

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

August 2008

How do companies feel about 'opening up'?

The need to work collaboratively with others on R&D – known as ‘open innovation’ – is an increasingly important issue for many companies. Today’s rapidly changing technologies and markets mean that few can afford to rely on in-house research departments alone.

However, working with another organisation and sharing information is not easy, not least because the organisations involved are likely to have different work cultures and perspectives.

CTM has been researching how to operationalise open innovation as part of a Unilever-funded research project. In May, CTM brought together a range of multi-national companies to address this issue at a workshop in Cambridge entitled ‘Cultural aspects that underpin the implementation of open innovation’. The companies were all members of the Cambridge Open Innovation Network, or ‘COIN’.

The CTM research team has developed an initial framework for open innovation based on a series of recently completed case studies. The framework highlights the different perspectives which can exist within individual companies and the consequent different attitudes towards open innovation.

Discussion at the workshop (above) focused on the different issues facing both ‘blue sky’ R&D and applied R&D, as well as those services and functions established specially to support the implementation of open innovation. Different implementation strategies were discussed, highlighting the various perspectives of companies and sectors. The framework was used as a tool for capturing and discussing the different



approaches that have been used to overcome cultural resistance to open innovation.

IP and open innovation

The workshop was preceded by an evening event organised by the Cambridge Network (www.cambridgenetwork.co.uk) and CTM entitled *Intellectual Property (IP) in open innovation: A dangerous mix?*. This event, sponsored by the law firm Hewitsons, brought together Cambridge start-ups and support service providers with representatives of multinationals including Nokia, P&G, France Telecom, Pepsico, Kodak and Unilever. Differing perspectives on IP and open innovation were presented by Mike Addison (P&G) and Tony Hooley (1 Ltd). The 50 attendees then continued discussion over dinner.

Next steps

These two events concluded the final phase of the research project sponsored by Unilever. The results of this project will be published shortly in a summary report.

CTM’s research on open innovation continues under the umbrella of the Cambridge Integrated Knowledge Centre

(www.cikc.co.uk). The CIKC was recently set up by the University of Cambridge with funding from the Engineering and Physical Sciences Research Council (EPSRC) to develop advanced manufacturing technologies based on new macromolecular materials systems, and to create valid commercial exploitation models for these innovations.

Forum for open innovation

The CIKC involves several university departments and a number of industrial partners and provides a perfect setting to continue the research into open innovation. Researchers will look into the specific issues faced when multiple companies seek to engage with universities to capture value from ideas emerging from collaborative research and application projects. CTM’s aim is to maintain and expand the current open innovation community of practice and to provide a forum for the sharing of knowledge and experience.

Training events

CTM is also responding to requests to run training events on various aspects of open innovation. In June, the second of three workshops to help ‘green technology’ start-up companies work with large firms was held in Scotland, in partnership with the Carbon Trust and TTP. This autumn, CTM and the Cambridge Network will run an introductory workshop on ‘Implementing open innovation in Cambridge’ for local start-ups.

For further information on these events, projects and future activities, please contact Tim Minshall (thwm100@cam.ac.uk) or Letizia Mortara (lm367@cam.ac.uk).

Mastering operational excellence

CTM delivered its annual one-week module on technology management as part of the Cranfield MSc in 'Operations Excellence' in June. Thirteen delegates from two companies – Rolls-Royce and BAESystems – spent the week with CTM at Selwyn College in Cambridge.

The module was delivered by members of the CTM team, with additional input from expert speakers from industry, and covered technology management frameworks and tools, technology roadmapping and planning, IP, innovation and alliances, and operational scope.

The module involved presentations, exercises, discussions and background reading, all of which fed into an integrating case exercise. The case exercise focused on the development and application of an advanced joining technology in the aerospace industry. First-hand experience was provided by experts from Rolls-Royce who had been involved in the development of this technology over a number of years.



For the assessment part of the module, delegates are required to apply the technology management tools and techniques to a project within their own firms.

Plans are already underway for the refinement and delivery of this module in 2009.

Recent CTM research papers

Development of practitioner guidelines for partnerships between start-ups and large firms

Tim Minshall, Letizia Mortara, S. Elia and David Probert. **Journal of Manufacturing Technology Management**

This paper illustrates the development of the final outputs of a research project looking at partnerships between technology-based start-ups and large firms ("asymmetric" partnerships). It presents the stage of the research aimed at understanding how best to design outputs to assist firms in managing such partnerships.

Treatment of risk in valuing and comparing small portfolios of projects

Rick Mitchell, Francis Hunt and David Probert. To be published in **Research Technology Management**

Many of the tools used in valuing and selecting projects are applicable only to large portfolios. This paper presents an approach for smaller portfolios. The approach is simple and logical although it requires an uncomfortable change of perspective. The paper also includes recommendations for best practice in building decision trees.

Technology insertion in the defence industry: A primer

Clive Kerr, Rob Phaal, David Probert. **Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture**

This paper gives a concise overview of 'technology insertion' in order to provide a standard frame of reference. A generic definition of the term has been proposed together with a taxonomy that places technology insertion into context with other technology management processes. In addition, the components and dimensions of technology insertion are presented. These concepts are illustrated by real-world examples.

Creating wealth from knowledge: practice and policy

Keynotes at this year's Cambridge Technology Management Symposium will include speakers from Arup, Philips, China Mobile, the Technology Strategy Board, Imperial College, Shell and Plastic Logic.

This year's event will focus on the successful exploitation of scientific knowledge. This is an important driver of all advanced economies, requiring coordinated action by research organisations, funding bodies, large and small firms and government departments. This is a subject of increasing concern in many countries as new ways are sought to stimulate and sustain growth.

The symposium, now in its 14th year, will have the usual stimulating mix of case study and workshop sessions. It takes place in Cambridge on 25 and 26 September. Book now to avoid disappointment!

www.ifm.eng.cam.ac.uk/ctm/symposium14/



A speaker at last year's symposium

Philips' technology incubator proves the exception to the rule

Large technology-based firms are constantly searching for approaches that enable them to innovate more successfully and retain their competitiveness. Corporate incubators represent one such approach but many have had to be terminated after a year or two due to financial cutbacks. However, a recent study by CTM researchers has found the Philips Technology Incubator in Eindhoven is proving an exception to this rule.

Established in 2002 by Philips CTO Ad Huijser, the incubator benefited from Huijser's strong commitment to the programme as well as support from the Philips Board during turbulent market conditions. The incubator remains in operation today thanks to a successful approach put in place by Jelto Smits, the Technology Incubator CEO, remarkably similar to venture capital-based entrepreneurship.

The first similarity is in the entry criteria to the incubator. Project groups from within the Philips project divisions hoping to become one of the incubated ventures need to satisfactorily demonstrate five criteria: (1) The protectability of the intellectual property governing the technology, (2) The potential of the technology to create a €100 million market, (3) The potential disruptiveness of the technology to an industry, (4) The strategic alignment of the technology with Philips' long-term corporate strategy and (5) A motivated and capable team.

The second similarity is in the incubator management. Excess bureaucracy is avoided by having only a CEO and CFO managing the ventures in the incubator. Their role is to provide the space for each enterprise to make its own decisions. However, all customer and supplier contract decisions are routed through them and the progress of the ventures towards commercial readiness is determined by the Bell-Mason stage-gate process.

The ultimate objective of the incubator is to 'spin-in' those ventures that retain strategic alignment with the company once they have begun to generate sales. Out of 21 applicants for the incubator, 11 have been accepted. Of these, two have since been re-introduced to Philips product divisions. Meanwhile, another three ventures have been deemed to no longer have strategic alignment and have been spun-out in partnership with new venture partners.

The success of this first technology incubator encouraged Philips to open two further incubators in healthcare and lifestyle technologies early in 2006. However in contrast to the 'technology-push' model of the technology incubator that relies on prior technical research within Philips, these new incubators identify market opportunities and then develop solutions in response, through whatever mechanisms possible.

Mosquito traps, cocktail makers and intelligent litter bins...

A high street litter bin that sorts waste and a device to help deaf musicians feel the beat are just two of the latest ideas by Cambridge University students hoping to bring new products to market.

The ideas went on display, along with eight more prototypes, at the Institute for Manufacturing's Design Show in June. The annual showcase is a chance for Manufacturing Engineering students to show off their ideas to local inventors, industrialists and designers, looking to spot the next big thing.

This year's products ranged from a mosquito trap designed for use in rural India and a new design for a laboratory pipette, to a professional cocktail making machine to help bartenders meet rush hour demand.

Other products on display included an automated ironing device, a shower tray that recovers energy from waste water and a transportable apparatus for producing a column of clean air for field surgery.

Each project for the show is produced over the course of a year by teams of three or four students. The participants have to research the market and devise a full business plan, the only limit on their ambition being that whatever they produce has to be an original idea that meets a genuine customer need. The projects are supervised by Dr James Moultrie of CTM.

"The projects require both engineering and industrial design skills. The students not only have to come up with novel ideas, they also have to consider the commercial and marketing aspects of their designs. They also learn a great deal from



having to produce models and prototypes of their products," said Dr Moultrie.

Practical projects are a strong feature of both the IfM's undergraduate and postgraduate courses. Students work individually or in small teams on company-based projects, tackling real industrial or commercial problems. Recent projects have included improving the ultrasonic welding of plastic medical devices, researching the design of a portable power supply and considering ways to improve the customer experience for audiences of a professional orchestra.

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

Conference reports

Creating and managing a knowledge economy

International Conference on Management of Technology (IAMOT), Dubai, April 2008

Four members of CTM presented papers at this event, attended by around 200 academics:

Embedded software: from development project to commercial asset (Val Thorn)

Using patent information to increase efficiency of R&D investment (Yongtae Park, Sungjoo Lee and Byungun Yoon)

Innovation capability reconfiguration in business transition: A case study on Taiwanese PC firms (Ting-Kuei Kuo and Tim Minshall)

Developing the concept of 'Innovation Readiness Levels' – a new approach for managing the process of innovation (Lan TAO, David Probert, and Rob Phaal).

Emerging and new approaches to R&D management

R&D Management Conference, Ottawa, June 2008

This conference was run in conjunction with the National Research Council of Canada, who provided tours of their leading-edge research facilities.

CTM was well represented at the event, with presentations by Clive Kerr, Sungjoo Lee, Simon Ford, Charles Romito, Lan Tao and Andrew Muir Wood.

In his farewell address, R&D Management editor Jeff Butler, indicated that next year's conference will return to its spiritual home at Manchester Business School. The 2009 conference will take the theme: *Imagination, intelligence and innovation*.

Open innovation: Creating products and services through collaboration

International Society for Professional Innovation Management (ISPIM), Tours, June 2008

Delegates to this conference enjoyed key notes presentations by companies such as IBM and Total, as well as by Professor John Bessant, Chair in Innovation Management at Imperial College, London.

CTM presented two papers: *Open innovation in Korean SMEs – the case of the ICMS intermediary* (Sungjoo Lee)

Implementing open innovation: cultural issues (Letizia Mortara, Imke Slacik, Johann Napp, Tim Minshall)

The event provided excellent networking opportunities as well as a taste of Loire Valley culture.

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Diary

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

Sept

25-26	<i>CTM Symposium Creating wealth from knowledge</i>	Two-day conference Downing College Cambridge
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Oct

2	<i>Technology evaluation</i>	One-day course New Hall Cambridge
16	<i>Strategic roadmapping</i>	One-day course New Hall Cambridge