

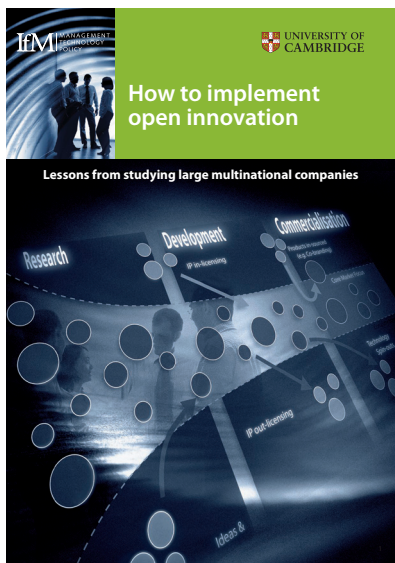
Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

May 2009

CTM research published as practical guidelines for industry

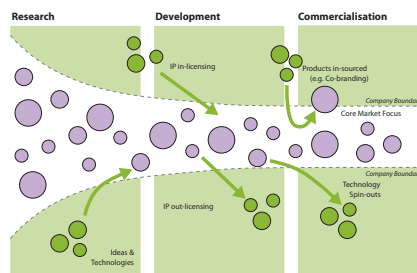
Two recently completed research projects on open innovation and marketing technology have resulted in practical guidelines for managers – as well as getting very favourable reviews from the academic community. Both have produced guides to be published by the IfM this summer.



Open innovation

How to implement open innovation will be published shortly. Open Innovation (OI) is a strategy whereby companies allow a flow of knowledge across their boundaries so that resources can be shared between the company and external providers in order to enhance innovation capabilities.

The report explores the challenges in implementing OI for managers in companies who are at the starting point of implementing an OI strategy. The research was supported by a network of companies active in open innovation.



The open innovation process, with company boundaries represented by dashed lines allowing ideas to pass in and out of the firm

Compiled from a series of interviews and workshops involving a total of 36 firms, the report addresses the following questions:

- What does OI mean for companies and why do companies open up?
- What are the routes to OI and what strategies are companies using to open up their innovation process?
- How can a company implement OI and what are the implications for company culture, structure, skills and incentives?

The analysis reveals four main issues that companies have to tackle on their way to implementation: culture, procedures, skills, and motivation.

The research was funded by Unilever and the Cambridge Integrated Knowledge Centre (CIKC). It was carried out in collaboration with companies in the Cambridge Open Innovation Network (COIN).

COIN is continuing to investigate issues related to open innovation by looking into the role of intermediaries in supporting OI. For information on

this project contact: Dr Letizia Mortara
lm367@cam.ac.uk.

Marketing technology

The marketing technology research project addressed the issue of making the business case for investment in early stage technologies. The research aimed to help managers who had a technology that needed to be 'sold on' to the next stage of development or use.

This is a common problem for technology managers, and may involve customers inside or outside the organization. The uncertainties surrounding such technologies mean that a consultative approach is required, progressively engaging the confidence of the customer, while developing a solution to his problem.

A diverse research team of seven CTM people, led by Dr Marcel Dissel, collaborated most effectively to investigate current literature, practice and theoretical issues. A process model was developed to show how the appropriate analytical and communication methods can be applied as the case is developed.

A practical guide to marketing technologies will be published this summer. It will be available from the IfM's website at:

www.ifm.eng.cam.ac.uk/service/books/

If you are interested in obtaining a copy of the guide once it has been published please email: ifm-enquiries@eng.cam.ac.uk

The research was completed last year, and we have recently had the results of an external academic review which were extremely positive.

CTM Symposium 2009

The 2009 technology management Symposium will be on 24-25 September at Downing College. Titled 'Creating opportunities from uncertainty: Navigating industrial emergence' and drawing on the IfM's Emerging Industries Programme, it will feature key speakers from the Energy Technology Institute, GSK, Cambridge Display Technologies and many other leading companies.

As always the Symposium will include latest research findings and provide a great opportunity to network with other experts. Book early to avoid disappointment! E-mail Jo Griffiths jg393@eng.cam.ac.uk. For detailed information, and to download your booking form visit:

www.ifm.eng.cam.ac.uk/ctm/symposium15/



Success for T&IM

This year's 3 day Technology and Innovation Management course at Jesus College was again a great success, and received very positive feedback from participants. A wide range of organisations were represented, from large established businesses, through technology brokers to technology developers. The course covers a practical range of topics, and the mix of presentations, activities and discussions seems to work very well with a group of around 20 participants.

As this course draws on our core research team, we do not have capacity to run it more than once per year. However with the help of our colleagues in Education and Consultancy Services we do run other customized short courses for specific groups, for example Rolls-Royce in June, the Red Meat Industry Forum in July, and the Chinese Productivity Council in September.

If you are interested in executive education in this area for your organisation please contact Jo Griffiths jg393@eng.cam.ac.uk

Could the recession be the best time to start a new business?

Cambridge high-tech businesses founded in the recession of the 1990s enjoyed consistently better survival rates than companies started in the boom years. This is one of the findings of a CTM study examining the fortunes of the Cambridge hi tech cluster over the past two decades.

Looking at firms founded during the last recession in 1992 the study found that survival rates for Cambridge hi tech firms were unusually high, and exceeded rates for all East Anglia firms and UK firms.

In contrast the survival rates for firms founded in the second half of the 1990s and early 2000s in Cambridge and throughout the UK were significantly lower. The difference persists for many years after companies were founded. The report suggests one reason for the difference may be that only firms with good prospects were founded in the recession of the early

1990s. The survivors then benefited from the economic expansion later in the decade.

The report, co-authored by Dr Elizabeth Garnsey of the Institute for Manufacturing's Centre for Technology Management, looks at the impact of major economic trends, such as the IT revolution, the technology crash and the Cambridge cluster. The data was analysed in terms of industry sector, company size and year of foundation.

High failure rate in IT

Overall there has been an expansion in the number of firms since the 1960s. However, there was a marked decline between 2002 and 2006 caused by a high failure rate amongst new IT software companies started during the technology boom. In contrast, the Biotech and R&D sectors enjoyed steady growth through the 1990s and early 2000s with an increase in both firm and job numbers.

The report found that larger companies with their roots in Cambridge have generally done much better than companies headquartered elsewhere. Many firms have been attracted to set up branches in the Cambridge area but have then been more prone to closure and relocation than the larger indigenous companies. This points to the value of competences accumulated locally, persisting through changes of ownership in some cases.

Cambridge's high tech companies have experienced some problems since 2004 with a fall in the number of new start-ups and a rise in the number of closures. However, the number of new firms active in emerging technology sectors points to continuing innovation and diversity among the city's technology cluster, the report maintains.

The study concludes that in the current financial situation, knowledge based firms engaged in technological

and creative activity are more important than ever as providers of exports and of the skills of the future.

Innovation under constraints seminar

Continuing the theme of overcoming adversity, CTM will be holding a one-day seminar, "Doing more with less: Innovation under constraints" on the 2 June in Cambridge. Along with presenting this work on Cambridge high-tech firms, the event will also feature CTM research around the theme of supporting breakthrough innovation and how technology consultants can facilitate innovation. The day will include presentations from CTM staff and industry speakers.

More information and booking forms for this event can be found on the IfM website: www.ifm.eng.cam.ac.uk/service/events/info/doing.html

High tech innovation sustained as new firms spin out from old

As part of the Innovation and Productivity Grand Challenge (IPGC) project the IfM's Dr Elizabeth Garnsey has carried out a study that seeks to understand the origins of high-tech companies, their business models and the ways in which they emerge and grow.

The study has shown that high-tech firms develop and diffuse innovative technologies that flow into other sectors of the economy where they raise productivity, lower costs and make possible new activities.

The research investigates companies like Metalysis, founded in 2002 by Dr Derek Fray and his colleagues at Cambridge University. They developed a process that produces metals from metal oxides at a fraction of the usual cost and without the hazardous by-products of conventional processes. Metalysis aims to develop more energy-efficient processes with much less adverse environmental impact. The

company has a hybrid business model that involves in-house manufacturing, joint ventures, acquisitions and licensing. Since 2004 the company has been located in South Yorkshire and is working with international partners to develop its process for a range of metals, most prominently titanium and tantalum

University spin out firms most likely to achieve breakthroughs

It has been found that new firms spun out from universities are especially likely to achieve breakthroughs when their technologies provide new and unexpected solutions to industrial and consumer problems. Using a database of high-tech firms in the Cambridge area, the project focuses on the growth that must be achieved if they are to have a positive impact on the economy.

Evidence shows that to trace the impact of firms originating in the university it is not enough to look at the first generation

of firms. Spin-outs from previous spin-out firms create new clusters of activity over time, where there is a higher chance of giving rise to successful firms.

It is important to the economy in the longer term that tech-based firms build up local competences and apply these to new and diverse industrial fields, giving rise to further innovation in response to international demand. Cambridge tech firms have been sensitive to cyclical trends in the economy, and though resilient for over a quarter of a century, they have been showing signs of contraction since the technology downturn.

High-tech firms are subject to a variety of pressures, including pressure from the financial sector to achieve more rapid revenue streams and returns to investors. It is important to ensure that these firms have the funds to create new value for users, without which financial returns cannot be sustained.

CTM builds links with Guangdong Province in China



Guangzhou, the capital of Guangdong Province, is the centre of China's manufacturing heartland close to Hong Kong. As the local industrial base matures and labour costs continue to rise, interest has naturally grown in R&D, technological development, and a drive for innovation as a basis for continued economic growth.

In this context technology management, and the work of CTM, has been seen as particularly relevant. There has been a local initiative at the Department of Science and Technology to apply the Cambridge T-Plan technology roadmapping approach to exploring suitable sectors for development. In July 2008, the British Consulate

in Guangzhou arranged for David Probert to visit the key Departmental officials and Jinan University, in order to identify areas of potential collaboration.

In March this year, a Chinese delegation paid a return visit to Cambridge, in order to further develop these links leading to a Memorandum of Understanding and joint projects. In addition to the Consular and S&T Department staff, organisations represented on the visit were Jinan University and the Institute for Traditional Chinese Medicine.

Systematising traditional medicines

Interestingly the Chinese see a major opportunity in systematising and exploiting their traditional medicine both technologically and commercially, as a complement to the Western approach to

medicine. It is likely that this will provide a focus for a first collaborative project in technology roadmapping, with research support from Jinan university, which is keen to establish activity in this area.

The CTM range of research, teaching and outreach was also presented, with many staff taking part in the discussions. The Chinese delegation, which was in the UK for a week also visiting EPSRC, TSB, KTNs and UKTI, expressed great satisfaction with their visit and the hope that specific project collaboration could soon follow.

CTM is also developing links with the S&T Department at a national level in Beijing, and with Tsinghua university for further dissemination of T-Plan in a Chinese translation.

Technology management research at Cambridge

- Good design practice
- New product introduction collaboration
- Strategic technology management
- R&D project selection
- Software sourcing in manufacturing
- Product planning
- Enhancing creativity in new product development
- Technology management: a process approach
- Technology selection
- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- Technology management in software production
- Technology scanning and intelligence
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and knowledge management
- Technology valuation
- Technology foresight

Student projects

The following list outlines interesting areas of new research being explored through undergraduate and postgraduate students projects, that may lead to further work:

- How do financial downturns affect venture financing behaviour for technology start-ups?
- User-driven open innovation in the solar energy industry in developed & developing countries
- Disruptive Innovation: A viable business strategy for engaging the Indian 'Bottom-of-the-Pyramid' (4 Billion people with incomes less than \$7 per day)
- Innovation policy for the development of University Science Parks in China: A comparative case study between China and the UK
- The long-term effect of 'innovation vouchers' on SME collaborations with universities: Case study examples from Cambridge.

- How do organisations intending to engage in asymmetric partnerships conduct initial communications?
- How do innovative cleantech firms interact with their external business environment?
- Investigating the issue of intellectual property (IP) in the implementation of open innovation
- Analysis of the marketing and production issues for the introduction of a novel refrigeration technology in Indian rural markets

Research award

David Probert, Clare Farrukh and Rob Phaal of CTM have been awarded an International Association for Management of Technology award. This is given to top researchers in the field of 'Management of Technology' based on publication record in the last 5 years in the top 10 related refereed journals.

Welcome...



David Gill has joined CTM as a part time Senior Research Associate on the Emerging Industries Programme (EIP).

Within EIP, David will be working with Helen Xia and Tim Minshall to review the role of public and private investments in the emergence of new, science-based industries.

A particular focus will be on the role of venture capital and corporate venture capital, and government policy in supporting these activities.

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Diary

www.ifm.eng.cam.ac.uk/events

June

2	<i>Doing more with less: Innovation under constraints</i>	One-day seminar Moller Centre Cambridge
3	<i>Cambridge Manufacturing Engineering design show 2009</i>	Evening event The Pitt Building Cambridge
10-11	<i>Strategic roadmapping</i>	Two-day course Murray Edwards College Cambridge

July

9	<i>Software sourcing - turning costs into assets</i>	Afternoon workshop Murray Edwards College Cambridge
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