

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

November 2008

Creating wealth from knowledge

Cambridge Technology Management Symposium, September 2008

This year's Symposium attracted a record attendance of nearly 100 people, wanting to explore the ways in which science can be more effectively converted into wealth. For us in CTM, this is a key area of research, with two major EPSRC-funded projects focusing on this issue: The Innovation and Productivity Grand Challenge (IPGC), and the Cambridge Integrated Knowledge Centre.

Key attractions for delegates were the keynote speakers from a variety of interesting organisations and backgrounds in companies, government and universities. Professor John Bessant got proceedings off to a great start with a stimulating review of the challenges of innovation – of particular relevance in his role as academic lead on the IPGC.

Mike Hield from IXC UK described their novel approach to brokering open innovation, and the remarkable growth of this intermediary organisation since its foundation five years ago in Australia. The role of intermediaries is the focus of a CTM research project starting in December 2008 – see page 2 of this newsletter for more details.

The role of the Technology Strategy Board (TSB) in accelerating innovation



was outlined by Dr Allyson Reed, who showed how the chosen innovation platforms and targeted government procurement spending could be used to enhance the UK's innovative capacity. This theme was taken up by Professor Jeremy Watson, Director of Global Research at Arup, who have worked closely with the TSB. The use of foresight and roadmapping by Arup to explore future innovation opportunities was particularly interesting.

Large company approach

In the final plenary session, thought provoking examples of the way large companies drive innovation were provided by Henry Ge of China Mobile and Dr Bob Bates of Philips. China Mobile is developing new technologies to exploit the large opportunities for growth in the rural areas of China. Philips have had significant success with a new approach to business incubation linked to their chosen areas of business focus.

In addition to the plenary sessions, the delegates broke out into parallel case study presentations, where there was the chance to discuss particular examples of interesting practice in more detail. The themes here included breakthrough innovation through intrapreneurship, accelerating knowledge transfer, developing an open innovation culture and generation of new business in the Cambridge area.

Insight into current research

Four workshops offered the opportunity for delegates to get an insight into the findings of CTM research in areas relating



to the symposium theme. Industry emergence, the fuzzy front end of innovation, environmental innovation and the skills required for open innovation were all topics explored in these workshops.

The Symposium dinner, always a highlight of the event, was held this year in Emmanuel College. Following a welcome to delegates from Professor Andy Neely (co-Director of the Advanced Institute of Management Research), the after-dinner address was given by Sir Richard Dearlove, Master of Pembroke College, and former Chief of MI6. His informative and entertaining speech, based on his professional experience, made some insightful links to the world of technological innovation, and his willingness to take questions afterwards was greatly appreciated by everyone. As he pointed out, there is no such thing as an indiscrete question, only an indiscrete answer!

Next year's Symposium will be on 24 and 25 September 2009, and we are already looking forward to another enjoyable and useful event.

David Probert

Evaluating the potential of new technologies

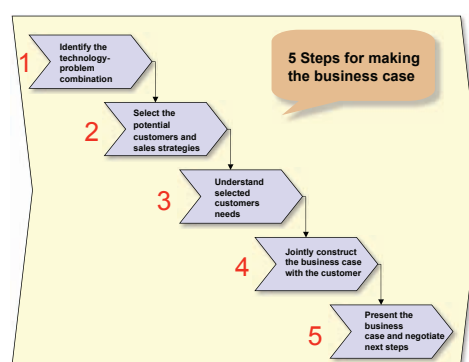
How much is a technology worth? This is a commonly asked question but very challenging to answer, particularly for early-stage technologies. Financial calculations are hindered by complexity, ambiguity and uncertainty. A combination of qualitative and quantitative approaches is needed to support communication and good quality decisions. CTM held a one-day workshop in Cambridge on 2 October to explore these issues, attended by 20 participants from a range of sectors.

Financial methods such as net present value (NPV) are widely used, and are necessary for supporting investment in technology projects. However, research has demonstrated that companies that rely solely on such measures under-perform compared to those that take a more balanced approach to the evaluation of technology.

Understanding and communicating the technological and commercial context of innovation is vital, bringing together key stakeholders from these two communities. As well as financial measures, a number of other tools and techniques can provide support for the technology evaluation. At an early stage of a technology's development more qualitative approaches are appropriate, with an increasing emphasis on quantification and financial measures as the technology matures and the market is understood.

A number of standard methods were presented at the workshop, including weighted scoring, portfolio management and roadmapping approaches, together with novel methods developed as part of a recent research programme undertaken by CTM:

- Value roadmapping, which is a workshop technique that brings together technology and commercial functions to explore the commercial potential of an emerging technology. The application of this technique was illustrated with a case study from Dr Andrew Flewitt from the Centre for Applied Photonics and Electronics (CAPE), focusing on the development of high performance zinc oxide films.
- A method for valuing projects in small portfolios, where probabilities cannot be reliably applied. This uses a combination of graphical decision trees and expert judgement to identify confidence levels, providing a measure of the range of likely outcomes from a project. This enables managers to understand the potential value and risk associated with their investments, and to take appropriate decisions based on options-thinking.
- A five-step process framework (below) for making the business case for new technologies, based on marketing principles and consultative sales techniques. This brings together the various activities needed to commercialise a new technology successfully.



Students go on study tour of Brazil



Last July final year manufacturing Engineering students set off to research Brazil's industrial development. Focusing on foreign investment, Brazilian entrepreneurship, and the Brazilian energy industry, the group visited Sao Paulo, Rio de Janeiro, and Brazil's first capital, Salvador.

The organisations visited included Embraer, Brazil's leading aircraft

The team was also very interested to learn how international companies tailor products to suit the people of Brazil.

The tour proved a valuable introduction to the vibrant culture of the country and its current strengths, as well as the areas it is targeting for improvement and its plans for the future.

manufacturer, Macroplan, a leading strategy consultant, and a Petrobras oil refinery. One of the most striking findings was the discovery that Brazil is almost self-sufficient in electricity production through hydroelectric power.

Technology intelligence

A new project focusing on the role of intermediaries in helping companies set up their intelligence networks and access information will begin on 1 December 2008. The project will be supported by the IMRC in collaboration with a consortium of companies including BP, CIRA (Italian Aerospace Research Centre) Crown Cork, Doosan Babcock, IXC-UK, GSK, NESTA, Oakland, Pepsico and Shell.

Executive education workshops will enable participants to increase their knowledge of technology intelligence and to learn about methods for reviewing and improving their company's current TI activity. The workshops will be a great opportunity for cross-company debate and to learn from each other's experience. Events have been scheduled for 19 February and 14 October 2009.

For more details of this project email Dr Letizia Mortara: lm367@cam.ac.uk.

How India is building on its IT strengths

How India is developing innovative new products by building on its substantial strengths in international IT services was the focus of a recent research visit to the country by three members of CTM.

The visit, by Tim Minshall, David Gill and Satya Dash, formed part of the 'Funding Technology' research project supported by the Gatsby Charitable Foundation. The findings will provide input to a report on India being produced as the latest project publication. They will also help in the preparation for a two-week research trip to India being organised by the IfM's final year manufacturing engineering students. The trip is due to take place in late June and early July 2009.

The Funding Technology team visited a range of companies, government departments and other organisations. The CTM members were accompanied by Martin Rigby of ET Capital and Rahul Nayar of IndusAge Advisors.

For more information on the 'Funding Technology' report series please visit: www.fundingtechnology.org

Open Innovation

The Cambridge Integrated Knowledge Centre (CIKC) ran a workshop in November bringing together industrialists and academics to discuss the opportunities, methods and challenges of collaborations between firms and universities. The workshop took place at the Centre for Advanced Photonics and Electronics (CAPE) in Cambridge, as part of the Open Innovation Research project, following sponsorship from Unilever.

An introductory workshop on how to implement Open Innovation in Cambridge will be run by CTM and Cambridge Network next spring.

Radical innovation and 'intrapreneurship'

Intrapreneurship is the range of entrepreneurial activities that are ongoing within an established organisation. The Innovation and Productivity project, one of several government-funded 'Grand Challenges', has identified intrapreneurship as a topic of interest. Research has found that a firm's organisational culture is often seen to inhibit intrapreneurs and their attempts at innovation.

Survey of technology managers

To further investigate intrapreneurship and its links to stimulating radical innovation, the project is currently conducting a survey of technology managers. The results of this survey will be used to help establish what approaches are being taken by UK technology-based firms and whether intrapreneurial activity can be of benefit to firms attempting radical innovation.

The results of the survey will be disseminated at a one-day workshop in Cambridge on 22 January 2009. This workshop will also provide the opportunity for technology managers to interact with their peers and seek a better practical understanding of how to harness intrapreneurial activity within the firm and support radical innovation.

Take part online

Managers in technology-based firms can take part in the survey online. Each responding firm will receive a report that compares their responses to the average responses of the aggregated sample. An online form of the questionnaire can be found at:

www.ifm.eng.cam.ac.uk/ctm/innovationsurvey.html

For a paper copy of the questionnaire or for more information about the survey or workshop, please contact Dr Simon Ford at sjf39@cam.ac.uk or telephone 01223 766776.

Would you like to host a student project?

CTM ran a successful new module on Technology and Innovation Management for the IfM's MPhil in Industrial Systems, Manufacture and Management (ISMM) over two weeks last January. ISMM is a nine-month Masters degree that prepares graduates for an accelerated career in manufacturing and business enterprise. The programme is designed to provide them with the technical skills, personal development and industrial experience they need to be immediately effective in their early careers.

Following the module, the students undertake two-week industry-based projects, where pairs of graduates work in a company tackling real problems. The IfM has been running similar projects in other subject areas for many years and they are of great value to the students and the companies involved.

Further opportunities to host a project will come early next year. Companies can take one or two pairs of graduates for a two-week period in late January and early February. The students work on a project tailored to each organisation's requirements. At the end of the project a formal presentation is given together with a copy of the assessed project report.

The students are supported by a mentor from the IfM. There is no charge for hosting a project, but companies should be able to accommodate students at an appropriate place of work and give them access to the resources they need – typically key people associated with the issue they are looking at together with a workstation. For further details please contact Judith Shawcross at jks45@eng.cam.ac.uk.

A later project opportunity is provided by our Manufacturing Engineering students who carry out individual, seven-week projects after Easter. Over the years they have engaged very effectively with many of our collaborating companies on a wide range of topics. If you think you have an idea for a suitable project please contact David Probert at 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

Welcome to new people at CTM...



Rani Dang is a visiting doctoral student from the National Center for Scientific Research at Sophia-Antipolis, in France. She is studying the involvement of

SMEs in regional innovation clusters and the effect of this on technological development.



Vivian Mohr is a doctoral student investigating the later stages of the entrepreneurial life cycle with an emphasis on the biotech sector. Vivian holds an MPhil

in Innovation, Strategy and Organisation and a B.A. in Business.



Dr Brychan Thomas is a CTM Research Associate on a ten month secondment from the University of Glamorgan. He is investigating the formation and growth

of new technology based firms.



Catherine Mulligan joins CTM as a Research Associate on the Emerging Industries Programme. Catherine is in the final stages of her PhD, applying a 'systems

thinking' approach to the industrial evolution of the Telecommunications, Information Technology and Broadcasting industries.



Alex Drofiak graduated from the IfM this year and has re-joined CTM as a research assistant. He is continuing research on firm and sector trends in the

Cambridge high tech clusters and is particularly interested in methods of cluster analysis.



Jan-Niklas Keltsch has joined CTM as a doctoral student. He will explore the integration of a suitable technology management system (tools and processes) with different business models.

Contact us

Centre for Technology Management
Institute for Manufacturing
Department of Engineering
Mill Lane
Cambridge CB2 1RX
UK

Tel: +44 (0)1223 766401
Fax: +44 (0)1223 766400
Email: ctm-enquiries@eng.cam.ac.uk
www.ifm.eng.cam.ac.uk/ctm

Diary

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

Dec

3	<i>Manufacturing Mobility: Setting up manufacturing operations abroad</i>	Afternoon workshop New Hall Cambridge
---	---	---

Feb

19	<i>Technology intelligence: monitoring science and technology developments</i>	One-day workshop New Hall Cambridge
----	--	---

Mar

5	<i>Strategic roadmapping</i>	One-day course New Hall Cambridge
---	------------------------------	---