

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

May 2008

Innovative training for technology managers

Industrial engagement lies at the heart of the Centre for Technology Management's activities, including research, outreach and education. Over the past few years CTM has developed a range of executive education courses that provide opportunities to understand and explore the key concepts and techniques needed to fully exploit technological investments and opportunities.

The interactive nature of these courses provides a unique opportunity to experiment with a range of approaches. This is enabled by a combination of presentations, discussion and group-based workshop sessions, drawing on the range of interests within CTM. The rich experience that attendees bring to the courses is invaluable, with participants typically representing a range of sectors.

Technology and innovation

The most recent technology and innovation course was held at Jesus College in Cambridge in April, attended by 20 people. This was an intensive three-day event, covering the following topics:

- Introduction to technology and innovation management
- Technology, industry and market evolution and change
- Technology and innovation management audit
- Innovation and new product introduction
- Strategic technology management
- Technology intelligence
- Strategic roadmapping

- Open innovation, partnerships and alliances
- Technology acquisition – make-or-buy
- Intellectual property and technology protection
- Company case studies – invited speakers

Modular course design

The course is modular in design, enabling the content to be customised for particular organisations and sectors. The various modules can also be delivered separately, for example make-or-buy, roadmapping, technology intelligence and technology valuation. CTM has also collaborated with Cranfield University for a number of years to deliver a week-long course for Rolls Royce, as part of an MSc 'Operations Excellence' programme.

Tailored courses for industry sectors

The flexibility of the course was tested this year by an interesting opportunity to work with Cranfield University to deliver training to future leaders of companies



in the red meat industry. A one-week technology and innovation course was delivered in March, with case studies and discussion tailored to the unique challenges facing this sector. The course was developed in association with the Red Meat Industry Forum and the Danish Meat Trade College, comprising a total of ten modules held in Cranfield, Roskilde and Cambridge.



Studying how new industries emerge

How does a new industry develop? What conditions are needed to ensure a novel technology or scientific concept is transformed into products and services and grows into a viable industrial sector?

CTM is involved in a major new research programme looking at these important issues. Supported by £800,000 from the IfM's Innovative Manufacturing Research Centre funding, this research will develop understanding of the conditions that lead to the successful growth and establishment of new industrial sectors, and their associated companies.

This is a multi-faceted problem and the project involves three other IfM research centres. The issues being explored range from policy and regulatory implications, through funding and the management of start-up firms, the development of suitable supply networks, investment and manufacturing strategy to the role of design.

CTM researchers are involved in many of these projects, including design, investment and start-up strategy. However, current effort focuses primarily on two aspects of the programme. One is the development of a conceptual framework that enables these different perspectives to be integrated and communicated to the various stakeholders, and the other is an exploratory project to develop mapping techniques that investigate emergence of a new industry.

Diamonds, catalytic converters and mobiles...

This latter project, 'Technology-based emerging industries - mapping creation and transitions', has already used a mapping technique to depict the emergence of industries as diverse as synthetic diamonds, mobile telecommunications, catalytic converters and software. A typical map shows the development of the industry over time, from the initial 'spark', through application of the concept or science to the establishment of viable businesses. By showing the key events and conditions that influenced the emergence of an industry in the past, together with other barriers and enablers that affected the establishment of a new industry, it is hoped that some general lessons can be drawn. These might be about the mapping technique itself, or about the conditions that influence emergence.

The diagram (right) shows an example emergence map, drawn for the synthetic diamond industry. The next phase of the project will review the learning from several such maps, before going on to develop a prototype management scanning (mapping) tool to support navigation of future emergent industries.

The findings from the whole EIP programme are due for completion by September 2010. Collaborators and sources of additional funding to expand the work beyond the current projects are actively being sought – anyone interested please contact David Probert (drp@eng.cam.ac.uk).



New investigation into entrepreneurship in India

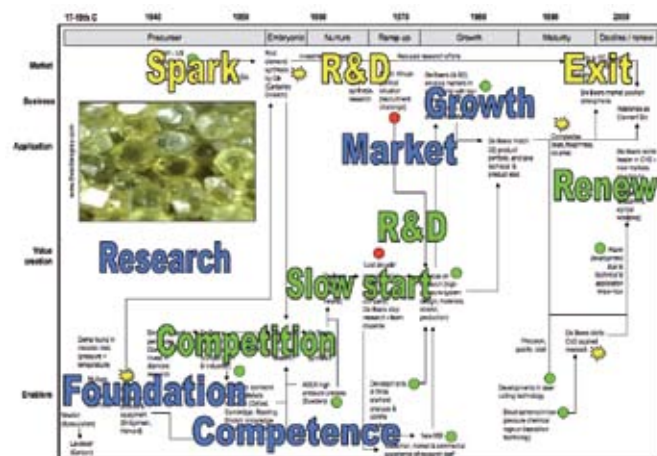
CTM is currently preparing the fifth in a series of reports on support for innovation and entrepreneurship in different national contexts. The first four reports in this series have covered the United States, Israel, Germany and the UK. The latest report will examine innovation and entrepreneurship in India.

The research, supported by the Gatsby Charitable Foundation and St John's Innovation Centre, will provide an overview of the growth of the Indian economy, and summarise the role of venture capital, banks, universities, public policy, firms (large domestic firms, multinationals, SMEs and start-ups) and professional service providers in driving the recent surge in the performance of the Indian economy.

The research team are drawing upon the numerous strong links that the University of Cambridge has with the Indian private and public sectors. The report will be linked to ongoing research on India at the IfM's Centre for International Manufacturing and Centre for Economics and Policy

For information on the Indian report, which is due for publication in early 2009, please contact Tim Minshall (thwm100@eng.cam.ac.uk). All reports in the 'Funding Technology' series can be downloaded from:

www.fundingtechnology.org



A map of how the synthetic diamond industry emerged

Continuing focus on technology intelligence

CTM ran a highly popular two-day event at the end of February on 'technology intelligence' – the processes required by companies to scan for new technologies.

Delegates from international companies discussed how to establish a TI system in their organisations, exchanging ideas and experiences while learning about CTM's model and tools. Participants also heard about TI activities at Unilever and Kodak.

Intermediaries can provide important services in relation to TI. This was illustrated in a presentation by RTC North.

New TI research

CTM is continuing its work into TI systems with two new projects which aim to improve the current understanding and develop new tools:

The role of intermediaries in establishing TI networks

People play a central role in TI systems. Intermediaries can help a company with limited resources to grow its contact base exponentially. However, many service providers are available and it can be difficult to decide which one to use. Finding the right person within the organisation to act as an intermediary can be fundamental. This project will explore these issues and will provide guidelines for practice.

CTM is establishing a consortium of industrial stakeholders to be part of the project. The companies will provide steering for the research as well as financial and in-kind support. In return they will gain early access to the tools being developed.



Gathering intelligence from existing documents

Many company documents contain raw data in unstructured form, originally created for different purposes, which could have great potential as sources of TI, if properly analysed. Examining large volumes of data and extracting explicit intelligence information, could be very valuable.

However, a large proportion of the data lies in company databases and is hardly used because such documents are poorly structured and difficult to access. CTM is exploring how ICT tools could be used to manage information and make sense of the data captured.

Contact Letizia Mortara (lm367@cam.ac.uk) if you are interested in this work.

CTM's growing portfolio of technology management events

CTM has a growing portfolio of workshops, short courses, teaching modules and executive education designed to disseminate research findings in technology and innovation management. Topics covered include strategic roadmapping, technology and innovation management, technology intelligence, technology evaluation and partnerships between large and small companies.

The Centre's long-running annual Symposium is held in September. This year it will look at the successful exploitation of scientific knowledge as an important driver of all advanced economies.

Roadmapping

Strategic roadmapping (also known as route mapping) is increasingly seen as a key management tool, enabling companies to link technological capability to product and business plans so that technology and strategy go hand-in-hand. The technique has been found to be extremely useful to businesses of all sizes and types who wish to plan their route into the future. CTM is an acknowledge centre of roadmapping expertise and runs three public courses, and many in-company projects, each year. The next public course will be held on 11-12 June.

'Managing partnerships between start-ups and large companies', is the topic of another popular workshop. Early-

stage, technology-based companies are significant generators of innovation but typically lack the resources they need to exploit their ideas. Larger, more mature companies need access to new ideas and need to source them from wherever they are generated – whether internally or externally. Collaboration between the two offers great benefits – but achieving a successful partnership is usually a major challenge. The next workshop is expected to be held in the autumn.

Valuing new technologies

Assessing the future value of new technology is a key management challenge. There is growing awareness that widely accepted cash-flow/payback models are of limited use, particularly in circumstances involving a great deal of uncertainty. The 'Technology evaluation' workshop gives an insight into the outputs of a recent research project investigating ways of valuing early-stage technologies.

Delegates are provided with practical ways of tackling technology appraisal in their own organisation. The approaches include software to raise awareness of technology evaluation issues; a decision tree software tool to support the use of quantitative approaches; and a value roadmapping guide for qualitative evaluations. The next workshop is expected to be held in the autumn.

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

CTM people news



Doctoral research Nicky Dee, above, has successfully completed her PhD. Her research focuses on the growth and development of early-stage environmental technology companies, with a particular emphasis on sustainable energy technologies. A workshop drawing on this work will run at the CTM Symposium in September (see Diary below).



Stewart McTavish, left, has successfully completed his research-based MPhil on the topic of: 'Comparing and contrasting business plan competitions at Cambridge and MIT'. Stewart's research was funded by the Cambridge MIT Institute, and drew upon data gathered when he was President then Chairman of Cambridge University Entrepreneurs. Stewart is now running his own start-up venture mo.jo which focuses on supporting start-up investors.



We welcome back CTM researcher Clare Farrukh, left, who has returned from maternity leave. Clare will be concentrating initially on technology evaluation research.

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Diary

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

June

11-12	<i>Strategic roadmapping</i>	Two-day course New Hall, Cambridge
12	<i>Profit from innovation</i>	One-day free workshop Hethel, Norfolk
19	<i>Software sourcing</i>	One day workshop New Hall Cambridge

Sept

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