Welcome to our world

The University of Cambridge: creating and strengthening mutually beneficial relationships with industrial companies

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The University of Cambridge, founded in the 13th century, is one of the oldest and most respected universities in the world. Its long tradition of working collaboratively with industry has gained the university an international reputation for its industrially relevant research.

Through its Corporate Liaison Office, Cambridge University creates and strengthens mutually beneficial relationships with industrial partners around the globe. One of these partners is ABB.

Through the founding and development of various institutions; the creation of professorial chairs; contractual arrangements; executive education; and spin-out companies, Cambridge University is working hard to ensure a strategic and long term agenda between industry and academia.

Cambridge ranks alongside the best academic institutions in the world. An international league table developed by Shanghai Jiao Tong University[1)] ranked Cambridge third in the world, after Harvard and Stanford universities. Eight of the top ten institutions in the league table are in the USA and each has significant backing from the US Government and industry – typically receiving 80% of its research income from government departments and 20% from external collaborations. In contrast, Cambridge receives less than 70% of its research income from the UK Government 1. In 2003 the University's total income was £464.8 million of which £230 million was for research activities.

While Cambridge has a long and distinguished history of working collaboratively with industry (this is borne out by research relationships with companies such as Rolls Royce, BP and GSK), academic freedom is jealously guarded. This preserves the research excellence within the University and enables its academics to operate on a more strategic and long-term agenda than most industrial collaborators.

The British Government has acknowledged the key contribution that universities like Cambridge make to the UK and the world economy through their collaborations with business and industry. It is research that underpins

Footnote:

[1)] Universities were judged by several indicators of academic or research performance, including alumni and staff winning Nobel Prizes and Fields Medals, highly cited researchers, articles published in Nature and Science, articles in Science Citation Index-expanded and Social Science Citation Index, and academic performance with respect to the size of an institution. See http://ed.sjtu.edu.cn/rank/2004/Methodology.htm

the knowledge economy and universities have an important role in stimulating knowledge transfer across the commercial and voluntary sectors.

The Lambert review

At the end of 2003 the UK Government published the findings of an independent review of business-university collaboration, conducted by Richard Lambert, former editor of the Financial Times[2]. The resulting report concluded that the biggest single challenge to the universities lies in boosting demand for academic research from the business community. This is not just an action on business to take more interest in university research, but also on universities to increase exposure to their research activities and to make it more straightforward for businesses to work with them. This latter challenge is being addressed through "Third Stream" funding, money allocated to universities by the Government to increase knowledge transfer activities.

In response to the Government's Third Stream agenda and the University's need to provide a clear and structured mechanism for external interaction, Cambridge University set up the Corporate Liaison Office[3] (CLO) in 2000. The principal role of the CLO is to create and strengthen mutually beneficial relationships with industrial partners globally and in the Eastern region of England. With 125 departments and more than 5,000 academic staff Cambridge can be a difficult place to navigate; the CLO provides companies with an informed entry point into the University and helps to identify the expertise they require.

Corporate Liaison Programme

One of the CLO's many objectives is to help companies be more strategic in their engagements with Cambridge; one-off collaborative projects between the University and industry are mutually rewarding but if the channels of communication are allowed to shut down after the project is completed, the opportunity for future collaborations – perhaps in a different research area – might be missed. The CLO set up the Corporate Liaison Programme – a membership scheme that provides a framework within which companies can build their relationships with the University – to help mitigate this.

The Programme offers its members a range of services including a regular newsletter featuring research and collaboration activities, tickets to the Horizon seminars (see later paragraph) and a dedicated relationship manager who helps member companies develop an action plan for the year and who feeds back information about new and interesting opportunities for collaboration as they arise. To date 15 companies have joined the Corporate Liaison Programme including ABB, BAE Systems, Boeing, British Telecom, EDS, GSK and Kodak. Joining the Corporate Liaison Programme is not obligatory for companies who want to collaborate with Cambridge. It is just one of many ways in which they can choose to work with the University.

One of the companies that the University is currently in discussions with is ABB. ABB joined the Corporate Liaison Programme in December 2003 and established a new framework for R&D management with the University that promises exciting results. ABB has a history of delivering innovation through working with Cambridge: it is active in the Institute for Manufacturing's Manufacturing Leaders' Programme and in the past has invested in "spintronics" research at the Cavendish Laboratory.

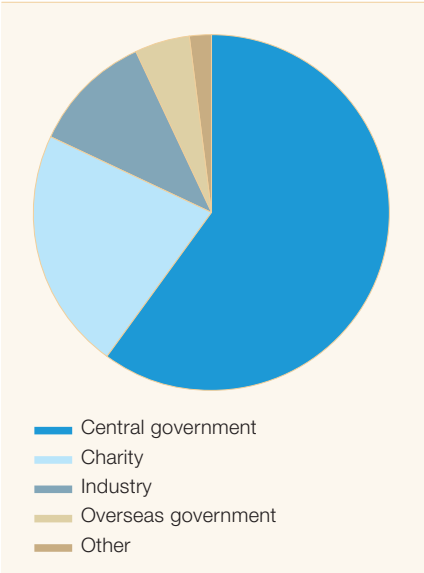
According to Markus Bayegan, CTO for Group R&D and technology 2, ABB works with universities like Cambridge because "developing relationships with the leading research universities in the US, Europe and Asia is a key element in our global R&D strategy … this mutual exchange of ideas and information is proving invaluable in helping to encourage some of the best young researchers in the world as well as giving ABB access to the latest developments in emerging technologies." Cambridge is currently in discussion with ABB in research areas as diverse as manufac-

Footnote:

[2] See the consultation and responses to it at http://www.hm-treasury.gov.uk/consultations_and_legislation/lambert/consult_lambert_index.cfm

[3] www.clo.cam.ac.uk

1 Sources of research income for the University of Cambridge.



2 Markus Bayegan presents ABB's research interests at the Horizon R&D event at Cambridge.

3 Delegates at one of the events organised for industry.

4 Artist's impression of the CAPE building.

turing in China and human machine interfaces.

The CLO works hard to ensure that each relationship is tailored to reflect the needs of the company and the interests of the University in a balanced and productive manner. For example, in 2003 Boeing signed a five-year strategic agreement with Cambridge. In addition to providing research funding and collaboration for individual projects in areas such as materials research and aerospace design, Boeing has decided to foster a long-term relationship in the area of information technology. The company has provided the University with a fixed research budget that will be used to fund projects in a number of departments.

One of the CLO's most successful activities is the Horizon series of seminars. These bring together academics and industry representatives to showcase the University's latest research in a particular area 3. Launched in April 2003, the series has featured ICT, Computational Biology, Nanotechnology, R&D in electronics and the environment. To date more than 100 academics from departments as diverse as Physics, Philosophy and Public Health have taken part. Delegates from roughly 250 companies have attended and interdisciplinary links have been developed between academics and company executives.

New institutions

For centuries the collegiate system at Cambridge has provided a fertile environment for academics from different disciplines to meet and learn from each other. More recently this inter-disciplinary approach has been formalised in the development of research institutions, many of which are funded by companies such as Intel, BP and Unilever. Given the right conditions and personalities, powerful and productive partnerships can be established.

The founding of institutions, such as the Centre for Interdisciplinary Medical Research and the Interdisciplinary Research Centre for Nanotechnology, enable academics to work with their peers in industry so that they can combine pure and applied research with real-world practical experience. One recent example is the Centre for Advanced Photonics and Electronics (CAPE) 4, which was launched in February 2003, and is led by Professor Bill Milne. CAPE is pioneering research into the electronics supply chain and draws University researchers from the Departments of Engineering, Physics, Chemistry and Materials Science. Major sponsorship from Alps Electric Company Limited, Dow Corning Corporation and Marconi Corporation plc, in partnership with the University and Government, has enabled construction to begin of a purpose built laboratory 5.

Another way of achieving this type of partnership is to establish of an "embedded" laboratory. In 1989 Hitachi took this step and set up an embedded lab at the Cavendish Laboratory with the aim of creating new concepts of advanced electronic/optoelectronic devices. The Hitachi Lab (HCL) works in close collaboration with the Microelectronics Research Centre (MRC) in the University. The Hitachi Lab comprises an international team of researchers, and its openness for research has produced a profitable collaboration for both the company and University. HCL specialises in advanced measurement and characterisation techniques, and MRC specialises in nanofabrication techniques.

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Direct collaborations are not the only means of supporting research. Some companies choose to endow a professorial Chair. Chairs can be funded either by an endowment fund or by an annual gift or donation. Companies that have provided funding for Chairs at Cambridge include BP, Shell, KPMG and QinetiQ. Companies supporting Chairs benefit by helping to further research into an area that is relevant to their particular industry.

The ultimate aim of all of these collaborations is the transfer of knowledge to the benefit of both parties. This may take the form of licensing and the exploitation of IP, but more often than not it is subtler than this and more difficult to quantify, taking the form of informal interactions between researchers such as sharing

Table 1

	Inventors (jointly)	University	
		Department	Central Funds
Net Income	(%)	(%)	(%)
First £20,000	90	5	5
Next £40,000	70	15	15
Next £40,000	50	25	25
Above £100,000	33.3	33.3	33.3

5 Mr Isao Tanimoto, Senior MD Alps; Professor Alison Richard, Vice-Chancellor, University of Cambridge; Mr John Newbold, VP Marconi; and Mrs Babette Pettersen, Global Photonics Program Director, Dow Corning on the site of the CAPE building on 15th October 2004.

Students relaxing in the summer on the river in Cambridge.

methodologies and techniques. These interactions develop over time and become an invaluable source of knowledge for both sides.

Contractual arrangements and executive education

The contractual arrangements between the University and collaborating organisations vary depending on the sector and business. However, there are two basic standard contracts that enable different levels of investment depending on the intellectual property agreement required. If the full cost of the research is borne by the company then it can have exclusive rights to any intellectual property arising from that project. If the risk is shared then there is a reduction in the cost of research and the University and company will then negotiate a licence deal around any resulting intellectual property. This second type of agreement makes up the majority of University contracts.

The University has a contract with all of its academic employees giving them rights over the intellectual property they develop in return for the University covering the costs of protecting and patenting the ideas. Table 1 (on page 12) gives the split of income arising from the exploitation of such intellectual property between the University and the academics.

However, the majority of academics do not collaborate with industry solely to increase their income through intellectual property exploitation. Academics are very enthusiastic about their areas of research and are passionate that their work should be used to take forward developments and society. Many want to work closely with companies on strategic issues and applications where they can see that they make a difference. The University of Cambridge is keen to encourage this sort of interaction. While IP is important in these collaborations it should be noted that income from patent exploitation is less than one per cent of the University's research income.

Interactions with commercial organisations are not restricted to collaborative research. The University makes a major contribution to the education and development of company executives through executive education. The Judge Institute for Management Studies and the Cambridge Programme for Industry, for example, offer a wide range of courses and seminars tailored to the needs of company executives, from courses aimed at understanding complex issues within the company to broader topics such as environmental issues and corporate social responsibility.

Overall impact

As a result of its collaborative activities, the University's impact on the national and international knowledge economy has been far reaching. It sits at the heart of the largest "cluster" of high-tech and biotech companies in Europe. In 2004 the Cambridge cluster secured more than 25% of the UK's venture capital investments and more than 8% of the total invested in the whole of Europe. The University has made a major contribution to the development of the cluster by providing a unique mix of academic expertise and technology innovation. Over the past 30 years many academics have set up spin out companies to exploit technologies they have developed in the laboratory or in partnership with industrial research collaborators.

One highly successful entrepreneurial academic is Professor Sir Richard Friend who led the research team at the Cavendish Laboratory that invented light emitting polymers. He founded Cambridge Display Technology (CDT) in 1992 to drive forward the commercialisation of this exiting and revolutionary technology. CDT has now established a large number of industrial partnerships and opened up a whole new area for exploitation as well as winning a number of awards in the process.

A broad academic base

Cambridge's key strength lies in its broad academic base; the University is unusual in that its expertise is evenly split between the Arts and Sciences. Particular strengths include cosmology, archaeology, quantum theory, philosophy, classics, nanotechnology, materials science, chemistry, law, physics, statistics and medicine. This breadth of expertise enables it to offer collaborators a deep understanding of new technologies and how they impact society. For example, the area of climate change and the environment is of great interest to Cambridge as it brings together expertise from the fields of science, engineering, economics and social sciences.

Third Stream initiatives at Cambridge are concerned with highlighting the diversity of research that is conducted and encouraging companies to think beyond more obvious research links. While meeting the challenge set by the Lambert review, it is important to bridge the cultural gap that often exists between business and academia, and ensure that the relationships that result from greater exposure are of mutual benefit to both the academics and the company concerned.

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