IfM Centre for Technology Management

UNIVERSITY OF CAMBRIDGE

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM) August 2009

Open Innovation and the CTO

Chief Technology Officers have a central role to play in the successful implementation of Open Innovation, according to the fifth annual European Institute for Technology and Innovation Management (EITIM) Senior Management Forum.

The event, which took place in Cambridge in May, also warned that the global economic crisis – the worst recession since the 1940s, should not prevent the drive towards innovation.

Interest in Open Innovation (OI), the process of developing products and technology with other organisations, is high and the event was designed to share ideas of how best to promote it. And the role of the Chief Technology Officer (CTO) could be central to overcoming barriers its successful implementation.

The event was attended by some of Europe's leading businesses and academic institutions. Senior managers from the likes of Unilever, Philips and BAE systems were able to offer practical perspectives on how to achieve OI. Proceedings covered five main themes:

- Working with technology clusters to tap into sources of knowledge
- Entrepreneurial finance
- Cultural issues impacting innovation
- Open source practices and challenges
- Market intelligence, foresight and emergence

Also attending the event were the Fraunhofer Gesellschaft, Bosch und Siemens Hausgerate, Systematic (Paris), TWI, Unilever, Volvo, Speed International and the Technology Strategy Board.

Key challenges

Together with presentations drawn from current research at the EITIM universities, the comparison of practices at these leading companies provided a very rich basis for discussion and identified some of the key challenges facing the CTO in the implementation of open innovation. These include:

- Making use of networks, inside and outside the company
- Managing barriers to open innovation in networks, often related to intellectual property rights
- Focusing on team and market factors, not just the technology
- Overcoming the 'stickiness' of knowledge that hinders the implementation of innovation
- Building a system that links open and closed innovation inside the company

Entrepreneurial approach

And the forum delegates also warned that the tough global economic situation should not impede the drive for innovation. The forum heard that firms needed to develop an entrepreneurial approach to finance and accessing external resources. The ability to successfully access additional cash flows would be a significant factor for companies. This was illustrated by David Gill, Director of the St John's Innovation Centre in Cambridge, during his speech at the Forum dinner in Peterhouse. His theme was 'Finance for Innovation' and he traced the origins of the banking system through to the current context, and focused particularly on the implications for securing finance for new firms in emerging industries.

Delegates agreed that the two days had been very useful in not only identifying the key issues, but also debating the different practical means of dealing with them in varying organisational contexts.

Plans are already under way for next year's Forum, which will again focus on issues central to the role of the CTO. For further information on the activities of the EITIM see the website at www.eitim.org

Technology Management module for Cranfield MSc in Operations Excellence

For the sixth year in a row, CTM has delivered its module on Technology Management for the Cranfield MSc in Operations Excellence. The MSc, originally designed for Rolls-Royce, now attracts delegates from companies including BAE Systems, Selex Galileo, James Walker & Co Ltd.

This year's module was delivered at Selwyn College, Cambridge, and was structured around the core themes of technology management frameworks and models, technology strategy and planning, IP, alliances and innovation and operational scope. The module was delivered by a combination of CTM staff and guest speakers from Rolls-Royce. Key lessons from the module were then applied through the discussion of an integrating case study of an advanced technology project. The delegates reflected on the lessons learned throughout the week by writing a report on a current or historical project from their own organisation.

The delegates were also able to attend a formal dinner at Girton College, where the guest speaker Dr Rick Mitchell provided an informative and entertaining overview of the history of Cambridge. The warm weather provided an opportunity for the delegates to experience the pleasures of punting on the Cam.

R&D conference report

This year's R&D Management conference was held in Vienna in partnership with ISPIM (International Society for Professional Innovation Management). The theme was the reality of R&D and its impact on innovation. CTM contributed six papers: three from the research team, two PhD papers and a joint submission with our Korean research collaborators.

Dr Simon Ford reported on the survey findings from the Innovation and Productivity Grand Challenge (IPCG) project on radical innovation through intrapreneurship. Dr Clive Kerr presented the paper entitled "Cogitate, articulate, communicate: The psychosocial reality of technology roadmapping and roadmaps". This area represents a new research focus for CTM.

The research on open innovation was showcased by Dr Letizia Mortara through the "Skills and culture for open innovation" paper. On the PhD front, Lan Tao presented his work on innovation in response to emissions legislation, reporting on a case study at Johnson Matthey.

Yuan Zhou presented his paper "Building the innovative capabilities: An inquiry into the dynamic growth process of university spin-outs in China".

There was a joint paper between the technology intelligence project team at CTM and two of our previous visiting researchers Dr Sungjoo Lee (2008) and Dr Byungun Yoon (2007) on the application of data mining.

Technology acquisition and protection project

As companies extend their acquisition of technology to a wider base of potential supply partners through open innovation approaches, the issues of intellectual property protection increase in significance. Given growing industrial interest in this area and a lack of accessible practical guidance, a new project investigating technology acquisition and protection was started by CTM in July 2009.

The first industrial workshops in this project are planned for early autumn. If you are interested in getting involved in these please contact Simon Ford, sjf39@cam.ac.uk.

Design in Science

Design in Science is a new project that explores the impact that designers may have on scientific research, particularly in its early stages. The aim is for designers to collaborate with scientists on their work in order to address the following questions:

- How and to what extent can design play a useful role in early stage scientific research?
- How will the role and impact of design engagement be influenced by factors such as the type of science, the extent to which science is applied and its complexity?

For more information about this project, contact Dr James Moultrie (jm329@cam.ac.uk)

Innovation and Productivity Grand Challenge (IPGC) comes to an end

June 2009 marked the formal conclusion to the Innovation and Productivity Grand Challenge (IPGC). In order to disseminate a number of the findings from the multiple threads of research in the project, CTM held a one-day seminar "Doing more with less: innovation under constraints" in June at the Møller Centre, Churchill College. This event showcased the research conducted by the IPGC in Cambridge, with each of the three sessions picking up a specific strand.

The breakthrough innovation work was described in the first session, "Regenerating large firms: developing new business models". Research into university spin-outs and entrepreneurial activity was presented in the second session, "Growth through adversity: the Cambridge phenomenon and environmental ventures". Finally, the third session, "Letting others do the work: technology consultants and intermediaries", picked up issues of working in partnership with others. The day concluded with group discussions around these themes and presentations from each group to all the participants. We would like to thank the external speakers who came and gave such illuminating presentations: Tony Sidwell of British Sugar, Eric Mayes of CDT and Jeremy Klein of Sagentia.

A practitioner report, "Organising for breakthrough innovation" is currently in the final stages of preparation prior to publication. Drawing on case studies of Philips, BAE Systems, BT and ARM, along with recent IPGC survey data, the report describes some of the organisational challenges breakthrough innovation presents and aims to provide firms with guidance on how they can approach it with greater success.

The report characterises the search for breakthroughs according to the organisational objective and innovation strategy involved (see Figure right).

A short film from our project partners at Imperial College will soon be released. In the film, researchers from each of the five participating universities describe the outcomes of the IPGC. David Probert and Elizabeth Garnsey provide insights from the Cambridge research and a link to this will soon be made on the CTM website.

Categories of breakthrough innovation

Organisational objective

Innovation strategy	Exploration	Exploitation
Structured	BT Brightstar corporate incubator	Philips technology incubator
Emergent	ARM mbed project	BAE Systems autonomous systems facility

The figure shows four different examples of breakthrough innovation that we have studied, set in a matrix which provides a categorisation of the conditions under which these occurred. The axes show:

Organisational objective: *whether the purpose of the work behind the breakthrough was to explore new opportunities or to exploit something already present in the company*

Innovation strategy*: whether the organisational form that enabled the breakthrough to emerge was structured top down by management or emerged organically within the company*

Final year student projects tackle all aspects of manufacturing business

At the end of their four year course, manufacturing engineering students at Cambridge choose a seven-week, individual project on a topic of particular interest to themselves. Subjects range from research and market studies, through product and process design, to factory improvement and overseas projects.

This year CTM staff supervised 12 such projects, covering an unusually large spectrum of interests. Typical examples are:

- Developing a fault diagnosis system for a scientific instrument
- Yield improvement in food processing
- A market potential study for a solar panel business
- Investigating intellectual property issues in open innovation
- Automation feasibility in cell culture
- A ten year financial success study of Cambridge University spin-outs

These projects start every year around Easter time and, apart from the great learning opportunity they provide for the students, often give very useful results for the host organisation.

We are always interested in hearing about stimulating project ideas to offer the students, so feel free to contact David Probert with any suggestions (drp@eng.cam.ac.uk).

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

New CTM people

Alex Driver is working with James Moultrie on a project called "Design in Science". The aim of the project is to explore how designers and scientists can work together effectively to commercialise scientific research.

Carlos Peralta-Mahecha is a PhD student under James Moultrie's supervision, investigating the intersection between science and design, examining the ways in which designers and scientists interact and collaborate.

Bernhard Dusch is researching for a PhD with James Moultrie focusing on sustainable Design of domestic appliances. He has been working as a Designer for the German based design consultancy MetaDesign before he joined the IfM in May 2009.

New address…

Staff outside the IfM's new building in Charles Babbage Road.

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

September		
24-25	*CambridgeTechnology Management Symposium*	Two day symposium Downing College Cambridge
October		
14	*Technology intelligence Monitoring science and technology developments*	One day workshop, IfM Cambridge
15	*Strategic Roadmapping*	One day workshop, IfM Cambridge
November		
11	*Make or Buy - are you getting it right?*	One day workshop, IfM Cambridge
19	*Technology evaluation Assessing the business potential of new technologies*	One day workshop, IfM Cambridge