 year period (which is broadly the case), that a reasonable proportion had reached a position of substance in terms of employment and/or revenue levels.
- 3.10 This is further borne out by the proportion of companies securing equity finance and the substantial average level of such investments. The figures in the last column, for universities with smaller research budgets, average the experience of Strathclyde University, which has a long history of involvement with research commercialisation, and Loughborough University whose experience is much more recent. Their lower levels of equity finance – both the proportion of companies obtaining finance and the average level obtained – probably reflect the relatively low proportion of companies from the life/clinical sciences which typically need significant equity funding from the outset. Conversely the two universities have a relatively high proportion of companies achieving revenue of £250,000 or more; and again the absence of life science businesses may be part of the explanation.

### ***Linkages***

- 3.11 The proportion of companies that have stayed in the sub-region is an interesting indicator of contribution to local economic development and the relatively lower percentage for the universities with the largest research budgets is chiefly a reflection of the ‘London’ factor; both Oxford and Cambridge had retention rates similar to the other non-London universities. It should not, however, be assumed that the similarly lower percentage (24%) of companies in university accommodation or a related incubator is also accounted for by the London institutions. The proportions in Cambridge, Imperial, Oxford and UCL were, in fact, very similar one with another.

3.12 On a more encouraging note, the final row of data shows that, despite a greater spatial separation from their spin-outs, these four universities achieved an above average performance in terms of on-going links (though there was considerable variation concealed within the average and it was not explained by the 'London' factor). In addition, although we could not quantify the effect, companies were able to use their links with the universities to tap into wider networks; drawing, for instance, on alumni as sources of managers, finance and commercial connections. This alumni link was often strong in connection with the universities' business schools and could well become of growing importance as universities invest greater effort in their alumni relationships. Business schools also provided a link to 'free' commercial resource in the form of MBA student projects.

### **Qualifications to the data**

3.13 The 10 commercialisation offices researched were spinning out an average of 3 companies per year, and most of the interviewees thought that between 3 to 5 per year was a 'manageable' number. The actual spread in the number of spin-outs was from less than 1 per year in the lowest university up to 9 per year in the highest. This highlights the important fact that we are not dealing with a homogenous group.

3.14 Our data are also in sense incomplete, because they relate to companies that had survived to the point at which our study was undertaken. We did, however, cross check this aspect and found that the average failure rates for spin-out companies across all the 10 universities were very low; under 10% compared to the average for high tech firms of 60-70%<sup>16</sup>.

3.15 Using data such as these to measure the performance of University commercialisation offices is not straightforward; they can only take a spin-out company to a certain point of its commercial development, after which the spin-out's success depends on a multitude of other factors. In measuring their own performance, university commercialisation offices often see the attraction of external investment by the spin-outs as a useful measure; which is why we have shown these figures.

3.16 We have not tabulated returns to the university from dividends or the sale of its equity. Although there were some and they were, of course welcomed, such returns are regarded as unpredictable rarities, especially in the short to medium term. Equally, it would be wrong to record such benefits without also recording other direct benefits from spin-outs including research commissions for academics and jobs for students. Indirect benefits also need to be factored in and they include fulfilling institutional ambitions to help the local community and economy, and helping to encourage positive attitudes to entrepreneurship amongst staff and students.

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<sup>16</sup> Garnsey, E. and P. Heffernan (2003). "Growth setbacks in new firms." *University of Cambridge Centre for Technology Management Working Paper Series* 2003/1, [www.ifm.eng.cam.ac.uk/ctm](http://www.ifm.eng.cam.ac.uk/ctm).



### **When to go the spin out route**

3.17 The Lambert Review had highlighted the concern that there may be an over emphasis on creating spin-outs rather than seeking to licence a technology to an established business. In response to the question: “How do you decide when to form a spin-out?” the following points were given by the commercialisation offices:

- for platform technologies
- where the inventors are very keen to commercialise the technology themselves
- when the idea needs to attract substantial investment to develop IP relating to the technology for subsequent licensing
- when the technology is not readily licensable
- for a generic technology with many different applications.

### **Four notes of caution from our discussions**

3.18 The importance to spin-out activity of the national policy framework should be kept firmly in mind. Mention is frequently made of the impact that the Research Assessment Exercise (RAE) has on the priority given to commercialisation activities within universities. Through specific resource allocations, the Government’s 2<sup>nd</sup> Higher Education Innovation Fund (HEIF2) is presently seeking to redress the balance somewhat more in favour of knowledge transfer and application. However, although outside the timeframe of our research, some of the universities report that spin-out formation has largely dried up as a result of the fiscal changes in the July 2003 Finance Act.<sup>17</sup> Clearly academic engagement with spin-out activity is sensitive to the various policies and incentives.

3.19 Successful spin-outs consume a significant amount of staff time from the university commercialisation office. Continuing resources are also needed to ensure that the university’s investment stakes in spin-outs are appropriately managed. Such management requires specific expertise, which may need to be drawn in from beyond the commercialisation offices. However, this should not be taken to imply that licensing is an ‘easier route’ - it was also noted that considerable amounts of staff time and effort are needed to develop and manage a good licensing agreement with an established business.

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<sup>17</sup> Schedule 22 of the Finance Act 2003 sought to ensure that those who are awarded shares as part of their remuneration packages are liable for income tax and national insurance on such payments. This has unintentionally made it more difficult for academic members of universities to take equity stakes in spinouts. This, in turn, is believed to be having a slowing effect on the number of spin-outs formed by some universities. Efforts are now being made to persuade HM Treasury to amend this Schedule. Two structural modes have been identified that would allow any income tax and national insurance charges to be deferred until the spin-out is successful. However, the Government agencies themselves recognise that this does not address the core issue of concern, and discussions continue between HM Treasury, Inland Revenue and the Department of Trade and Industry to find a clear fiscal environment that encourages rather than hinders HEIs in their efforts to spin-out businesses based on their research.

- 3.20 It is often asserted that life science spin-outs are expected to have a very long pay-back period, but this can also be true for complex physics-based technologies. Patient resources have to be available to fund the initial establishment and on-going development costs of the individual technologies and also to manage what may become a portfolio of linked technologies (even if patenting costs can be recovered from co-investors).
- 3.21 Involving academics with spin-outs, and thereby broadening their understanding, is often viewed as one of the positive outcomes to be gained from supporting this type of activity, but there will be opportunity costs here too. Academics focusing time and effort on commercialisation activities may divert attention from their core activities of teaching and research. There can, moreover, be serious questions concerning conflicts of interest. These have to date raised much more concern in the USA than the UK; a reflection perhaps on the relative levels of both activity and litigiousness.

### **Other observations**

- 3.22 Taking into account companies founded before our study period, several of the universities we interviewed have had some really encouraging successes producing significant returns from sale of equity in their spin-outs. This was, however, a relatively rare occurrence and had, in a number of cases, been linked to the buoyant economic conditions immediately prior to the Internet-fuelled speculative bubble bursting in 2000. It was emphasised in discussion that it can be up to 10 years before significant returns start to flow from spin-out activities.
- 3.23 Some universities, but by no means all, gave us estimates of the likely number of spin-outs in an average future year. Levels were determined in part by availability of resources in the commercialisation office, but individual academic enthusiasm was also an important factor in the choice of commercialisation route and most universities mentioned engagement with spin-outs (and start-ups) being part of their strategic commitment to the regional/sub-regional economy. It was noted, however, that target setting inevitably leads to behavioural change. It is, therefore, arguable that if targets are set for spin-outs then there need to be targets set for other IP routes as well if distortion is to be avoided.
- 3.24 The majority of commercialisation offices have established informal or formal links to a range of venture capital sources which they see as appropriate. However, these relationships have not always been fraternal; when the situation was tight some follow-on financing could only be obtained on draconian terms. Some of the links were 'first option to fund' arrangements (i.e., a fund is given the right to consider possible deals before other investors) with the financial partner typically making a significant up-front payment, and these seemed to have worked well.
- 3.25 Scotland has had a relatively long history of strong and reflective public sector support for commercialisation (and especially spin-outs). University efforts have been supported and

complemented by publicly-funded input from the Scottish Executive, SHEFC and the Royal Society of Edinburgh. An international enquiry into good practice in commercialisation led to a number of innovative initiatives from Scottish Enterprise<sup>18</sup>. However, the overall longer term impact of publicly-funded early stage support for start-ups generally and, specifically, university spin-outs is yet to be proven. Widespread publicly-funded support is less developed in many parts of England than in Scotland, though most RDAs are now actively involved in addressing the topic. An example of regional support for enterprise in England can be seen in the introduction of the Regional Venture Capital Funds<sup>19</sup>.

### **Our overall views**

- 3.26 Spin-outs, if not over-emphasised, fit very well with a number of other university aims – the enterprise agenda, local economic contribution, laying the potential for a long term relationship with a research-focussed firm.
- 3.27 It is arguable that, in the recent past, university spin-outs have been given too high a profile in policy pronouncements. Because they have been ‘in fashion’ spin outs have been seen, sometimes uncritically, as a ‘good thing’. Whilst there is a strong case for moving towards a more cautious appreciation of their contribution, it would be unfortunate if the fashion pendulum were to swing back too far the other way. Direct financial benefits to universities may well only accrue in the long term and the distribution of financial benefits may well be heavily skewed towards a few spin outs. There are, however, as this report has instanced, a number of valuable positive spillovers to both regional and national economies that are likely to be felt more immediately.
- 3.28 Investment in university spin-outs involves a significant commitment from the university sector as, in the short term, the costs they entail will exceed the financial returns. It is, therefore, important that there is an overall policy encouragement towards university spin-outs that reflects their full range of contributions and not just their financial impact.

### **Conclusions on the practicality and value of systematic measurement**

- 3.29 The work reported above is a pilot exercise. In part we hope to have provided some information and insights that will be of value in their own right. However, the main purpose is to consider whether an ongoing exercise to track spin-outs would be worthwhile. Our conclusions on this are that it would certainly be worthwhile for university commercialisation offices themselves (confidentiality considerations probably preclude such work being ‘sub-

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<sup>18</sup> <http://www.scottish-enterprise.com/>

<sup>19</sup> <http://www.sbs.gov.uk/finance/rvcf.php>

contracted’) to track spin-outs through their early stages and to pool data, on a confidential basis, through UNICO or AURIL<sup>20</sup>.

- 3.30 In Appendix A we suggest the data that we believe it would be sensible to collect. Aggregate data could be placed in the public domain – perhaps using a typology of universities such as we suggest in paragraph 1.4.

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<sup>20</sup> An alternative approach to a third party gathering data from university spin-outs is to provide incentives for the spin-outs themselves to provide the data. Such an incentive might be to raise the profile of the company to potential investors. This approach would only be of relevance for those companies seeking equity investment.

## 4 Further readings

Since this research project began, a number of reports, books and papers have been produced that provide useful additional material on the topic of university spin-outs. A selection of such recent publications is given below.

Clarysse, B., M. Wright, A. Lockett, E. Van de Veldea and A. Vohora (2004). "Spinning out new ventures: a typology of incubation strategies from European research institutions." *Journal of Business Venturing*, In press.

Druilhe, C. and E. W. Garnsey (2003). "Do academic spin-outs differ and does it matter?" *University of Cambridge Centre for Technology Management Working Paper Series 2003/02*, [www.ifm.eng.cam.ac.uk/ctm/publications](http://www.ifm.eng.cam.ac.uk/ctm/publications).

Lockett, A., M. Wright and S. Franklin (2003). "Technology transfer and universities' spin-out strategies." *Small Business Economics* 20(2).

Nicolaou, N. and S. Birley (2003). "Academic networks in a trichotomous categorisation of university spinouts." *Journal of Business Venturing*, 18(3): 333-359.

Shane, S. (2004). "Encouraging university entrepreneurship? The effect of the Bayh-Dole Act on university patenting in the United States." *Journal of Business Venturing*, 19(1).

Tang, K., A. Vohora and R. Freeman, Eds. (2004). *Taking research to market: How to build and invest in successful university spinouts*. London, Euromoney Books.

Vohora, A., M. Wright and A. Lockett (2004). "Critical junctures in the development of university high tech spin-out companies." *Research Policy*, 33(1): 147-175.

Wright, M., (2004), "Spin-outs from universities: strategy, financing & monitoring: Full report of research activities & results", Final report of ESRC-funded research project. Download from: [www.regard.ac.uk/research\\_findings/R022250207/report.pdf](http://www.regard.ac.uk/research_findings/R022250207/report.pdf)

# Appendix A - Proposed data to be collected on university spin-outs

Based on the experience of this research project, it is believed that the following basic data fields would be required to provide a minimum useful dataset. This dataset would form an acceptable compromise between utility, and accessibility of reliable data.

- Name of company
- Brief description
- URL
- Year of incorporation
- Most recent employment
- Employment history
- Most recent sales (£k)
- History of sales (£k and years)
- Total equity funding raised (£k)
- History of equity funding raised (£k, rounds and years)
- Stayed in sub region?
- Premises on science park, or incubator / university premises?
- SIC code(s)
- University shareholding
- Founder's Departments
  - Engineering, Material sciences, IT, Chemistry, Physics, *et al.*
  - Clinical school, Life sciences
  - Other
- On-going links with university?
  - Informal occasional, informal extensive, work with students / sponsor student, staff is/are member of university, spin-out uses university facilities, collaboration on projects, fund projects in university, IP pipeline agreement, staff secondment, no links.

## Appendix B: Individual university case studies

University of Cambridge .....	1
Cranfield University .....	8
University of Edinburgh .....	13
Imperial College, London .....	18
Loughborough University .....	24
University of Newcastle upon Tyne .....	30
University of Oxford.....	35
University of Southampton .....	40
University of Strathclyde.....	47
University College London .....	53

# University of Cambridge

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## Regional context

- B.1 The city of Cambridge is at the centre of a successful high technology business cluster that has grown rapidly since the late 1970s. In 1978 there were only about 20 high-tech companies in the area. By 1985 the number of high-technology companies had increased to 360 when the significance of what was happening in Cambridge was identified by the publication of the ‘Cambridge Phenomenon’ report<sup>1</sup>. Since then, the Cambridge high technology business cluster has grown significantly to around 1,500 high technology businesses either locally grown, or inwardly invested, employing in total around 44,000 people.
- B.2 The University has contributed to building the company base in Cambridge. In 1985, 25% of the high-tech firms in the Cambridge area had a founder originating either from Cambridge University or from a research establishment in the Cambridge area<sup>2</sup>. More recently, as corporate venturing has increased, this proportion has fallen. The University has also attracted a number of large corporations to the area that have set up research units in and around Cambridge, or entered collaborations with high profile academic research groups. High profile companies located in the area, sometimes on University premises, include GSK, Hitachi, Toshiba, Unilever, Microsoft, and BP.

## Key University data<sup>3</sup>

- B.3 The University of Cambridge is one of the oldest universities in the world and it undertakes research in a wide range of science and arts subjects. It is also one of the largest in the United Kingdom with over 18,000 students. The University has the following mission: “[..] to contribute to society through the pursuit of education, learning, and research at the highest international levels of excellence.”

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<sup>1</sup> Segal Quince & Partners (1985), “The Cambridge Phenomenon: The Growth of High Technology Industry in a University Town”. Segal Quince & Partners: Cambridge.

<sup>2</sup> Ibid.

<sup>3</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).



	FTE Academic Staff	
	Number	%
Teaching only	33	0.9
Research only	2087	57.7
Teaching & research	1500	41.4
Total	3620	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	11424	63.4
UG other	779	4.3
PG taught	1410	7.8
PG research	4401	24.5
Total	18014	100%

### **Research income**

B.4 In 2001-2002 the total research income (including HEFCE core funding) to the University of Cambridge was over £214 million with approximately half of the research funding devoted to clinical medicine and biosciences. Other major proportions of funding go to areas such as chemistry, physics, engineering and maths<sup>4</sup>.

B.5 Excluding HEFCE core funding, the balance of around £150 million was brought in from the following sources<sup>5</sup>:

- Research Councils 39.6%
- Charities 30.7%
- UK central government 8.5%
- UK industry 8.6%
- EU government and other 6%
- Other overseas 5.4%
- Other 1.2%

### **Resources allocated to commercialisation and spin-outs**

B.6 Support for commercialisation activities at Cambridge has passed through a series of phases in recent years that can be summarised as follows<sup>6</sup>:

<sup>4</sup> Data from www.hesa.ac.uk for 2001/2

<sup>5</sup> Data from www.hesa.ac.uk for 2001/2

<sup>6</sup> This description draws upon Druilhe, C. (2002). *The emergence and process of academic enterprise: Cases from the University of Cambridge*. PhD thesis, University of Cambridge Judge Institute of Management.

- 1960- 1998: A diffuse and liberal approach to technology transfer predominates. In 1960 a small unit was formed within the Engineering Department to facilitate technology transfer. In 1970 this unit became the Wolfson Industrial Liaison Office (WILO). Intellectual property rights (IPR) policy was similarly liberal: the IPR were not automatically assigned to the University but academics had to work with WILO if they were supported by a Research Council grant. In 1987 a revenue share agreement was put in place that divided any results of commercialisation activities between the inventor, their department, and the University. In cases where the research had been funded through some other route, either the funding sources brought their own obligations or academics could claim ownership of their inventions. This policy granted significant independence to scientists in negotiating IPR with industrial sponsors and engaging in research commercialisation.
- 1998-2002: During this period, a new structure for technology transfer activities emerged, alongside a new IPR policy. In 2001, a new policy was agreed stating that “IPR generated by externally funded research<sup>7</sup>, except where the University has agreed otherwise, will be owned by the University.”<sup>8</sup> When revenues are generated by the exploitation of such IP, any net benefit received by the University is shared between the inventor, the Department and the University. In 1998 the University also developed an integrated framework for technology transfer and adopted a more proactive approach to support. The University became directly involved in the commercialisation of research and the promotion of entrepreneurship. The key organisations that emerged included:
  - Research Services Division (RSD) – formed in 2000 to create a single organisation dealing with technology transfer and the University's external research funding from industry, research councils, the European Union and from charitable trusts and foundations.
  - Technology Transfer Office – the group within RSD that manages the commercial development of University intellectual property (IP), and that arising from projects undertaken within the Cambridge-MIT Institute and at Addenbrooke's (the University's teaching hospital).
  - University Challenge Fund – provides funding from £10,000 to £250,000 for University of Cambridge spin-outs.

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<sup>7</sup> Externally funded research covering research funded by the research councils and all other external sources of research funding (e.g. charities, industry, European Union, UK government departments).

<sup>8</sup> From [www.rsd.cam.ac.uk](http://www.rsd.cam.ac.uk)

- Cambridge Entrepreneurship Centre – funded by the Science Enterprise Challenge in 1999, the Centre was established to provide training and support for entrepreneurs.
  - 2002-2003: In 2002 the process began of forming a single organisation - called Cambridge Enterprise - that aimed: “to improve the support available to the academic community to make their ideas and concepts more commercially successful for the benefit of themselves, the University, and the UK economy”. This new organisation sits within RSD and aims to provide a more focused approach to support for commercialisation by integrating the main functions and acting as a ‘one stop shop’ for transactions between academics and commercial partners. Cambridge Enterprise brings together the Technology Transfer Office, the University Challenge Fund, Cambridge University Technical Services Ltd (‘CUTS’ - the trading vehicle for University intellectual property) and the business creation activities of the former Cambridge Entrepreneurship Centre.
- B.7 Cambridge Enterprise has approximately 24 FTE devoted to commercialisation activities. Most of these staff will be working on both licensing and spin-out activity. Those dedicated exclusively to company creation and investment activities include the Challenge Fund staff (2 FTEs), and staff brought to Cambridge Enterprise from the former Cambridge Entrepreneurship Centre (3 FTE). In addition, a proportion of staff working on licensing activities will be focused on licensing to spin-outs and start-ups.
- B.8 The Cambridge Entrepreneurship Centre’s teaching and training activities are now delivered under the umbrella of the Centre for Entrepreneurial Learning, which sits within the Judge Institute of Management. This Centre is strongly linked to the local business community and provides practically focused programmes for students, researchers and staff in the University. A number of the Centre’s programmes, such as the Entrepreneurship Summer School, are also open to those outside the University. Cambridge Enterprise commissions the Centre to deliver training programmes within the University.
- B.9 Cambridge University Entrepreneurs is a student-run organisation that manages three business plan competitions for members of the University. The founders of this competition drew influence from MIT’s long standing ‘\$50k’ business plan competition and now provide £100,000 of prize money per annum through its ‘£50k’, ‘£1k’ and ‘3P’ (People, Planet and Productivity) competitions.
- B.10 In addition to the University Challenge Fund, the University itself is able to make investments in University spin-outs from its own reserves. This it has been doing since the mid-1990s. The University does not have any exclusive arrangements with any external venture capital funds.

B.11 Cambridge Enterprise manages a small business incubator that utilises space within the Computer Laboratory. This is the only business accommodation provided by the University, though commercial incubation and science park facilities are provided by Cambridge colleges such as St John's and Trinity. In the very early stages of company formation, unused departmental space may provide a temporary home for spin-outs.

### **Experiences with spin-outs to date**

B.12 Over the last five years, Cambridge has spun-out 23 new businesses of which 1 has failed and 2 have been acquired.

B.13 There is no specific pressure towards creating spin-outs, rather there has to be a specific reason for not licensing an invention to an existing businesses: "Spin-outs have an important role in our strategy, but this is not the first line. [...] In general, if we get a good licensing deal and the inventor is happy, then this is satisfactory. If the inventor really wants to create a spin-out, then we follow what the inventor wants"<sup>9</sup>

B.14 It is hard to make any general findings as to on-going links that spin-outs have with the University. Some are very keen to maintain the linkages and to leverage the brand, others maintain almost no public links. A number sponsor research within the University and in recent years there has been a growth in MBA and engineering students carrying our business and technical projects within spin-outs<sup>10</sup>.

### **External linkages**

B.15 Cambridge Enterprise and related organisations within the University have numerous links with the local business community. Examples of such linkages<sup>11</sup> are given below:

- Conferences and events – Cambridge Enterprise is actively involved in the events such as the Cambridge Enterprise Conference (an international conference and 'deal day' for entrepreneurs and investors) and 'Horizon' events<sup>12</sup> (showcasing University technology to the business community).
- Networks – groups such as the Cambridge Network provide a forum for bringing together the business and academic communities around issues related to high technology businesses.
- Investor groups – strong links are made with active Business Angel networks such as Cambridge Angels and the Great Eastern Investment Forum.

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<sup>9</sup> Interview with David Secher, Director of RSD, 13/10/03.

<sup>10</sup> See [www.ifm.eng.cam.ac.uk/studentprojects](http://www.ifm.eng.cam.ac.uk/studentprojects)

<sup>11</sup> Additional information of such organisations can be found in the Cambridge Technopole Report – download from [www.stjohns.co.uk](http://www.stjohns.co.uk).

<sup>12</sup> Organised with the Corporate Liaison Office – [www.clo.cam.ac.uk](http://www.clo.cam.ac.uk)

- Business Mentor Programme – initiated by the Entrepreneurship Centre and KPMG in 2001, this programme leverages the experience of around 100 local managers and entrepreneurs to support university spin-offs and start-ups.
- Science parks and incubators – University spin-outs are able to find accommodation and support at the many facilities in the Cambridge area such as St John’s Innovation Centre and Cambridge Science Park.
- Cambridge Technopole Group – Cambridge Enterprise is part of a group that brings together business support organisations from the private, public and academic sectors.

### **Current reflections and future plans**

- B.16 Success with spin-outs until the late 1990s had been based upon an enthusiastic, ad hoc, but under-resourced approach. The formation of Cambridge Enterprise represents a significant step in the building a more systematic, supportive and appropriately resourced approach to the commercial exploitation of University science and technology. Cambridge Enterprise seeks to provide a range of services “to help inventors through the transition from the academic to commercial environments”<sup>13</sup>.
- B.17 The revisions to the IPR rules for the University have stimulated much debate. This debate brings many viewpoints, but two often expressed ones are on one hand that (a) the ‘loose’ IPR regime has been instrumental in the emergence of an active technology commercialisation environment, but on the other hand (b) the University has missed many opportunities by not maintaining tighter controls over IPR and managing its exploitation more actively.
- B.18 Spin-outs from Cambridge are seen as an important component within third stream activities, and are considered to make a growing contribution to regional economic development. The direct contribution may be small in relation to other knowledge transfer activities such as consultancy, training programmes and graduate recruitment, but spin-outs have the advantage of being high profile. The role of University start-ups (i.e., companies formed by University staff and students but with no University shareholding) could be viewed as equally valuable and this has been a particularly active area of knowledge transfer in Cambridge. Data are not available on such companies in any exhaustive state, but selective research shows that at least 200 start-ups have emerged from the University in the previous ten years.
- B.19 In terms of the sustainability of support for commercialisation activities at Cambridge, the aim is stated to be “to make the whole operation pay. Our goal is to decrease current reliance on subsidy.”<sup>14</sup>

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<sup>13</sup> Discussion with Miranda Weston-Smith, Cambridge Enterprise, 23/04/04.

<sup>14</sup> Ibid.

**Related websites**

Cambridge Enterprise – [www.enterprise.cam.ac.uk](http://www.enterprise.cam.ac.uk)

Centre for Entrepreneurial Learning – [www.entrepreneurs.jims.cam.ac.uk](http://www.entrepreneurs.jims.cam.ac.uk)

Cambridge University Entrepreneurs – [www.cue.org.uk](http://www.cue.org.uk)

Cambridge Network – [www.cambridgenetwork.co.uk](http://www.cambridgenetwork.co.uk)

Cambridge Science Park – [www.cambridge-science-park.com](http://www.cambridge-science-park.com)

St John's Innovation Centre – [www.stjohns.co.uk](http://www.stjohns.co.uk)

Cambridge Enterprise Conference – [www.cambridgeenterprise.co.uk](http://www.cambridgeenterprise.co.uk)

# Cranfield University

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## Regional Context

- B.20 Cranfield University sits in the largely rural area between Milton Keynes and Bedford at the heart of the Oxford to Cambridge Arc. This Arc is a network established with the support of three regional development agencies (East of England, South East England and East Midlands) to promote the educational, research, business, commercial and governmental resources that exist in the area around and between Oxford and Cambridge.
- B.21 The Cranfield Technology Park has been established to provide 100 acres of development potential that currently houses the Nissan Technical Centre Europe and Trafficmaster as well as small units for early stage ventures. A cluster of aviation related commercial and non-commercial organisations are linked to Cranfield University and its associated airport with 2,000 metre main runway.

## Key University data<sup>15</sup>

- B.22 Cranfield University's origins are rooted in the establishment of the College of Aeronautics<sup>16</sup> in 1946. Since then, it has widened its technology base and in 1969 became the Cranfield Institute of Technology (CIT) and then, in 1993, CIT became Cranfield University. The University is spread over three locations: Cranfield (where the focus is on engineering, physical sciences, manufacturing and management), Silsoe (where the focus is on bioscience and the environment) and Shrivenham (which focuses on defence related technologies and hosts the Royal Military College of Science on contract from the Ministry of Defence). Cranfield is moving towards being an exclusively postgraduate institution, and aims to achieve this by July 2005.
- B.23 The mission of Cranfield University is communicated as follows:

*“To create and transform world class science, technology and management expertise into viable, practical, environmentally desirable solutions that enhance economic development and the quality of life.”*

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<sup>15</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

<sup>16</sup> The College of Aeronautics was established as a Centre of Excellence for the UK, driven by the Royal Aeronautical Society, who recognised that aeronautical education in the United Kingdom needed to be revitalised and its scale increased.

	FTE Academic Staff	
	Number	%
Teaching only	11	1.5
Research only	293	40.4
Teaching & research	422	58.1
Total	726	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	583	21.4
UG other	0	0
PG taught	1464	53.8
PG research	675	24.8
Total	2722	100%

### **Research income**

B.24 The University's total research income for 2001-2002 was over £46 million, of which around 80% of this focused on engineering<sup>17</sup>.

B.25 Excluding HEFCE core funding from this total research income, the balance of around £38 million was brought in from the following sources<sup>18</sup>. As can be seen from the data below, a significant proportion of this research income comes from industry and Cranfield has built strong, long term relationships with a number of key industrial partners including Airbus, Rolls-Royce, Ford and Nissan.

- Research Councils 18.7%
- Charities 0.6%
- UK central government 18.1%
- UK industry 38.6%
- EU government and other 11.8%
- Other overseas 12.3%
- Other 0%

### **Resources allocated to commercialisation and spin-outs**

B.26 Cranfield's activities with large corporations have tended to lead to any intellectual property resulting from the collaborative work being assigned to the sponsoring organisation. As such, there was little need for support for spin-out activities as there was relatively little IP owned by the University and its staff. However, in recent years a number of activities at Cranfield

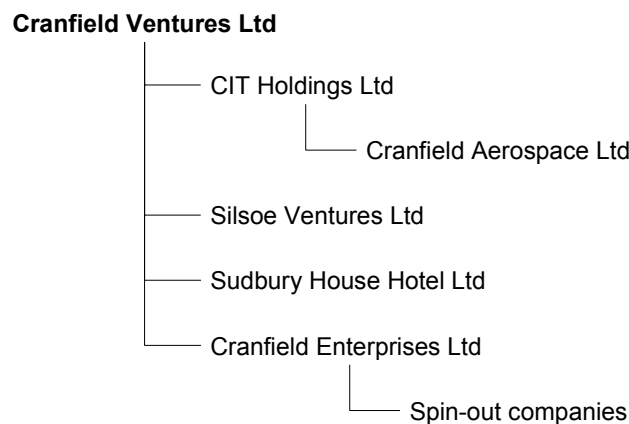
<sup>17</sup> Data from www.hesa.ac.uk

<sup>18</sup> Data from www.hesa.ac.uk for 2001/2



have received funding to help ensure that when the University and its staff do have exploitable IP, they should receive the best support to bring it to market.

- B.27 Commercialisation activities at Cranfield are now managed by ‘Cranfield Creates’, an organisation created in 2002 that has the broad aim of acting *“as the focal point for regional activities, especially with the Small and Medium sized Enterprises (SMEs), as well as commercialising the Intellectual Property of the university.”* Cranfield Creates was set up with funding from the national Higher Education Reach-Out to Business and the Community (HEROBaC) and Higher Education Innovation Fund (HEIF) schemes.
- B.28 Cranfield Creates employs 14 people, of which 4 are focused on technology commercialisation activities. The other 10 staff work on a range of reach-out activities that includes the management of Knowledge Transfer Partnerships, STEP placements, CASE awards and access to European funds. The technology commercialisation team is headed up by Peter Leverkus, seconded from the Cambridgeshire-based technology consultancy firm The Technology Partnership (TTP).
- B.29 In administrative terms, Cranfield Creates reports in to the Vice-Chancellor’s Office. Its trading arm, Cranfield Enterprises Ltd, also forms part of the University’s commercial activities that are brought together under Cranfield Ventures Ltd (See Figure 1 below).



**Figure 1: Structure of Cranfield Ventures Ltd**

- B.30 A number of new activities are currently being developed by the technology commercialisation team within Cranfield Creates. These include the establishment of an Enterprise Fellowship Scheme, the Cranfield Enterprise Forum (an informal network of some 180 members of staff and students with an interest in technology transfer), a Proof of Concept Fund (in partnership with other HEIs in the East of England), a business venture competition and an IP mapping project.
- B.31 Cranfield Creates is planning to build an incubator for its spin-out ventures on the Cranfield campus, and has received funding for this from the East of England Development Agency.

Cranfield Creates runs an Entrepreneur's Club at the Innovation Centre on the nearby Cranfield Technology Park. The Technology Park is managed on behalf of Cranfield University by a separate management company. These facilities will provide a chain of accommodation for Cranfield spin-outs, as they move from incubator to Innovation Centre to separate building on the Technology Park.

- B.32 Cranfield is currently refining its revenue-sharing policy. There is a sliding scale for revenue, broadly with 40% going to the School concerned, 30% to the academic team, and 30% to the centre, some of which would be channelled to Cranfield Creates. Cranfield Enterprises is also looking to take equity stakes in spinouts.

### **Experiences with spin-outs to date**

- B.33 As Cranfield Creates was only established in 2002, it is very early to report on outputs. However, as of the end of 2003, one company has been created, and one is in the process of formation.
- B.34 Cranfield Creates views support of spin-outs as an integrated part of a portfolio of university-business collaborative activities. Effort has only recently been applied to stimulating activity in this area and it is being driven by a desire to ensure that IP that is developed by the University is most effectively and efficiently brought to market. Anticipation of direct financial benefit to the University is one of the driving forces behind these activities.

### **External linkages**

- B.35 The management of relationships with the 5 main Schools of the University are regarded as critical. Each School is run as a profit centre and hence it is recognised that each will have a strong interest in the commercial exploitation of any of its intellectual assets. The Heads of Schools Group ensures cross-School linkages for Cranfield Creates' activities. The Vice-Chancellor's Office provides the direct reporting line for Cranfield Creates but also provides access to legal services and resources.
- B.36 Cranfield Ventures Ltd provides the commercial infrastructure for spin-out ventures and members of Cranfield Creates usually attend this organisation's board meetings to ensure that the technology transfer agenda receives appropriate exposure.
- B.37 The Cranfield Management Association (CMA) has around 8,000 members, and includes a sub-group for those with a particular interest in entrepreneurship. This forms a valuable potential source of investors, management expertise and commercial connections.

- B.38 Business Angel networks such as the Great Eastern Investment Forum, Oxford Investment Opportunity Network and Connect Midlands<sup>19</sup> are regarded as important for potential funding of spin-outs.
- B.39 Regional business networks in Cambridge, Luton and around Hertfordshire provide access to a wide range of contacts and expertise.
- B.40 The collaborative Proof of Concept Fund being developed in partnership with other regional HEIs will help address the need for very early stage funding for spin-outs.
- B.41 Cranfield Technology Park is owned by Cranfield University and houses an Innovation Centre for new technology-related ventures.

### **Current reflections and future plans**

- B.42 Cranfield is still at the early stages of developing a system for supporting spin-out activity. To date, one spin-out company has been created and one is in the formation stage. Cranfield Ventures Ltd also has formed joint exploitation alliances with external technology ventures – one example of this is Sphere Medical Ltd (a spin-out from Cambridge-based consultancy, the Generics Group). The University’s history and strong links with large aerospace and automotive companies had meant that, until recently, identifying IP owned by the University that could be successfully commercialised was not a high priority. This is now changing and it is interesting to observe the rapid marshalling of resources to address this new need, drawing upon resources from across the region.
- B.43 A key activity for the technology transfer team at Cranfield Creates is the raising of awareness among the University’s academics of the value of IP, and the different ways in which it can be brought to market. Without the underlying drive from those that create the new IP, it is realised that progress will be slow in building technology transfer activities.
- B.44 Cranfield Creates is required to balance the meeting of targets for levels of technology transfer activity – both licensing and spin-outs - set by those that have funded its activities against the ‘natural’ internal level of activity that can realistically be achieved.
- B.45 As Cranfield Creates has been funded through grants from specific UK Government programmes, attention is being focused on building a sustainable business model for the technology transfer activities.

### **Related websites**

Cranfield Creates - [www.cranfield.ac.uk/business/ccreates.htm](http://www.cranfield.ac.uk/business/ccreates.htm)

Oxford to Cambridge Arc - [www.oxford2cambridge.net](http://www.oxford2cambridge.net)

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<sup>19</sup> See [www.geif.co.uk](http://www.geif.co.uk), [www.oion.co.uk](http://www.oion.co.uk), and [www.connectmidlands.org](http://www.connectmidlands.org)

# University of Edinburgh

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## Regional context

- B.46 Scotland, in general, has been ahead of the UK in recognising the importance of its universities as assets in regional economic development. There was a comprehensive review of international good practice in the mid 1990s which led to the Technology Ventures Initiative through which university interactions with business were encouraged by discrete projects and initiatives.
- B.47 In addition, two Scotland-wide programmes were established (and are still in operation) that seek to stimulate research commercialisation – with an emphasis on generating spin-outs. The Scottish Enterprise Proof of Concept Fund provides research funding and active guidance for projects where the research appears to have commercial potential and the researcher is committed to pursuing it. The Royal Society of Edinburgh Enterprise Fellowships scheme provides funding, mentoring and entrepreneurship training for researchers (typically post doctoral researchers rather than faculty members) who have research that can, within 12-15 months, be developed into a business plan that can attract funding. The most recent initiative is to establish a small number of Intermediate Technology Institutes that will commission research of commercial significance to help redress the low level of Business Expenditure on Research and Development.
- B.48 Regional offices within the Scottish Enterprise network have had considerable discretion in determining their economic development priorities. For the Edinburgh area, SEEL has been active in ensuring the provision of incubation, innovation centre and science park space for technology-based businesses.

## Key University data<sup>20</sup>

- B.49 The University's fundamental mission is: “[..] *the advancement and dissemination of knowledge and understanding. As a leading European centre of academic excellence, the University has as its core strategic objectives:*
- *to sustain and develop its identity as a research and teaching institution of the highest international quality;*
  - *to provide an outstanding educational environment, supporting study across a broad range of academic disciplines and serving the major professions;*

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<sup>20</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

- *to produce graduates equipped for high personal and professional achievement;*
- *to enhance the scientific and cultural vision of society as well as its economic well-being.*

*As a great civic university, Edinburgh especially values its intellectual and economic relationship with the Scottish community that forms its base and provides foundation from which it will continue to look to the widest international horizons, enriching both itself and Scotland.*

	FTE Academic Staff	
	Number	%
Teaching only	2	0.1
Research only	1073	45.6
Teaching & research	1279	54.3
Total	2354	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	14484	81.2
UG other	196	1.1
PG taught	1732	9.7
PG research	1434	8.0
Total	17846	100%

### **Research income**

B.50 Annual research income (including SHEFC core funding) is in the region of £120 million. The latest data that break down the non-SHEFC contributions are (from HESA) for 2001/02. In that year they totalled about £88 million with the following proportions:

- Research Councils 33.4%
- Charities 28.1%
- UK central government etc 21.3%
- UK industry 6.1%
- EU government and other 6.0%
- Other overseas 3.1%
- Other 1.9%

B.51 Medicine and life sciences/veterinary medicine dominate Edinburgh's research, accounting from some 60% of the total.

B.52 Income from licensing and royalties was approximately £3.4 million<sup>21</sup>, with a further £2.2 million coming from consultancy contracts.

**Resources allocated to commercialisation and spin-outs**

B.53 As at end July 2002 Edinburgh Research and Innovation Limited (ERI)<sup>22</sup> employed 44 staff, including 5 Senior Managers. Of these, 7 FTE staff are involved in commercialisation activities; with a significant additional involvement from the University's lawyers. Around 2.4 FTE staff effort is engaged on spin-outs and start-ups. Taking a broader view of the resource commitment, it is important not to under-estimate the time spent on spin-out activities by University academics.

B.54 There are no other university staff directly tasked with spin-out development, but there are good links to the Management School, whose MBAs take leading management roles in the University spin-out companies. In addition, the Scottish Institute for Enterprise (SIE) which has been given space within the University, provides training and support in entrepreneurship and business skills (for students not academic staff) through:

- undergraduate programmes in entrepreneurship and innovation
- credit-bearing postgraduate courses
- a series of short half-day workshops designed to help participants to develop their business and entrepreneurial skills.

B.55 Edinburgh Technology Fund is the only internal source of funding for spin-outs. The Fund was established under the University Challenge Fund competition and also covers the Moredun Research Foundation, Roslin Research Institute, the UK Astronomy Technology Centre and the Edinburgh Station of the British Geological Survey. ETF ran out of funds a year ago, but it is an evergreen fund so once investments are realised, the proceeds will be available for reinvestment.

**Experience with spin-outs to date**

B.56 Key elements of Edinburgh University's strategy are to:

- "increase the volume of research activity, by broadening the sources of sponsorship, whilst retaining the University's international reputation for excellence
- effectively evaluate and exploit new ideas
- establish an integrated company development programme
- maximise the local economic impact of the University's activities."<sup>23</sup>

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<sup>21</sup> However, a major proportion of this income came from one achievement – the vaccine against hepatitis B (the first vaccine of this kind, developed by Professor Sir Kenneth Murray)

<sup>22</sup> [www.research-innovation.ed.ac.uk](http://www.research-innovation.ed.ac.uk)

<sup>23</sup> *Annual Review 2001/02*, Edinburgh Research and Innovation Limited, The University of Edinburgh

B.57 In the commercialisation strategy, both technology transfer and research exploitation through spin-outs are prioritised alongside increasing the base of research income. The decision to select the spin-out route, i.e. give a new company a licence to exploit university IP, takes pragmatic account of several factors. The aspirations of the academic(s) involved are important but so is the relative achievability of the licensing route compared with a spin-out backed by angel investors.

B.58 In practice recent numbers of spin-outs and start-ups have been as follows (start-ups would, typically, be by post graduates as the University does not own their IP):

	Spin-out	Start-up
2001/02	4	11
2002/03	4	8
2003/04 (expected)	4?	6?

### External linkages

B.59 ERI has a number of important external linkages that support spin-out activity. The Scottish Enterprise programmes mentioned in paragraph B.47 have both been important in Edinburgh and helped foster fruitful collaboration with both SE and SEEL. In the finance sphere there is an active and fruitful link with Braveheart, a grouping of Scottish Business Angels and there also good relationships with most of the active VC firms.

B.60 There are several supportive property-based initiatives of value to the spin-out route:

- *the Edinburgh Technology Transfer Centre (ETTC)* adopted a new entry/exit policy in 2001/2002, which resulted in a healthy ‘churn’ of companies, with 7 of the 14 companies moving on
- *the Scottish Microelectronics Centre* (opened in 2000 on the University’s King’s Buildings campus) is a centre for Research & Development and incubation in the semiconductor sector. It is a joint venture between the University, SE and SEEL
- *the Edinburgh Technopole*, the University’s science and technology park, was re-launched in 2001/2002. As well as catering for demand from within the University, its aim is to attract R&D based companies that are currently engaged with or have a potential to be engaged with the University.

### Current reflections and future plans

B.61 Looking forward, a target of 5 spin-outs a year seems reasonable; but, of these, only one every two years would be a top-tier spin-out - requiring in the region of £2 million funding from day one. (It should, however, be noted that, in early 2004, the dearth of early stage funding is

inhibiting spin-out activity.) If this target is compared with the data in paragraph B.58, it is worth noting that start-ups may become spin-outs – when it has been realised that important background IP has been contributed by the research supervisor! Moreover, the University has recently moved away from a simple equity stake in spin-outs towards a royalty agreement with an equity ‘sweetener’.

- B.62 In terms of physical provision, discussions are under way to build a *BioIncubator*, offering about 10 small wet laboratories, and a *Biomedic Park*.
- B.63 Spin-outs have generated useful funds for the University, but the main justifications for the resources devoted to spin-outs are the economic and social benefits for the community at large. High levels of financial benefit for the University cannot be expected – the chances of a ‘big hit’ are too low to be factored in. Similarly, although the direct benefits from start-ups cannot be anticipated, the University devotes significant effort to helping them; as part of its local economic development mission.

#### **Related websites**

Edinburgh Research & Innovation - [www.research-innovation.ed.ac.uk](http://www.research-innovation.ed.ac.uk)

Scottish Enterprise - [www.scottish-enterprise.com](http://www.scottish-enterprise.com)

Braveheart Ventures - [www.braveheart-ventures.co.uk](http://www.braveheart-ventures.co.uk)

Royal Society of Edinburgh Enterprise Fellowships –

[www.ma.hw.ac.uk/RSE/research\\_fellowships/enterprise.htm](http://www.ma.hw.ac.uk/RSE/research_fellowships/enterprise.htm)



# Imperial College, London

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## Regional context

- B.64 London, as with many capital cities, encompasses wide economic disparities. It is the centre of UK government, the country's major tourism hub and home to many cultural institutions. In the private sector, there are concentrations of highly competitive and globally active clusters – notably in the financial and other business services. By contrast many of London's traditional sectors, especially in manufacturing have been in decline for many years, partly through out-movement (e.g. of the port and related industries) and partly through the emergence of low-cost producers overseas (e.g. in the clothing industries).
- B.65 There have been many major initiatives in London that have aimed at the physical regeneration of run-down areas. Some, for instance the redevelopment of London's Docklands, have achieved dramatic large-scale, success. There have also been many area-specific initiatives focused on skills and economic development – typically targeted on areas or groups with particular problems. The recent establishment of the London Development Agency (LDA) has, however, brought a new coherence to tackling these issues and also increased the focus on making more positive efforts to harness London's economic strengths in wealth creation.
- B.66 London has more than 30 HEIs with diverse strengths, aspirations and local linkages. One of the LDA's priorities over the past two years has been to foster closer interaction between HEI strengths and draw them more fully into wealth (and employment) creation within London. In doing so there has been constructive joint-working with the two development agencies responsible for London's natural hinterland.

## Key University data<sup>24</sup>

- B.67 The Imperial College of Science, Technology and Medicine was founded in London in 1907. The College now ranks consistently within the top 3 for UK higher education institutions for its research and teaching. The College is spread over a wide geographic area with seven central and west London campuses, and two campuses in South-East England.
- B.68 Imperial College has the following mission:

*“Imperial College embodies and delivers world class scholarship, education and research in science, engineering and medicine, with particular regard to their*

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<sup>24</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

*application in industry, commerce and healthcare. We foster interdisciplinary working internally and collaborate widely externally.”*

	FTE Academic Staff	
	Number	%
Teaching only	210	7.0
Research only	1785	59.9
Teaching & research	987	33.1
Total	2982	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	7085	67.2
UG other	97	0.9
PG taught	1535	14.6
PG research	1824	17.3
Total	10541	100

### **Research income**

B.69 The College’s total research income for 2001-2 was over £210 million with disciplines receiving the largest proportions of this funding being clinical medicine (51%), biosciences (16%), chemistry (4%), physics (7%), engineering and computing (17%)<sup>25</sup>.

B.70 Excluding HEFCE core funding for research, the balance of £153 million was brought in from the following sources<sup>26</sup>.

- Research Councils 30.7%
- Charities 31.3%
- UK central government 8%
- UK industry 13.4%
- EU government and other 6.7%
- Other overseas 7.6%
- Other 2.3%

### **Resources allocated to commercialisation and spin-outs**

B.71 All technology commercialisation activities aside from consultancy activities are managed by Imperial College Innovations Ltd<sup>27</sup>, a company with an external board, external chairman, structured as financially independently and run as a profitable business wholly owned by

<sup>25</sup> Higher Education Statistics Agency data, <http://www.hesa.ac.uk/acuk/maninfo/2001-02/totals0102.htm>

<sup>26</sup> Data from www.hesa.ac.uk for 2001/2

<sup>27</sup> Imperial College Innovations website

Imperial College. Consultancy work by academics is handled by a separate organisation, Imperial College Consultants Ltd<sup>28</sup>.

B.72 The role of Innovations is to help academics realise the full commercial potential of their academic research within the IP framework provided by Imperial College (which, in normal circumstances, means that Imperial College owns any intellectual property generated by its researchers)<sup>29</sup>. While projections are made for the number of spin-outs anticipated in a particular timeframe for resourcing purposes, no specific targets are set for number of spin-outs. The way in which Innovations work with an inventor to select between licensing to an existing business or forming a spin-out can be summarised as follows:

- If it is a single technology and there are obvious customers in the market, it makes sense to license the IP. Innovations view this as the most efficient, most cost-effective means to exploit such a technology.
- If it is a generic technology with many different applications, or if it is technology that needs substantial further funding to develop it, then the spin-out route may be a better proposition.

B.73 Innovations has around 25 FTE (both executive and support) in total. The organisation regards itself as adequately resourced but “we still find it a challenge to attract people because we do not pay ‘industrial salaries’.”<sup>30</sup> Each team member at Innovations has a responsibility for managing a departmental relationship. The company is organised into the teams as follows:

- *Technology Transfer Teams:* The two teams in this area focus on Engineering and Physical Sciences (5 people), and Medical and Life Sciences (6 people), working closely with the Business Development Team. The Technology Transfer Teams are not split into separate ‘spin-out’ and ‘licensing’ functions as Innovations have noted that it is increasingly the case that a deal with a spin-out company is a combination of a license and an equity deal.
- *Business Development Team:* Their task is to create opportunities and interface with industry at the ‘soft’ end of the business that allows people to interact effectively. This team includes 2 people focused specifically on market and competitor analysis. This team has strong links with Imperial Consultants Ltd.
- *New Ventures:* Provides incubation support for companies once formed, helping to evolve the business plan, establish the board and the executive team and promoting the opportunity. The team also works on the formation of new partnerships and joint ventures with business.

<sup>28</sup> <http://www.imperial-consultants.co.uk>

<sup>29</sup> <http://www.imperialinnovations.co.uk>

<sup>30</sup> Interview with Susan Searle, Managing Director, Imperial College Innovations Ltd, 22/10/03.

- *Asset Management and Investment*: This comprises two people (both with backgrounds in The City) whose task is to take on support for the spin-outs companies once they have raised their initial seed funding. “They are not nurturing, growing or developing. They are aggressively shareholder managing. They work closely with the firms to resolve issues as the firms go through funding rounds and need to tackle problems going forward.”<sup>31</sup>
- B.74 Imperial College does not have its own business incubator or science park, though there are plans to build an incubator within property owned by the Royal School of Mines.
- B.75 Innovations has access to a number of potential sources of funds to support the early stage growth of its spin-outs. These include the usual mix of business angels (for Imperial, this is an informal group of around 200 people that it hopes will be formalised in the near future), private funding placements, and the major venture capital funds. It currently also has three more specific sources: the Imperial College University Challenge Seed Fund (£4m), Nikko Principal Investments (£20m), and a partnership with Fleming Family and Partners which holds portfolio of shares in 34 Imperial spin outs. In addition, a new fund for life science spin-outs is currently being raised in partnership with BioScience Managers Ltd (BML).
- B.76 Imperial College Innovations form part of Development and Corporate Affairs, an organisation that oversees activities in four areas (Imperial Innovations, Imperial Consultants, Alumni Development and Environment Office). Development and Corporate Affairs provide important links for Innovations. For example, the Alumni Office is useful as many alumni are, or may become, investors, directors or chairmen. Imperial Consultants have strong linkages with the Innovations’ Business Development Team, and the Environmental Office provides links to opportunities for environment-related technologies.
- B.77 Innovations has a number of strong linkages with the Business School. One example of this is the ‘Entrepreneurs Programme’, a joint initiative with the Business School’s Entrepreneurship Centre. This provides a series of seminars, workshops and master classes to develop commercial and entrepreneurial skills within the research faculty and support staff at Imperial. The Entrepreneurship Centre also runs business plan competitions. Alumni of the business school have joined some of the Innovations’ spin-outs.
- B.78 The Research Support & Development Division assists the academic staff of Imperial College with the procedures and processes involved in securing research funding, providing consultancy services to industry, handling intellectual property and commercial exploitation of the same. To do this, the Division links together the work of four organisations: Research Grants & Contracts, Research Accounts, Imperial College Innovations, and Imperial College Consultants. From the standpoint of IP management, the links between Innovations and Research Grants and Contracts are particularly important.

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<sup>31</sup> Interview with Susan Searle, Managing Director, Imperial College Innovations Ltd, 22/10/03.

### External Linkages

- B.79 **Nikko Principal Investments Limited:** Nikko has allocated £20 million for investment in Imperial College early stage spin-out companies. Nikko provides not only money but a platform for entry into Far Eastern markets.
- B.80 **Fleming Family and Partners (FF&P)** acquired a 30% interest in a portfolio of shares held by Imperial in 36 companies (spin outs created over the period 1996 - 2000). These shares are held through a partnership of which Imperial owns 70%. The partnership has a board and a portfolio management structure. It draws on a pool of experienced non-executive directors to support the development of the companies.
- B.81 **BioScience Managers Limited (BML)**, the specialist bioscience fund manager, and Imperial College have a joint initiative to raise a new venture capital fund focused on early stage medical and life science companies. The Fund will have exclusive preferential access to opportunities emerging from Imperial College in the medical and life sciences sectors.
- B.82 **Industry partners** – there are around 30 ‘large relationships’ between Imperial College and industry partners that provide useful links for Innovations’ activities. These include joint activities with GSK, BP and Shell. In addition, the corporate venturing groups within various multinational companies are proving to be useful partners for Innovations spin-out companies. These have included Unilever Ventures, Nokia Ventures and Mitsubishi.
- B.83 **London Technology Network** – The Managing Director of Innovations is a board member of the London Technology Network (LTN), along with the directors of UCL Business and KCL Ventures. The LTN is a publicly funded initiative that creates links between industry and 19 London HEIs. It does this through running a Business Fellows Programme – academics who are trained to map the technologies of their department and liaise with industrialists - and organising pan-London technology showcase events. These activities are linked with Innovations’ Business Development Team.

### Experiences with spin-outs to date

- B.84 Innovations has spun-out 55 ventures in the previous five years of which 2 have failed.
- B.85 In addition to direct funds coming back to the College from sale of shares (either through trade sale or floatation), royalty income and dividend payments, Innovations also views the following as benefits delivered back to the College through spin-outs:
- research funding from the spin-outs (this is now the fastest growing sector of industrially-sponsored R&D for Imperial);
  - the founders (the academics) have themselves made money;
  - there is a positive impact upon the culture of the College that is perceived as helping the College attract and retain good academic staff;

- students have the chance to work with Imperial spin-outs, and a growing number choose to join these companies when they graduate.

### **Current reflections and future plans**

- B.86 Imperial College Innovations takes a very commercial approach to supporting spin-outs and has built a strong support network to help ensure that the spin-outs have not only a good start, but access to the resources they need to continue their growth. The formation of the partnerships with Nikko, FF&P and GHAM, and BioScience Managers Ltd have the potential to help ensure that Innovations-driven high growth spin-outs are appropriately funded through to later stages.
- B.87 ‘Middle-of-the-road’ firms (i.e., those that may have a good commercial offering but are not predicated to show the level of growth required from venture capital) still face some challenges: “One has to treat these opportunities differently. [...] Where do they go to fund a business opportunity because they are unable to attract VC funding? Does one look to SMART awards? They are not in a position to borrow from the bank generally.”<sup>32</sup>
- B.88 Innovations do not feel that there is necessarily a shortage of management talent to run their spin-outs ventures as they are able to draw on a wide pool through their alumni network and investors will help bring in good people. “We have to grow our own pool of entrepreneurs in the UK. [...] There are good people here who, if encouraged in the right way, can build good businesses.”<sup>33</sup>

### **Related websites**

Imperial College – [www.ic.ac.uk](http://www.ic.ac.uk)

Imperial College Innovations Ltd – [www.imperialinnovations.co.uk](http://www.imperialinnovations.co.uk)

Imperial College Consultants Ltd – [www.imperial-consultants.co.uk](http://www.imperial-consultants.co.uk)

Imperial College Entrepreneurship Centre – [www.ec.ms.ic.ac.uk](http://www.ec.ms.ic.ac.uk)

London Technology Network – [www.ltnetwork.org](http://www.ltnetwork.org)

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<sup>32</sup> Interview with Susan Searle, Managing Director, Imperial College Innovations Ltd, 22/10/03.

<sup>33</sup> Interview with Susan Searle, Managing Director, Imperial College Innovations Ltd, 22/10/03.

# Loughborough University

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## Regional context

- B.89 Loughborough is one of the industrial towns in the East Midlands region. It is not the largest, being smaller than both Leicester and Nottingham (the administrative centre for the region). The town has strong traditions in both electrical and mechanical engineering. Larger firms have, in common with many UK manufacturers, tended to reduce their employment levels over the past two decades. However there is still a substantial presence of engineering activity and the national research laboratory for British Gas is located in the town (adjacent to the university campus).
- B.90 Loughborough University, has for many years, been recognised widely as ranking highly amongst the UK's centres of sports education. The other academic fields in which it is best known relate to various aspects of engineering and manufacturing; which have kept it in close contact with industry. In common with other regional development agencies, the East Midlands Development Agency (EMDA) has identified increased innovation in industry as important to its strategy and, in consequence, its policies have been favourable to the region's universities, including Loughborough.

## Key University data<sup>34</sup>

- B.91 Loughborough is research-intensive university with all departments having a strong research base and contribute to an international reputation with particular strengths in the fields of Built Environment, Social Science and Sports Science. There are 24 academic departments and over 30 Research Institutes and Centres.
- B.92 The mission of the University is: “ *To increase knowledge through research, provide the highest quality of educational experience and the widest opportunities for students, advance industry and the professions, and benefit society.*”

### *Ethos*

*This is characterised above all by:*

- *a physical and intellectual environment that allows academic freedom and scholarship to flourish, promotes the professional development of staff, and enables the comprehensive care and support of students in partnership with Loughborough Students' Union*

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<sup>34</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

- *a strong involvement with industry and the professions through research and teaching, consultancy and training, to provide direct support for wealth creation, social advancement and cultural development*
- *a unique contribution to the development of a wide range of sports, allowing exceptional opportunities for participation and achievement at every level.*”

	FTE Academic Staff	
	Number	%
Teaching only	47	5.1
Research only	352	37.8
Teaching & research	531	57.1
Total	930	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	9294	82.5
UG other	19	0.2
PG taught	940	8.3
PG research	1014	9.0
Total	11267	100%

### **Research Income**

B.93 Annual research income (including HEFCE core funding) is in the region of £39 million. The latest data that break down the non-HEFCE contributions are (from HESA) for 2001/02. In that year they totalled about £25 million with the following proportions:

- Research Councils 33.0%
- Charities 5.1%
- UK central government etc 26.0%
- UK industry 24.0%
- EU government and other 6.3%
- Other overseas 2.7%
- Other 2.9%

B.94 The high proportion from corporate research sponsorship testifies to good links with industry. The UK Central Government category includes significant DTI funding for research in the social sciences (Loughborough has a large policy department). The low figure for income



from charities reflects the fact that the University does not carry out research in the life sciences.

***Resources allocated to commercialisation and spin-outs***

- B.95 Loughborough University commercialisation strategy has three strands: an IP office; Loughborough University Enterprises Limited (LUEL); and Loughborough Innovation Centre. Loughborough was one of the first universities in the UK to offer consultancy services, dating from 1969. The IP office was set up in 1997, and has since taken over the management of the consultancy services offering. LUEL sits within the Division of Business Partnership, Innovation and Knowledge Transfer, and is co-located, but not linked, with Research Services.
- B.96 There is no one specific university resource for spin-outs; responsibility is split across three or four people. The total resource allocation for spin-outs is approximately 1.5 FTE staff. LUEL is under-resourced in this aspect, as their director sits on the board of 15 different spin-out companies at present (the university wishes to have a presence on each board, but LUEL have difficulty in finding other staff who are willing to donate their time).
- B.97 The university does not allocate any money to spin-out or patenting activity – there is no patent budget. LUEL receives only £125K from University funding, but with this they are the most efficient technology transfer office in the UK (see the Nottingham Business School Report). LUEL does retain the margin that it makes on consultancy but, even given this, only just about breaks even. Loughborough University is pushing for LUEL to become self-financing.
- B.98 A joint bid to the second round of the University Challenge Fund with Loughborough as lead institution (the others being Nottingham, Nottingham Trent, Leicester and De Montfort Universities) was awarded £4 million - now branded the ‘Lachesis’ fund. There are currently discussions with EMDA to top this up by 50% (with £1 million each to come from EMDA single pot funding and from ERDF monies; as parts of the area qualify). To date £1 million has been committed.
- B.99 The Gatsby Charitable Foundation has provided Loughborough with seed corn money to which spin-outs can apply for grants of up to £45K, solely to cover researchers’ time. Gatsby donated first £200K and then £300K, which was augmented by the university with £50K and £100K respectively. Small amounts of money (up to £15K) are also available to Loughborough spin-outs through HEIF funding (HEROBAC innovation and regional fellowships).
- B.100 Loughborough Innovation Centre has been running at the University for just over one year, and is wholly owned by the University (LUEL currently retains the profits). At present it is operating from 20-30,000 sq ft and occupied by twenty-four companies When the final phase

of refurbishment is completed the total will increase to 40,000 sq ft: The Centre operates a policy of 'easy-in, easy-out', with escalating rents over 3-4 years (year one rents are currently £12 per sq ft and will rise to £16 in year 2 and £21 in year 3). Companies must have some link to the University, though they do not need to be based on University IP. Within the Centre there is a hot desk area containing 2-3 student start-ups, and the feeling is that this facility will attract more as it becomes better known amongst the student body.

B.101 LUEL has few internal links at present, although one member of staff currently works jointly between the Business School and LUEL as Student Enterprise Officer. The Student Enterprise Challenge is also run through the Business School.

***Experience with spin-outs to date***

B.102 Since early 1997, 24 companies have spun out (there were only two prior to this). The University has equity holdings in all of them. These are distinct from any UCF stakes, as the University does not recognise these as 'equity holdings' – the approach to UCF tends to be made post-incorporation.

B.103 Of the 24, two companies have been wound up. One of these was through a creditors' voluntary agreement. The company was a student start-up which ran well for 2-3 years, and was a global business with large UK stockists for its product. However, the product was delivered on a sale or return basis and the product was manufactured in China; and these two factors combined made for a dreadful cash flow. In retrospect, the spin-out route is still adjudged to have been the right one; the problems lay with the management team. The University investment of £25K was lost but there was good PR in the early days of the company. The other company that is no longer trading was a joint venture between an academic and a local company. A clash of personalities led to the company closing after eighteen months; in this instance the University only lost the time that had been spent.

B.104 Of the current trading companies, there is none for which LUEL feels it clear cut that a licensing agreement would have been better (there is one case that in retrospect is at the margin). Some of the companies are, however, likely to have rather little growth potential – as their founders' ambitions are limited.

B.105 As yet the University has had no returns on its equity stakes – there have been no sales, no floatations, and no dividends paid. There have been other, less tangible, returns (for instance media coverage and raising the internal profile of the entrepreneurial option. These are very difficult to quantify, but LUEL is currently trying to come up with different ways of monitoring them.

## External linkages

B.106 The main external links are as follows:

- there are strong links with both EMDA and the Government Office for the East Midlands
- LUEL runs an enterprise club (with networking as a major purpose) for the local business community, mentors and investors. There are currently 300-400 members, and approximately 40 of these attend the regular monthly meetings
- Astra Zeneca has a large pharmaceutical R&D site in Loughborough; one of their technology managers sits on the LUEL board, and the company sponsored the Innovation Centre
- with the Borough Council (including the Loughborough Advance Technology Initiative) and with the County Council.

B.107 The relationship with Business Link is poor, as LUEL has found that the average calibre of BL executives is not appropriate for companies spinning out of university research.

## Current reflections and future plans

B.108 The University has in the past pushed licensing activity rather than spin-outs, but this approach has now changed, partly as a response to where the maximum financial benefit is thought to lie, and where funding can be sought (e.g. from EMDA). LUEL has a target of six spin-outs annually, although LUEL has some doubts as to whether quantitative targets for spin-out activity are appropriate.

B.109 The quality of the idea underlying the spin-out, and the firm's consequent potential, should be rated as more important than the number of spin-outs. If the latter is seen as the priority, companies' may be formed at an earlier stage than is perhaps appropriate. The attractiveness of SMART awards may also pull in this direction. There are, however drawbacks with licences as well. If the licensee company runs into problems, it is often the new products, or those under development, that are the first to be trimmed.

B.110 The Vice-Chancellor at Loughborough is committed to the future of LUEL, and the commercialisation of University research, but there have been problems convincing the next tier down (the senior management team) as to the importance of the 'third mission' of universities in the present climate. Many of them do not see the case for diverting efforts from teaching and research (Loughborough has increased its academic standing in recent years thanks to strenuous efforts in these two areas).

- B.111 Current attention is being paid to improving links within the university. The Business School now has two senior lecturers covering entrepreneurship in small businesses and there is scope for setting up an Entrepreneurship Centre with the Business School as lead partner. Initial research into this has already been undertaken, including a Gatsby-funded trip to North Carolina to examine developments there. LUEL also hopes to engage members of the Business School with the companies in its spin-out portfolio.
- B.112 Finally, LUEL is currently in discussion with EMDA on the possible provision of funding for a pool of non-executive director calibre people; who can be drawn upon to provide useful inputs into university spin-outs.

**Related websites**

Loughborough University Enterprises Ltd - [www.lboro.ac.uk/business/luel](http://www.lboro.ac.uk/business/luel)

Loughborough Innovation Centre - [www.loughborough-innovation.co.uk](http://www.loughborough-innovation.co.uk)

# University of Newcastle upon Tyne

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## Regional Context

B.113 The North East region’s economy has, for many years, been undergoing processes of structural change. These have been assisted by public sector initiatives aimed at physical development and the attraction of inward investment (especially from overseas). Newcastle’s Urban Development Corporation spearheaded a major programme of regeneration along the river Tyne. The Northern Development Company, now incorporated within the regional development agency One North East (ONE), was seen as amongst the most effective regional partnerships seeking to promote investment.

B.114 Leading figures from Newcastle University have had active and longstanding involvements in the region’s development efforts, and initiatives have been promoted to make university expertise available to firms and to the public sector. This approach continues, strengthened by the priority given in ONE’s regional economic strategy, to harnessing the universities as leading resources for economic development. ONE is investing substantial resources in centres of excellence in selected technologies that will augment the universities’ efforts in applied research and development.

## Key University data<sup>35</sup>

B.115 The University’s mission is: *“To be a world-class, research-intensive university, to deliver teaching of the highest quality and to play a leading role in the economic, social and cultural development of the North East of England.”*

	FTE Academic Staff	
	Number	%
Teaching only	45	2.6
Research only	773	44.1
Teaching & research	935	53.3
Total	1753	100%

Source: www.hesa.ac.uk for 2001-2002-2002

	FTE Students	
	Number	%
UG first degree	10786	73.1
UG other	926	6.3
PG taught	1697	11.5
PG research	1353	9.1
Total	14762	100%

<sup>35</sup> Staff and student numbers are give as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

**Annual Research Income**

B.116 Annual research income (including HEFCE core funding) is in the region of £79 million. The latest data that break down the non-HEFCE contributions are (from HESA) for 2001/02. In that year they totalled about £51 million with the following proportions:

- Research Councils 24.5%
- Charities 26.3%
- UK central government etc 28.4%
- UK industry 7.9%
- EU government and other 7.6%
- Other overseas 3.8%
- Other 1.4%

B.117 Life sciences, including medicine, account for approximately 50% of research expenditure.

**Resources allocated to commercialisation and spin-outs**

B.118 Within the Business Development Department there are five executives working on the various forms of technology transfer, with three support staff and about 20% of the director's time. There are active plans to double this team to a total of 10 full-time executives (including an IP specialist). When the full complement is in post, it is expected that their time would be allocated as follows:

- 45% on licensing,
- 20% on R&D deals
- 35% on spin-outs (i.e. about 4 FTEs).

B.119 At the present time there is no other post within the University specifically concerned with promoting or assisting spin-out companies, though there are significant links within the University to:

- the Centre for Life, located in the Bioscience Centre, where six spin-out companies have located in the incubator facilities
- the Institute for Nanotechnology which has a small suite of office accommodation for spin-outs (currently fully occupied)
- the Enterprise Centre, which focuses on graduate enterprise.

### **Experience with spin-outs to date**

- B.120 There was no spin out formed by the University between 1998 and 2000 apparently because of a tacit disinclination for the University to take stakes in spin-out companies. Prior to that there had been a more active stance and positive outcomes from spin outs have included an equity realisation from Nova Castra (founded 1989) from which the University gained £5-6 million in 2002/2003. Since 2000 considerable effort has been put into the spin-out route and 15 companies have been formed; though a number of them should be seen as vehicles for technology development, rather than companies that will become significant producers/employers.
- B.121 The current policy is to avoid reaching too early a decision as to which commercialisation route will be best. It may take 6 months or so before an informed decision can be taken. The technology needs to be properly understood before its range of applications can be considered and this may involve dialogue with a number of companies (perhaps before an NCD is sought) on the basis of what the technology can achieve rather than how it will do so.
- B.122 A target of 4 - 7 spin outs a year from now is judged to be realistic; bearing in mind that the interests of the university should be taken into account and not just those of the individual academic. Only about one third of these spin outs would be expected to have an aggressive high growth business potential. Of the remainder, half would be serious businesses, but expected to grow more gently, and half to be research development vehicles.

### **External linkages**

- B.123 The main external links for the University's commercialisation efforts are with:
- the regional Centres of Excellence set up by ONE (the RDA)
  - NorthStar – an RDA initiative whose funding includes a proof of concept fund, a co-investment fund (alongside VCs) and a strategic regional fund (for projects with major employment potential)
  - Northern Enterprise Ltd - the only VC fund based in the region (they also operate a small seed fund to which there is university input)
  - Durham University which, with Newcastle, runs a Science Enterprise Centre with a strong focus on enterprise education. The two universities also discuss the technologies they hold so as to consider possibilities for joint ventures, collaborations, etc. (Newcastle University sees advantage in holding similar discussions with other HEIs in the region)
  - companies that have close links to the University. For instance. Arrow Therapeutics part-sponsors academic posts so as to free up the post holder's time for business development.

### **Current reflection and future plans**

- B.124 A lack of business management expertise in the practicalities of establishing a new company is one of the challenges that spin-outs often face. There have been two instances so far of seconding time from members of the commercialisation team into spin-outs as ‘shadow’ postholders to help meet the need for technical and commercial management capacity whilst proof of concept work is being undertaken. Another approach is to provide specific consultancy support on a project basis for business strategy development by a specialist from outside the commercialisation team. With either approach, time could either be charged at cost or, possibly, be compensated through an enhanced equity stake.
- B.125 Newcastle University now insists on the right to nominate a director to the Board of a spin out, though there is no fixed policy as to whether or not this should be a member of the commercialisation team. Newcastle’s broad approach is to develop continuity in the relationship between the spin-out and the university.
- B.126 Effort is now being put into harnessing the University’s post-doc community – currently 850 strong – to see whether a proportion (say 10%) can be catalysed into becoming ‘potential business development managers’. At the same time, potential interest that university alumni (from a variety of age groups) may have in forming a business is being actively canvassed. Two recent weekend events attracted 40 people and (in Spring 2004) 50 attendees.
- B.127 To ensure that spin outs are set in a broader frame, it will be appropriate to set targets for the number (and value) of agreements for research funding secured as a result of the University’s IP position and to set target for licenses. Doing so and tracking/publicising all the targets can help to encourage balanced thinking and guard against overmuch focus on spin-outs at the expense of other routes to commercialisation.

### **Two Cautions**

- B.128 There is a common misconception that the spin-out route will be more resource intensive. In practice, developing and taking forward a good licensing plan can be just as time-consuming as a spin out. A proper business plan with performance milestones is also essential for a major licensing opportunity and care needs to be exercised in evaluating the suitability of the company taking the licence. This can easily require two months of effort spread over five to six months.
- B.129 It is often asserted that the pay-back from commercialising life sciences research will, inevitably, take longer to emerge than is the case from other disciplines. This assertion should not be accepted uncritically; complex physics-based technologies can take equally extended time periods.



**Related websites**

University of Newcastle upon Tyne - [www.ncl.ac.uk](http://www.ncl.ac.uk)

One Northeast - [www.onenortheast.co.uk](http://www.onenortheast.co.uk)

North East Centre for Scientific Enterprise - [www.dur.ac.uk/scientific.enterprise](http://www.dur.ac.uk/scientific.enterprise)

Northern Enterprise Ltd - [www.nel.co.uk](http://www.nel.co.uk)

# University of Oxford

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## Regional Context

- B.130 Oxfordshire is part of the prosperous south east region. The area has, however, experienced considerable change as a result of two factors – ownership changes in the traditional motor industry based in Cowley and many changes in the nearby establishments that lead the UK’s nuclear energy research. The area around the city of Oxford has a number of major government research establishments, principally focused on the physical sciences, which mean the scientific research ‘community’ is significantly greater than the size of Oxford University itself would imply.
- B.131 Whilst there have, for many years, been strong connections with national research policy, it is only since the establishment of the South East England Development Agency (SEEDA) that the area and its institutions have been actively ‘courted’ as contributors to regional development. Prior to this, however, there were notable successes in commercialisation of university expertise – the most notable being Oxford Instruments. The success of this company, founded in 1959, and the vision and philanthropy of its founders (Martin and Audrey Wood) led to the establishment of the Oxford Trust – which has pioneered local economic and social development initiatives.

## Key University data<sup>36</sup>

- B.132 The University of Oxford is the oldest English-speaking university in the world and has the following mission: *“[The University] aims to achieve and sustain excellence in every area of its teaching and research, maintaining and developing its historical position as a world-class university, and enriching the international, national, and regional communities through the fruits of its research and the skills of its graduates. In support of this aim, the University will:*
- *provide the facilities and support for its staff to pursue innovative research, building upon Oxford's outstanding research record, by responding to developments in the intellectual environment and society at large, and by forging close links with the wider academic world, the professions, industry, and commerce;*
  - *promote challenging and rigorous teaching which benefits from a fruitful interaction with the research environment, facilitating the exchange of ideas through tutorials and small-group learning and exploiting the University's resources in its libraries,*

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<sup>36</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

*museums, and scientific collections, to equip its graduates to play their part at a national and international level;*

- *maintain and make best use of the advantages of its independent colleges, where members' intellectual and personal development is fostered within a stimulating, multidisciplinary academic community, and academic life is strengthened through the provision of high-quality support services;*
- *attract students of the highest calibre, from the UK and internationally, to its undergraduate, graduate, and continuing education courses, widening access by actively seeking applications from students from diverse backgrounds and extending further the many and varied opportunities for life-long learning offered in the Oxford region and more widely.”*

	FTE Academic Staff	
	Number	%
Teaching only	0	0
Research only	2143	61.9
Teaching & research	1320	38.1
Total	3463	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	11261	65.9
UG other	904	5.3
PG taught	1734	10.1
PG research	3195	18.7
Total	17094	100%

### **Research income**

B.133 Annual research income (including HEFCE core funding) is in the region of £219 million. The latest data that break down the non-HEFCE contributions are (from HESA) for 2001/02. In that year they totalled about £150 million with the following proportions:

- Research Councils 32.9%
- Charities 37.4%
- UK central government etc 8.0%
- UK industry 7.9%
- EU government and other 5.4%
- Other overseas 7.7%
- Other 0.8%

B.134 Medical sciences alone account for almost 60% of total research expenditure and life/environmental sciences a further 20%.

***Resources allocated to commercialisation and spin-outs***

B.135 Isis Innovation<sup>37</sup> is a wholly owned subsidiary of the university and works closely with the research services office. Unless there are other pre-existing arrangements for exploitation, the university assigns its IP to Isis; which then is responsible for evaluating, protecting and marketing the IP.

B.136 Isis employs 35 FTE staff of whom about half are involved with spin-out formation activities. In addition to the Isis staff, significant time is devoted to spin-outs from staff in research services and the Oxford Science Enterprise Centre (OxSEC) whose chairman is Isis' Managing Director. In total, some 20-25 FTE staff work on spin-out activities within the University of Oxford.

B.137 OxSEC is based at the Said Business School and encourages entrepreneurship through an Enterprise Programme that offers:

- entrepreneurship and business skills courses – the Basics of Building a Business course is an 8-week free business training course aimed at scientists, which covers good business practice with a focus on science entrepreneurship. The course is for all students and staff of the university and members of the Oxford business community. Although it is designed particularly around technological enterprise, most course material is relevant to all businesses
- specialist seminars to discuss the innovation potential within certain technology-based disciplines, and/or look at the research issues from the perspective of industry. These two-way seminars aim to provide a meeting point between academia and industry; they focus on the University's core research strengths and Oxford's regional economic clusters (which include nanotechnology, biotech, multimedia and internet technologies, supercomputing, and engineering)
- OxSEC also manages the Oxford University business plan competition for Venturefest Ltd (an annual event for entrepreneurs)<sup>38</sup>. The competition seeks out the best new marketable business ideas, to be judged by a panel of specialist investors. Entries are invited from entrepreneurs, scientists, students and new companies.

B.138 There are also strong internal links with the University-owned Begbroke Science Park; a major land and facilities acquisition which is to be the focus for Oxford's material sciences and where there is an innovation centre and a business incubator. There are currently 5 university spin-out companies at Begbroke.

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<sup>37</sup> [www.isis-innovation.com](http://www.isis-innovation.com)

<sup>38</sup> [www.venturefest.com](http://www.venturefest.com)

B.139 The main ‘internal’ sources of funding for spin-outs are:

- *the University Challenge Seed Fund (UCSF)*. This started in 1999 and its £4 million is now fully committed. 68 investments (ranging from £2.5k to £250k) have been made, so far leading to 21 spin-outs and 4 licence deals. UCSF investments have attracted a total of £20.4 million from business angel and VC investors
- *Isis College Fund* - a £10.7 million fund, with £1 million from the University and £9.7 million from 27 colleges. The money is dedicated to second round of financing of Isis spin-outs and is a regulated fund run by a venture capital firm (Quester).

### **Experience with spin-outs to date**

B.140 Isis, founded in 1988, was radically overhauled and expanded in 1997. This enabled much more effort to be put into P.R. and awareness-raising within the university. Isis staff actively look for opportunities for informal networking with university researchers and there tends to be a champion amongst the researchers in each department. Isis invests, typically, £1.5 million per year on patents; though some of these costs are clawed back from licensing.

B.141 Prior to 1997 there had been a number of important spinouts, including Powderject from which the university recently made a substantial capital gain, but numbers were small – at most one in a typical year. From 1998 on, numbers have risen sharply with an average of 6 a year from 1998 to 2003. All were still trading after five years. This is partly because they have all had to pass the scrutiny of external investors. Whilst a minority of the Isis companies have been supported by the UCSF, all have had to attract significant private funding – typically from angel investors. The university itself, via Isis Innovation, supports and manages the creation of new firms, frequently licensing IPR to the companies, but does not invest cash.

### **External linkages**

B.142 External linkages are sustained through three specific initiatives:

- the Isis Spinners club, which meets occasionally, inviting managers of existing spin-outs to come together to share their experience
- the Oxford Innovation Society provides member companies (annual fee c£7,000) with a ‘window’ on Oxford science. In addition to a range of focused communication activities, OIS’s regular dinner meetings “*provide a unique environment for constructive dialogue between business leaders, investors and top University scientists*”
- Isis Angels Network is a not for profit company that offers free Network membership and seeks to keep active contact with individuals and companies who may be

interested to invest, serve as nominee directors or provide interim management expertise to spin-outs.

- B.143 There is in addition a specific arrangement covering the Department of Chemistry where, in exchange for a substantial capital contribution IP2IPO, a company specialising in IP exploitation, is entitled to a 50% share of the University's commercialisation proceeds<sup>39</sup>.

### **Current reflection and future plans**

- B.144 Decisions as to appropriate routes for commercialising IP are pragmatic. There will be some areas, for instance platform technologies, where the spin out route is seen as the likely approach. In other instances the preferences of key academic inventors will help influence the chosen route; though the likelihood of raising realistic levels of finance may well have an even stronger bearing. With this in mind the preferred route for a pharmaceutical-related project may well be through licensing – on account of the need for money to be very patient over a long period of time. On occasion, however, this licensing strategy may itself be best achieved through a spin-out that is specifically structured to attract investment so as to fund work that will enhance the IP and possibly acquire complementary IP.
- B.145 Looking to the future the Isis approach has considerable support within the university – amongst both the administration and researchers. It is, therefore, likely to continue. The distinctive local impacts from spin-out companies (which tend to stay in the area) is recognised and seen as a relevant, though not a dominant, factor for Isis to take into account. Spin-outs (if they are successful) can be a part of the University's contribution to the local community.
- B.146 An indicative target for the future is for an average of 6 spin-outs a year. It should, however, be recognised that in some cases founding a spin-out could, from the outset, be seen as an appropriate route to subsequently securing a licensing deal.

### **Related websites**

Isis Innovation – [www.isis-innovation.com](http://www.isis-innovation.com)

Oxford Science Enterprise Centre - [www.science-enterprise.ox.ac.uk](http://www.science-enterprise.ox.ac.uk)

IP2IPO – [www.ip2ipo.com](http://www.ip2ipo.com)

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<sup>39</sup> IP2IPO has similar partnerships with the University of Southampton, King's College London and the University of York.

# University of Southampton

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## Regional context

- B.147 Southampton is the largest city in the South East of England outside London. It has a diverse economy formerly based on traditional manufacturing industries and port-related activities. Major employers in the city now include NHS hospitals, the higher education institutes, Ford Motor Company, Ordnance Survey, P&O Cruises, Skandia Life and Associated British Ports.
- B.148 Southampton is now being supported by the South East of England Development Agency as an Enterprise Hub based around photonics, electronics, telecommunications, computing, media and creative industries, and marine technologies.

## Key University data<sup>40</sup>

- B.149 The University of Southampton is one of the UK's top 10 research-led universities. It was granted university status in 1952<sup>41</sup> and is now spread across seven campuses in Southampton, Portsmouth, Winchester and the Isle of Wight. The importance of research is strongly communicated by the University which views itself as: “[...] a research-led institution in which teaching and learning take place in an active research environment.” In the last Research Assessment Exercise, Southampton was awarded 5 and 5\* in 24 of its 34 units of assessment.
- B.150 The University's mission is: *“The advancement of knowledge through critical and independent scholarship and research of international significance; The communication of knowledge in an active learning environment involving staff at the forefront of their disciplines; The application of knowledge for the benefit of society, both directly and by collaboration with other organisations”*

	FTE Academic Staff	
	Number	%
Teaching only	42	2.2
Research only	851	44.1
Teaching & research	1037	53.7
Total	1930	100%

Source: [www.hesa.ac.uk](http://www.hesa.ac.uk) for 2001-2002

	FTE Students	
	Number	%
UG first degree	10986	67.4
UG other	2326	14.2
PG taught	1744	10.7
PG research	1250	7.7
Total	16306	100%

<sup>40</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

<sup>41</sup> Until 1952, University College, Southampton had been a degree awarding branch of the University of London.

**Research income**

B.151 The University’s total research income for 2001-2002 was over £95 million with approximately one third of this funding being allocated to clinical medicine and life science research<sup>42</sup>.

B.152 Excluding HEFCE core funding from the total annual research income, the balance of just over £70 million was brought in from the following sources in 2001/2<sup>43</sup>.

• Research Councils	45.6%
• Charities	13.9%
• UK central government	12.8%
• UK industry	12.8%
• EU government and other	9.7%
• Other overseas	4.8%
• Other	0.5%

**Resources allocated to commercialisation and spin-outs**

B.153 The Centre for Enterprise and Innovation<sup>44</sup> (CEI) is charged by the University with overall responsibility for commercialisation activities. There is a separate organisation dealing with matters relating to research grants and contracts - the Research Support Office (RSO).

B.154 CEI was established in 2000 and now has around 20 staff. The organisation is led by Tony Raven, a serial technology entrepreneur, and most of the staff at CEI have come from industry. CEI’s activities are divided into four areas:

- Protecting University IP
- Commercialisation through licensing and spin-outs and knowledge transfer activities.
- Start up business incubation, support and mentoring
- Encouraging entrepreneurship in the University

There is a strong emphasis on the fourth of these activities, and this was summed up by CEI’s director: “[...] we see our remit as undertaking a cultural change within the University, to make

<sup>42</sup> Data from [www.hesa.ac.uk](http://www.hesa.ac.uk) for 2001/2

<sup>43</sup> Data from [www.hesa.ac.uk](http://www.hesa.ac.uk) for 2001/2

<sup>44</sup> The original commercial vehicle for Southampton University, Southampton Innovations Ltd, was seed funded by a donation from The Gatsby Charitable Foundation.



it a very entrepreneurial body. [...] We start at the cultural level and say; ‘the rest is a consequence of getting the culture right’”.<sup>45</sup>

B.155 The culture change activity is mainly the responsibility of the CEI’s business development and marketing team who work at all levels of the university and also interact with business, support organisations and government.

B.156 CEI has a group of business managers, all recruited from industry, that are each assigned to deal with one faculty within the University. These business managers are given free rein to interact proactively and reactively with academics from within these faculties. The rest of CEI is largely based around providing the business managers with support services, such as IP, legal counsel and investment (e.g., from investment advisor seconded to CEI from IP2IPO). The business manager will identify the opportunity and then bring together the resources from within CEI to implement the plan.

B.157 CEI views spin-outs as having two purposes:

- A standalone company whose business model is based around the development of products and services based around a technology.
- A vehicle for developing the commercial case for a technology and building a business model around licensing.

This second purpose is used to help overcome the common difficulty faced by universities in seeking to find licencees for a novel technology whose immediate application may not be obvious. Using a spin-out company as a means to develop possible application areas not only improves the likelihood of targeting appropriate potential licencees but, as the technology has been moved closer to market, it will have greater value and hence be able to generate greater returns than would have been possible when it was ‘straight from the lab’.

B.158 CEI has internal targets set for spin-outs but only in terms of limiting the maximum number supported – five to six per annum. If an academic presents an idea for a possible spin out, they are made aware the CEI only has the resource to support a limited number each year and will need to convince the CEI team that their idea has real potential.

B.159 CEI has built strong links with a number of early stage investment funds, including SULIS (£9 million), WessexBio (£400,000) and IP2IPO (£5 million).

B.160 CEI currently has two reporting lines – one on the commercial side and one on the University side. To help ensure clarity, this is currently being examined with a view to having one reporting line that takes input from both commercial and University sides. On the commercial side, CEI links in to Southampton Asset Management (SAM), a virtual company with a board

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<sup>45</sup> Interview with Tony Raven, Director of CEI, 14<sup>th</sup> November 2003.

of directors and of which the CEI director is unpaid Chief Executive. SAM is responsible for managing the investment assets of the University.

- B.161 On the academic side, CEI has built strong relationships with the Schools of the University. Each School has been encouraged to develop an Enterprise Strategy, and most have now appointed a member of staff to take responsibility for enterprise. Each interacts with CEI's Business Managers..
- B.162 CEI has recently help set up an Institute for Entrepreneurship (IfE) which will take over the entrepreneurship education agenda and leave the core CEI team to focus technology commercialisation. This Institute is based at the business school and Professor Elizabeth Chell has been recruited in from UMIST to lead this activity. Southampton's IfE is part of the Wessex Enterprise Centre initiative, led by Bristol University.
- B.163 The University of Southampton is lead partner in the SETsquared initiative that provides business start-up support and serviced office accommodation. The other partners are the universities of Bath, Bristol and Surrey, and together they have established five SETsquared centres. The businesses housed in these centres are not necessarily university spin-outs, but need to be high growth potential businesses with some research linkage to one of the four partner universities. CEI is co-located with one of the centres. This 'pre-incubation' accommodation provided by SETsquared in the first step in a chain of University-owned property that includes incubation space at its Chilworth Science Park, and then independent facilities also located on the same site.
- B.164 CEI supports the student entrepreneurship society 'Fish on Toast'. This society serves two main groups: students who are interested in learning some of the skills that they will need if they are to set up their own venture, and those that have a business opportunity they want to progress. Fish on Toast does not run a business plan competition but has raised a small fund from CEI - named 'Fish Food' - to provide very early stage funding for student business concepts. Investment decisions are made by the student organisers themselves. So far, at least four student businesses have been started with direct support from Fish on Toast, two receiving funding of up to £900 from the Fish Food fund.

### **External linkages**

- B.165 The deal that Southampton has with IP2IPO has, in the words of the CEI director, "made more difference than anything else" to the performance of CEI. IP2IPO have raised £5 million fund for investment in CEI spin-outs over a four year period, and have also taken a 20% stake in Southampton Asset Management. IP2IPO raised the fund and have seconded a member of their staff to CEI on a fulltime basis. This provides CEI with additional financial expertise, but also provides a direct link to brokers and analysts (such as EVI analyst group) to ensure that best and timely industry and technology knowledge is available to spin-outs. There are also

additional benefits resulting from the way this relationship has been structured: “Because their success is tied to our success, we also have a broker who is very motivated to do successful, private placements and, eventually, public. So the system is there without all the usual financial mechanisms, ratchets, preference, and all the rest, which would normally dilute the hell out of it.”<sup>46</sup>

- B.166 In July 2002, Southampton University joined the SULIS fund formed by the Universities of Bath and Bristol through an award made by the DTI from the second round of the University Challenge Fund. The fund has around £9 million to invest in amounts of up to £250,000 per spin-out.
- B.167 Through the DTI’s Biotechnology Exploitation Platform (BEP) programme, Southampton have joined with the universities of Brighton, and Bournemouth, and the Southampton University Hospital Trust to create WessexBio, a collaboration to exploit life science technologies.
- B.168 There is no strong Business Angel network in the Southampton area, but CEI is developing a relationship with the Solent Investment Opportunity Network (an off-shoot of the Oxford Investment Opportunity Network). The University also runs its own investor presentation day annually in London. The 2003 event was attended by over 40 early stage venture capitalists.

#### **Experience with spin-outs to date**

- B.169 Since 1997, Southampton has spun-off 10 firms of which one has been sold.
- B.170 Spin-out companies supported by CEI have delivered benefits back to the University beyond purely financial. In the words of the CEI director: “Our spin-out companies are some of our largest funders of research in the University, and some of our biggest employers of graduates from the University. That feedback loop is very strong and we encourage that”<sup>47</sup>. An example of this can be seen in spin-outs from one of Southampton’s strongest research areas, optoelectronics. These companies are able to access the high cost capital equipment at the Optoelectronics Research Centre (ORC) through research collaboration agreements. Strong, ‘symbiotic’ links are encouraged between spin-outs and the research base, and great care is taken to ensure that potential conflicts of interest are managed and that all interactions are appropriately costed. The nature of these links has allowed at least one spin-out company to apply their technology into new application areas by being able to draw on the wide research base of the University, facilitated by CEI.
- B.171 The most successful of the Southampton spin-outs is Offshore Hydrocarbon Mapping plc (OHM), which floated on the alternative investment market of the London Stock Exchange in March 2004, raising £10 million for further development. The company now has a market

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<sup>46</sup> Interview with Tony Raven, Director of CEI, 14<sup>th</sup> November 2003.

<sup>47</sup> Interview with Tony Raven, Director of CEI, 14<sup>th</sup> November 2003.

capitalisation of over £80 million, equivalent to over 20% of the money invested by the DTI in enterprise since 1999. OHM plc has supported four postgraduates at the Southampton Oceanography Centre (SOC), two of whom have finished their PhDs and are now working for the company. On floatation, the University was asked to sell some of its stake in OHM in order to make way for institutional investors. The money raised will support capital purchases both for the School of Ocean and Earth Sciences at SOC and for postgraduate support across the university.

### **Current reflections and future plans**

- B.172 In relation to performance measures for spin-out activities, the following comment was made by the CEI director: “There are no targets. We focus on what we believe is the right quality of activity to achieve the result. So if we do no spin-outs this year, we’re fine. If there’s nothing good enough, we shouldn’t be spinning it out. [...] Our measure of success is that we produce something where independent external investors support our judgement”<sup>48</sup>.
- B.173 It is recognised that the real impact of spin-out activity will not be measurable in less than five, or possibly ten years. Consequently, CEI is seeking to ensure that its activities are strongly embedded within the University to help maintain a long term perspective.
- B.174 The approach of focusing efforts on driving culture change within the University is perceived by CEI as paying dividends in a number of ways. Firstly, they observe a ‘bubble up’ of academics and students coming to CEI with ideas and opportunities. Secondly, CEI reports that academics are attracted to Southampton because they like its positive environment for the support of research commercialisation. Finally, students are reporting that potential employers are seem to favour ‘commercially savvy’ graduates such as those that have actively participated in entrepreneurship programmes.
- B.175 CEI is seeking ways to build stronger relationships with the local business community to help ensure that CEI’s activities are viewed as a positive contributor to regional economic development. A substantial project to engage the local and national business community is underway and will be rolled out over the course of the next nine months. The first deliverable from this project is a business focused expertise and service portal, University2Business, which allows businesses to search for university expertise either at Southampton or across those HEIs in the South who have joined the project<sup>49</sup>.

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<sup>48</sup> Interview with Tony Raven, Director of CEI, 14<sup>th</sup> November 2003.

<sup>49</sup> <http://www.soton.university2business.co.uk/>

**Related websites**

Centre for Enterprise and Innovation – [www.cei.soton.ac.uk](http://www.cei.soton.ac.uk)

‘Fish on Toast’ Student Entrepreneurship Society - [www.fishontoast.com](http://www.fishontoast.com)

SETsquared – [www.setsquared.co.uk](http://www.setsquared.co.uk)

IP2IPO – [www.ip2ipo.com](http://www.ip2ipo.com)

Chilworth Science Park - [www.chilworthsciencepark.com](http://www.chilworthsciencepark.com)

# University of Strathclyde

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## Regional Context

- B.176 Scotland, in general, has been ahead of the UK in recognising the importance of its universities as assets in regional economic development. There was a comprehensive review of international good practice in the mid 1990s which led to the Technology Ventures Initiative through which university interactions with business were encouraged by discrete projects and initiatives.
- B.177 In addition, two Scotland-wide programmes were established (and are still in operation) that seek to stimulate research commercialisation – with an emphasis on generating spin-outs. The Scottish Enterprise Proof of Concept Fund provides research funding and active guidance for projects where the research appears to have commercial potential and the researcher is committed to pursuing it. The Royal Society of Edinburgh Enterprise Fellowships scheme provides funding, mentoring and entrepreneurship training for researchers (typically post doctoral researchers rather than faculty members) who have research that can, within 12-15 months, be developed into a business plan that can attract funding. The most recent initiative is to establish a small number of Intermediate Technology Institutes that will commission research of commercial significance to help redress the low level of BERD.
- B.178 Regional offices within the Scottish Enterprise network have had considerable discretion in determining their economic development priorities. Scottish Enterprise Glasgow (SEG) has been a pioneer, over many years, in providing funding to encourage the city’s universities to increase their contributions to the local economy by:
- enhancing the quality of their academic standing by inter-institutional collaborations
  - investing resources in the commercialisation of research and expertise.
- B.179 In addition to providing (limited) direct funding, SEG has actively sought to ensure the provision of incubation, innovation centre and science park space for technology-based businesses, together with appropriate advisory services for firms.

## Key University data<sup>50</sup>

- B.180 The origins of the University of Strathclyde stem back to 1796, but its Royal Charter dates from 1964. Its mission is as follows: “*The University of Strathclyde was founded in Scotland*

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<sup>50</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

as a place of useful learning, to make higher education available to all, and to combine excellence with relevance. In fulfilling this mission in today's world it will :

- **Contribute** to the advancement of the knowledge society, to social cohesion and to the quality of life in Scotland, and in the wider national and global community
- **Generate**, through excellence in research and scholarship, new ideas, knowledge and skills to create opportunities for individuals and society
- **Provide** high-quality education to all of its students, regardless of background, inspiring them to develop to the full their abilities, and creating outstanding professional and creative people
- **Offer** the opportunities for all staff to develop their full potential, and contribute fully to the achievement of the University's Vision.

The University of Strathclyde aspires to be a dynamic top-ranking European University dedicated to excellence through its core mission of promoting useful learning.”

	FTE Academic Staff	
	Number	%
Teaching only	10	0.8
Research only	388	31.1
Teaching & research	848	68.1
Total	1246	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	10830	71.3
UG other	266	1.8
PG taught	3339	22.0
PG research	744	4.9
Total	15179	100%

### **Annual Research Income**

B.181 Annual research income (including SHEFC core funding) is in the region of £40 million. The latest data that break down the non-SHEFC contributions are (from HESA) for 2001/02. In that year they totalled about £22.5 million with the following proportions:

- Research Councils 34.5%
- Charities 11.6%
- UK central government etc 12.6%
- UK industry 18.0%
- EU government and other 13.5%
- Other overseas 3.5%
- Other 6.1%

B.182 Regarding funding from the research councils, EPSRC is proportionately the highest due to the traditional background of the university.

***Resources allocated to commercialisation and spin-outs***

B.183 The research and consultancy services office<sup>51</sup> employs 25 people in total, including five administrative staff. Of the remaining, 20, 10 are involved in contract and grant support, and 10 in business development. These latter 10 FTEs are responsible for the development of new research business as well as licensing and the spin-outs. On average there are probably 3.5 FTEs working with spin-outs, but the effort can fluctuate between 2.5 and 4.5 FTEs at any one point in time.

B.184 No other university staff resources are devoted to spin-outs, but there are significant internal links with:

- the Business Ventures Group (BVG) of the University Court, which has to approve all spin-outs and controls a small but flexible Commercial Development Fund
- the Hunter Centre for Entrepreneurship: an endowed academic department allied to the business school, that provides teaching and does research relevant to entrepreneurship
- Strathclyde University Incubator Limited, in which the University is one of four shareholders (along with Lloyds, Gresham House, and Scottish Enterprise); which has leased three floors of a university building and sub-leases this to 20-30 companies. It is moderately profitable and the university considers it an important outlet for spin-outs that has helped their development.

B.185 The Commercial Development Fund is controlled by BVG. There is an initial annual allocation from the University into this fund, through the university central budget, which can all be traced back to external sources. Any returns from spin-outs during the year are also invested straight into the fund. Payouts per annum are at the level of tens of thousands each year and the fund typically disburses £150-200K a year. It is primarily used for small investments in spin-outs, to meet exceptional patent costs and to cover the employment of academics or research staff during the period from the end of one grant until the spin-out is formed.

B.186 More substantial funding is available through the ‘Synergy Fund’ formed through a joint Glasgow University/Strathclyde University bid for University Challenge Fund money. This provides finance of up to £150K for the purposes of commercialisation or spin-out formation. It is run by external managers (Scottish Equity Partners) on a commercial basis – which tends to mean that it is more cautious in terms of funding approach than is ideal from the

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<sup>51</sup> [www.commercialisation.strath.ac.uk](http://www.commercialisation.strath.ac.uk)



Strathclyde University perspective. Strathclyde and Glasgow have also entered into a preferred research partner relationship. 'Pharmalinks', one of the initiatives within the research partnership, last year struck a £1 million/three year deal with Hyundai Pharmaceutical (Korean) for obesity research.

### **Experience with spin-outs to date**

- B.187 Licensing and spin-out routes are both considered to be valid routes for commercialisation. Historically, income from licensing has been strong – in the region of £1-3 million per annum (£1.4 million in 2003, £2.8 million in 2002, £1.3 million in 2001). The dominant contribution is from bio-pharmaceutical licences (the University has no active research in other areas of the biosciences with commercial potential, e.g. genetics or medicine). Strathclyde has yet to realise a large payout from a spin-out.
- B.188 Since 1997 the University has spun out 21 companies in which it has an equity stake. Two of these have since failed; one is no longer trading and the other is still trading but in a very limited way. In neither case, even with the benefit of hindsight, is it judged that licensing would have been a better route to commercialisation
- B.189 The current target is for three to five spin-outs per annum; this was achieved during 1998-2001, but in recent years rate of formation has been slower. The underlying activity remains strong, but there have been delays with funding, which has been through a very tight period, and with finalising legal agreements. The University's strategic plan now includes a target of five spin-outs per annum.
- B.190 If a good invention, together with a sound business plan, represents a viable business opportunity, the BVG has generally approved company formation, regardless of the size of the potential future payout to the university.
- B.191 The University's local economic development contribution features visibly on the internal agenda. The launch of spin-outs and successful licences are used for PR purposes, to illustrate the value the university provides to its local community.

## External linkages

B.192 The main external links are with:

- the Scottish Institute for Enterprise funds one of the FTEs in the research and consultancy services office with a focus on student entrepreneurship networks, competitions etc.
- Targeting Innovation - Strathclyde University is one of the guarantors of this company which supports business development in high technology industries and is actively supported by Scottish Enterprise Glasgow (SEG)
- SEG directly - which has supported the University both directly and through the development of supporting initiatives such as the West of Scotland Science Park.

B.193 The positive nature of the supporting environment is evidenced by the research and consultancy services office which is finding that academics who make enquiries are better educated and more questioning about avenues for commercialisation. This is because they have had access to increasing levels of support over recent years, with initiatives such as the Proof of Concept Fund and Enterprise Fellowships. As well as these specific programmes, the Royal Society of Edinburgh has been raising awareness through various seminars.

## Current reflection and future plans

B.194 The underlying reasons for taking the spin-out route to commercialisation have recently been re-visited so as to clarify the expectations of senior management – some of whom were not involved in the initial strategic thinking. The appropriate sequential criteria for approving a spin-out seem to be as follows:

- there is academic enthusiasm and a viable business plan
- the research and consultancy services office judges the approach sensible
- the BVG reviews the case and is inclined to favour the spin-out route. Even if a licensing/royalty deal might generate rather more revenue for the University, this can be counterbalanced by the economic development contributions and the PR dividend of the spin-out.

B.195 In this process it is recognised that there are many spin-outs that cannot be expected to be high fliers yet, considered together with others, will contribute significantly to the economic and social welfare of the local community. The research and consultancy services office should serve the academic community and what its members want to achieve. Income from spin-outs

and from licences is seen as a ‘bonus’ from an activity that the university is undertaking as part of its overall mission – not something to be closely calibrated through sets of targets.

- B.196 Faculties and departments have become much more devolved in financial terms over the last three to four years, and have become more questioning about the costs they bear in the setting up of a spin-out e.g. keeping the academic in question employed whilst they are spending most of their time getting their company off the ground.
- B.197 Lastly, a further addition to the supporting infrastructure will soon be in place, when the city centre science park adjacent to Strathclyde University’s campus is completed.

**Related websites**

Strathclyde Research and Consultancy Services - [www.commercialisation.strath.ac.uk](http://www.commercialisation.strath.ac.uk)

Hunter Centre for Entrepreneurship - [www.entrepreneur.strath.ac.uk](http://www.entrepreneur.strath.ac.uk)

Strathclyde University Incubator - [www.suultd.com](http://www.suultd.com)

Scottish Enterprise – [www.scottish-enterprise.com](http://www.scottish-enterprise.com)

# University College London

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## Regional context

- B.198 London, as with many capital cities, encompasses wide economic disparities. It is the centre of UK government, the country's major tourism hub and home to many cultural institutions. In the private sector, there are concentrations of highly competitive and globally active clusters – notably in the financial and other business services. By contrast many of London's traditional sectors, especially in manufacturing have been in decline for many years, partly through out-movement (e.g. of the port and related industries) and partly through the emergence of low-cost producers overseas (e.g. in the clothing industries).
- B.199 There have been many major initiatives in London that have aimed at the physical regeneration of run-down areas. Some, for instance the redevelopment of London's Docklands, have achieved dramatic large-scale, success. There have also been many area-specific initiatives focused on skills and economic development – typically targeted on areas or groups with particular problems. The recent establishment of the London Development Agency (LDA) has, however, brought a new coherence to tackling these issues and also increased the focus on making more positive efforts to harness London's economic strengths in wealth creation.
- B.200 London has more than 30 HEIs with diverse strengths, aspirations and local linkages. One of the LDA's priorities over the past two years has been to foster closer interaction between HEI strengths and draw them more fully into wealth (and employment) creation within London. In doing so there has been constructive joint-working with the two development agencies responsible for London's natural hinterland.

## Key University data<sup>52</sup>

- B.201 University College London (UCL) was formed in 1826 and is the largest of over 50 colleges and institutes which make up the federal University of London. UCL was the first university in England to admit students of any race, class or religion, and the first to welcome women on equal terms with men. In the last Research Assessment Exercise, 60 out of the 72 UCL departments were ranked as 5 and 5\*. The mission of UCL is communicated as follows:

*“The college is committed to be as outstanding, liberal, innovative and welcoming in its teaching, and as internationally renowned for its research, in the twenty-first century as it has been in the nineteenth and twentieth.”*

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<sup>52</sup> Staff and student numbers are given as Full Time Equivalents (FTE) and are drawn from the Higher Education Statistics Agency (HESA) database for 2001/2 – which provides the latest consistent data for all universities for the period of this research (i.e., 1998 – 2002).

	FTE Academic Staff	
	Number	%
Teaching only	63	1.8
Research only	1790	51.2
Teaching & research	1641	47.0
Total	3494	100%

Source: www.hesa.ac.uk for 2001-2002

	FTE Students	
	Number	%
UG first degree	10398	67.9
UG other	71	0.5
PG taught	2676	17.5
PG research	2156	14.1
Total	15301	100%

### **Research income**

B.202 UCL's total research income for 2001-2 was over £212 million with over 60% being for clinical, anatomy and physiology research. Other major areas of research spend are biosciences (15%) and physics (9%)<sup>53</sup>.

B.203 Excluding HEFCE core funding for research, the balance of around £148 million was brought in from the following sources<sup>54</sup>.

• Research Councils	30.9%
• Charities	45.4%
• UK central government	6.9%
• UK industry	6.5%
• EU government and other	5.7%
• Other overseas	4.3%
• Other	0.3%

### **Resources allocated to spin-out activities**

B.204 Until the end of 2003, technology commercialisation activities were largely under the remit of the UCL technology transfer office, UCL Ventures. At the start of 2004, all technology commercialisation activities at UCL were brought together under one separate administrative unit, UCL Business, which reports directly to a Vice-Provost.

<sup>53</sup> Data from www.hesa.ac.uk

<sup>54</sup> Data from www.hesa.ac.uk for 2001/2

B.205 The activities of UCL Business are split into five groups as shown below which employ 28 FTEs in total. In addition to these staff, there is the Commercial Director of UCL Business and 3 FTE administrators:

- The Contract Research Office is responsible for negotiating and concluding UCL's contracts with industrial and government sponsors, both in the UK and overseas (7 FTE).
- UCL Consultants Ltd is a company wholly owned by UCL set up to manage the consultancy services of UCL academic staff to external organisations (3 FTE).
- BioMedica Plc is a wholly owned subsidiary of UCL that was formed through the merger of UCL Ventures life science activities and Freemedic plc. BioMedica aims "to generate income and create capital value for UCL through the commercial exploitation of the bioscience research base at UCL and associated institutes."<sup>55</sup> (10 FTE).
- UCL Ventures Physical Sciences protects, manages and commercialises IP for engineering, computing and the physical sciences (2 FTE).
- UCL Business Development is a team within UCL Business that is focused on assisting businesses access resources and capabilities within UCL (6 FTE).

B.206 UCL Business does not have staff dedicated specifically to supporting spin-outs, as such activities fall within the remit of a number of staff throughout the organisation. Activities had in the past been split between support for new business creation and licensing, but this had been found to be counter-productive.

B.207 UCL Business does not provide accommodation for start-ups as they do not have space available. They were involved in the early stages of the development of what became the London Bioscience Innovation Centre<sup>56</sup> but are not currently involved in this project.

B.208 UCL business is involved in a number of seed funds that can provide support for the early-stage development of its spin-outs. These include the following:

- **The Bloomsbury Bioseed Fund** – a £4 million fund for start-ups from UCL that can invest between £10,000 and £250,000 in any project relating to the life sciences. Partners with UCL in this fund are Royal School of Pharmacy, CRC Technology, Royal Veterinary College, and the Imperial Cancer Research Fund.

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<sup>55</sup> [www.uclbiomedica.com/about.html](http://www.uclbiomedica.com/about.html). "Founded in 1989, UCL Ventures was established to form the link between academia and industry for the development of scientifically and commercially valuable technologies arising from UCL. UCL Ventures returned over £15 million to UCL. Freemedic Plc was established in 1993 to commercialise the Intellectual Property and other rights and opportunities arising primarily from the Royal Free Campus of UCL's Medical School. Freemedic's profits since 1996, all of which have been donated to UCL and utilised for investment in the Royal Free Campus, have exceeded £15m."

<sup>56</sup> [www.rvc.ac.uk/LBIC](http://www.rvc.ac.uk/LBIC)

- **Combined London University Challenge (CLUC) Fund** – a £3m fund awarded through the University Challenge Fund scheme. Partners with UCL for this Fund are the London Business School, King's College London, and Queen Mary and Westfield College. This fund is to support projects in information technology, communications and supporting technologies in electronics and software. Sussex Place Ventures, which is linked the CSEL and the LBS Foundation for Entrepreneurial Management, and includes as its partner universities UCL, Kings College (London) and Queen Mary's College, can provide matched funding through CLUC.
- **BioMedica Plc** – this group within UCL Business has access to its own £1.5 million fund for life science investments.

B.209 UCL and the London Business School successfully bid for funding from the Science Enterprise Challenge in 1999 to establish the Centre for Scientific Enterprise London (CSEL). CSEL's core activities are to enhance entrepreneurship expertise by bringing scientists and engineers from UCL together with graduate students and faculty from London Business School. CSEL also enables a range of technology transfer and entrepreneurship related programmes<sup>57</sup> via groups including London Business School and its Foundation for Entrepreneurial Management.

B.210 UCL Business is a co-organiser of the UCL Entrepreneurs' Challenge, a business plan competition linked to a series of educational and networking activities. This competition is organised in partnership with the London Business School and CSEL and has the overall aim to "enhance the entrepreneurial environment at UCL"<sup>58</sup>. UCL Business also has links with the Management Centre that runs entrepreneurship related courses including "New Venture Formation" and "The Business Plan".

### **Experience with spin-outs to date**

B.211 UCL has spun-out 27 ventures since 1997 of which 10 have failed or are dormant.

B.212 The focus of activity for UCL Business is to "find the best way to get technology and expertise out there, by patenting or licensing or whatever route is appropriate"<sup>59</sup>. If a technology is readily licensable (i.e., does not need substantial additional resource applied to make it useable to an identified customer) then the inventor will be encouraged to take the licensing route. If it is clear that the idea does need additional development (and hence resource applied to it) then the spin-out route may be encouraged. No targets are set for the number of spin-outs to be created per annum.

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<sup>57</sup> Information on these activities can be found at [www.cselondon.com](http://www.cselondon.com).

<sup>58</sup> From [www.ucechallenge.com](http://www.ucechallenge.com)

<sup>59</sup> Interview with Dr Jeff Skinner, Commercial Director, UCL Business 9<sup>th</sup> October 2003.

B.213 UCL Business view a successful spin-out business as one that has attracted external investment to develop the business: “We believe that we have done a good job - created value - if we are able to persuade external, sophisticated investors, to invest in one of our technologies or businesses”<sup>60</sup>.

### **External linkages**

B.214 The UCL Business Commercial Director was one of the founders of the London Technology Network (LTN). LTN was set up with the mission “to help technology-intensive companies be more effective and efficient in their knowledge acquisition from London's universities.”<sup>61</sup> LTN draws together 19 higher education intuitions from around London. Its key activities are based around networking events focused around particular emerging technologies that bring together academics and senior managers from industry, and the training and support of Business Fellows. Business Fellows are academics who are given the task of mapping the industrially relevant technologies within their departments, and to help facilitate relationships between their department and companies. They work with their university’s technology transfer office to help companies access their institute's technologies and capabilities. This also provides an environment that helps to stimulate entrepreneurial activity.

B.215 In addition to the funds in which UCL Business has direct linkages, they have also been able to draw in investment from a number of external seed and venture capital funds (including Apax Partners, Merlin Biosciences and ITX) to support the growth of its spin-outs. Reflecting the market conditions, there has been less involvement of such funds recently.

B.216 The Commercial Director of UCL Business takes an active role in the promotion of good practice in technology transfer. He is a Vice-President of the Association of European Science and Technology Transfer Professionals (ASTP), and sits on the Programme Committee for the Praxis, the UK University Technology Transfer Training Programme.

### **Current reflections and future plans**

B.217 The recent poor investment climate has slowed spin-out activity from UCL, but UCL Business is not allowing metrics and position on league tables of spin-out activity to distort its activities and pressure the formation of new spin-outs that have a poor chance of raising funding.

B.218 The growing links between the London universities, through initiatives such as the London Technology Network, are viewed as a positive development as they allow greater leverage of the London technology base than could be otherwise achieved by the individual higher education institutes.

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<sup>60</sup> Interview with Dr Jeff Skinner, Commercial Director, UCL Business 9<sup>th</sup> October 2003.

<sup>61</sup> [www.ltnetwork.org](http://www.ltnetwork.org)



B.219 In relation to direct financial returns to the University, the following view was expressed by the Commercial Director: “[..] if the spin-outs grow, create jobs, raise finance, develop new products - in a nutshell, 'thrive', then we know we've done a good job - even in those cases where the direct financial return to UCL is small”<sup>62</sup>.

**Related websites**

UCL Business – [www.ucl.com/uclbusiness](http://www.ucl.com/uclbusiness)

Centre for Scientific Enterprise London – [www.cselondon.com](http://www.cselondon.com)

London Technology Network – [www.ltnetwork.org](http://www.ltnetwork.org)

UCL Entrepreneur’s Challenge – [www.uclchallenge.com](http://www.uclchallenge.com)

UCL Management Centre - [www.ucl.ac.uk/management-centre](http://www.ucl.ac.uk/management-centre)

Association of European Science and Technology Transfer Professionals – [www.astp.net](http://www.astp.net)

Praxis – [www.praxistech.org.uk](http://www.praxistech.org.uk)

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<sup>62</sup> Interview with Dr Jeff Skinner, Commercial Director, UCL Business 9<sup>th</sup> October 2003.

## Report Authors

### **Tim Minshall**

Tim Minshall is a Lecturer at the University of Cambridge Centre for Technology Management ([www.ifm.eng.cam.ac.uk/ctm](http://www.ifm.eng.cam.ac.uk/ctm)), and is a member of the board of St John's Innovation Centre Ltd, Cambridge ([www.stjohns.co.uk](http://www.stjohns.co.uk)).

Prior to joining the University in 2002 he was an executive director of St John's Innovation Centre Ltd. in Cambridge (one of the UK's leading incubators of new technology ventures). He has managed a series of projects funded by the Gatsby Charitable Foundation to support the start-up and growth of new technology ventures, and to provide analysis of different systems for supporting technological innovation (through the publication of the 'Funding Technology' reports on, to date, the U.S.A., Israel and Germany). Tim was also a member of the start-up fundraising team, and then Programme Director for Research and Business Creation, at the University of Cambridge Entrepreneurship Centre.

He has a bachelor's degree in engineering from Aston University, and a PhD from Cambridge University Engineering Department. Before moving to Cambridge in 1993, he worked as a plant engineer, teacher, consultant and freelance writer in the UK, Japan and Australia.

### **Bill Wicksteed**

Bill Wicksteed has a degree in economics with statistics from the University of York. For the past 20 years he has been a director of SQW Limited, a consultancy firm covering the full range of economic development issues ([www.sqw.co.uk](http://www.sqw.co.uk)). Previously, much of his early career was focused on developing countries, notably in East and Central Africa, but he also worked in the Middle East and lived for a year in the Caribbean. Prior to helping establish SQW he was head of economics and research at the Welsh Development Agency.

For the past 10 years Bill has been involved with SQW's work on knowledge transfer; linked with policies to promote innovation at regional and international levels. He was rapporteur for the CVCP mission to review approaches to technology transfer at leading US universities (supported by the Gatsby Charitable Foundation) and has played a similar role in European Commission reviews of incentive frameworks to encourage business expenditure on research and development. Recent UK work has covered reviews of institutions' knowledge transfer activities, the strategic management of intellectual property in universities and a review of Scotland's Proof of Concept Fund. Overseas he has worked extensively in Norway, Finland and Italy and he is currently on the advisory panel for Singapore's one-north development.

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