

# Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

August 2011

## Studying the changing application of technology management

Delegates from Rolls-Royce, BAE Systems, Weetabix and Selex-Galileo participated in a five-day module on Technology Management in June delivered by CTM.

The module is part of the Cranfield MSc in Operations Excellence and has run every year since 2004. In its original form, the MSc was exclusively for Rolls-Royce employees but has been open to other companies for the last four years.

The module was structured around four main themes: the changing context for technology management, technology strategy and planning, IP and open innovation, and managing the changing operational scope of a manufacturing business.

Contributors to the module included both CTM members and senior managers from Rolls-Royce. Delegates were therefore able to experience both the broad lessons from a range of industry sectors studied by CTM researchers, plus the detailed experiences of those who manage technology for a globally-leading, high-value manufacturing corporation.

Key to the success of the module were the contributions that the delegates themselves were able to bring. The course was designed to ensure maximum opportunity for interaction and discussion through the use of case study exercises and the application of technology management tools. A new element this year was the delivery of a short session on 'Strategies for visual communication' by Dr Clive Kerr.

The delegates also experienced a flavour of the social side of Cambridge at a formal dinner at St John's College and an afternoon of punting on the River Cam.



*Delegates attending a formal dinner at St John's College, Cambridge (top) and working in case study groups on the balcony at the Institute for Manufacturing (below).*



*China Mobile delegates presenting at a group work session.*

## China Mobile Leaders' Programme

After the success of last year's first Cambridge University course for senior managers from China Mobile, the mobile communications company, we were delighted to work with a second cohort during two weeks in May. Now called the China Mobile Leaders' Programme, the course draws on many parts of the University, including the Institute for Manufacturing, the Judge Business School and the Cambridge Programme for Sustainability Leadership.

CTM topics included sessions on technology management, technology evolution, innovation management and open innovation. The delegates responded enthusiastically to our interactive and participative style of teaching.

## Students tackle real company problems

The teaching year is just coming to a close and once again our student projects and dissertations have produced many interesting and useful outcomes for their collaborating organisations. Each year students undertake a number of company-based projects, spending between two and six weeks tackling real industrial issues and putting the theory they have learned into practice.

Technology management-related projects this year included:

- Ideas competitions in multi-national organisations as part of open innovation
- The make-or-buy decision for production software in manufacturing firms
- Protection of technology and intellectual property during collaborations
- Managing risk in make-or buy-decisions
- Value stream mapping to reduce lead time in an engineering firm
- Future cost modelling for fuel cell manufacture
- The potential role of Technology Innovation Centres (TICs) within Bahrain's innovation strategy
- How has the impact of the financial markets on the venture capital industry affected the creation and funding of technology companies in key disruptive sectors?
- Evolution of the photo voltaic industry: Factors influencing world-wide installed capacity
- Mapping the emergence of the tablet computer
- Case studies of the role of location in supporting open innovation
- The role of demonstrators in technology-based industrial emergence
- Assessing the carbon impact of the supply chain at Domino Printing Sciences
- The issues and opportunities in acquiring ISO14001 accreditation at Domino Printing Sciences

The fuel cell business (Intelligent Energy) was particularly pleased with their project. The Head of Operations reported

that many of the student's recommendations are being implemented.

The IfM runs two student courses – the Manufacturing Engineering MEng and the Industrial Systems, Manufacturing and Management MPhil. Both these courses finish with an opportunity for each student to carry out a piece of original work, often in collaboration with a manufacturing company.

We are always interested to learn of possible project ideas, so feel free to send any suggestions to David Probert. Email: [drp@eng.cam.ac.uk](mailto:drp@eng.cam.ac.uk)



IfM Student Angaharad Porteous, who worked at Intelligent Energy, behind the wheel of a fuel cell-powered London taxi – a demonstrator for the 2012 Olympics

## Keeping Australia on track

Building on the successful Automotive Australia 2020 project ([www.autocrc.com/2020.htm](http://www.autocrc.com/2020.htm)), IfM is continuing to collaborate with The National University of Australia in the transport sector.

Senator Kim Carr, the Minister for Innovation, Industry, Science and Research recently announced a new initiative to develop a roadmap for the rail industry. "The roadmap will build a vision for the rail industry and provide direction for the next 30 years. It will identify pathways and areas for industry focus and investment, boosting capability and encouraging innovation."

The IfM contribution is being led by Dominic Oughton and Bill Colquhoun, supported by CTM, following on from similar projects in the UK. The Australian Rail Manufacturing Technology Roadmap will be developed over 12 months, involving manufacturers, service providers, operators, research organisations and other stakeholders.

## Conference on innovation management

David Probert of CTM was one of the keynote speakers at the annual conference of the International Society for Professional Innovation Management (ISPIM) in June. This year's event was hosted by the Hamburg University of Technology.

ISPIM was formerly aimed at industry managers and consultants concerned with the issues of innovation management, but has recently developed into a more academic conference. The mix of academics and industry professionals encourages good networking and also provides opportunities for CTM researchers to find interesting cases to study.



# How to encourage breakthrough innovation

A new CTM report *Organising for breakthrough innovation: Rejuvenating the established firm* by Simon Ford and David Probert is due to be published shortly. The report provides companies with guidelines on how to improve their approach to the generation of radically different technologies. The authors describe the obstacles facing firms and their employees when attempting to make significant innovative breakthroughs.

Ways of overcoming these obstacles to innovation are explored, including structured, top-down approaches (corporate entrepreneurship) and more informal activities by entrepreneurial members of staff (intrapreneurship).

Case studies of ARM, BAE Systems, BT, Philips and Qualcomm are included. These illustrate the challenges of putting such ideas into practice and the potential rewards of finding the right approach for a particular firm.

The report concludes with a number of key recommendations for firms pursuing breakthrough innovation. These include being patient during the development of breakthroughs,

removing barriers that inhibit entrepreneurial behaviour, giving employees ownership of projects, using stage gate processes for monitoring the progress and quality of projects, and making use of external resources.

The report is based on learning and insights gained from the recent Innovation and Productivity Grand Challenge. Following publication, a copy of the report will be available for download from the IfM's website at:

[www.ifm.eng.cam.ac.uk/free/](http://www.ifm.eng.cam.ac.uk/free/)

For further information please contact Simon Ford ([sjf39@cam.ac.uk](mailto:sjf39@cam.ac.uk))



## Sustainability and innovation: new ideas, initiatives and alliances

### R&D Management Conference 2011

Keynote presentations at this annual conference on R&D management emphasised the role of new technologies and innovation in addressing the environmental challenges of the 21st century. Industry, academia and government need to work together to cope with the challenges involved.

The conference was held in Norrköping, Sweden, a city once well known for its textile industry. The three-day event included parallel paper sessions, keynote presentations and a PhD student workshop.

#### Academic papers

Topics covered in the paper sessions included: *Managing R&D collaborations*, *Leadership and creativity in R&D management for sustainable innovation*, *Product-service integration for sustainable solutions* and *The role of entrepreneurship in sustainable innovation*.

As in previous years, a group of researchers and doctoral students from the Centre for Technology Management attended the conference to present the outcomes of their ongoing research projects.

#### Industrial keynotes

Industrial keynotes were provided by Vestas Wind Systems, the Electrolux Group, Scania, ABB and Borregaard.

Next year, the R&D conference will explore how 21st century organisations create, capture and deliver value through R&D management and innovation.

For the book of abstracts and full text papers, please contact Victor Ortiz: [vgo20@cam.ac.uk](mailto:vgo20@cam.ac.uk)

## Get involved in CTM research...

CTM research students are keen to hear from companies interested in participating in research in a number of areas:

#### Impact of innovation intermediaries on R&D and marketing relationship

Luz Rincon ([lr353@cam.ac.uk](mailto:lr353@cam.ac.uk)) is looking for organisations that have hired innovation management consultancy services and would like to measure the impact of such services on their organisational relationships.

#### Acquisition of new technologies through collaborative development

Victor Ortiz ([vgo20@cam.ac.uk](mailto:vgo20@cam.ac.uk)) would like to hear from companies that have worked collaboratively with other firms on the acquisition of new technologies.

#### Treatment of uncertainty and risk in roadmapping

Organisations can now trial (free of charge) an improved roadmapping process, designed to fully take into account future uncertainty and potential risks in developing strategic plans. Contact: Imoh Ilevbare ([imi22@cam.ac.uk](mailto:imi22@cam.ac.uk))

#### Early-stage equipment and service system development in regulated industries

Man Hang Yip ([mhy29@cam.ac.uk](mailto:mhy29@cam.ac.uk)) is seeking organisations in regulated industries, such as medical equipment and air transport, that are involved in new equipment and service system design.

#### Linking technology to corporate strategy

Clemens Chaskel ([cdc31@cam.ac.uk](mailto:cdc31@cam.ac.uk)) is seeking organisations interested in integrating their corporate strategy with their technology capabilities and requirements.

# Technology management research at Cambridge

- Strategic technology management
- R&D project selection
- Software sourcing in manufacturing
- Enhancing creativity in new product development
- New product introduction collaboration
- Technology management: a process approach
- Technology selection
- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- Emergence of technology based industry
- Technology scanning and intelligence
- Technology acquisition
- Technology protection
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and technology insertion
- Technology valuation
- Technology foresight

## Goodbye to.....

**Maicon Oliveira** of the University of São Paulo in Brazil has spent a year with CTM as part of his PhD research. His work focuses on the front-end phase of the innovation process. Maicon's stay with us provides an excellent basis for ongoing collaboration in Brazil.

CTM recently hosted two students from RWTH Aachen University. **Robert Lacher** and **Sebastian Dworschak** spent six months carrying out research for their Diploma theses. Both produced excellent reports:

Robert Lacher: *The impact of incubators on new venture performance: insights from the Cambridge high-tech cluster.*

Sebastian Dworschak: *Strategic sourcing in manufacturing start-ups: make-or-buy decisions in the evolving firm.*

Downloadable versions of these two reports will be available from the CTM website: [www.ifm.eng.cam.ac.uk/ctm/publications/](http://www.ifm.eng.cam.ac.uk/ctm/publications/)

## Book now for Technology Management Symposium in September

Booking is well under way for the 17th Cambridge Technology Management Symposium on 15-16 September. Themes include:

- industrial emergence
- open innovation
- early-stage technology acquisition
- technology management toolkits

For further details and booking see:

[www.ifm.eng.cam.ac.uk/ctm/symposium17](http://www.ifm.eng.cam.ac.uk/ctm/symposium17)

## Diary [www.ifm.eng.cam.ac.uk/events](http://www.ifm.eng.cam.ac.uk/events)

### September

15-16	<i>Cambridge Technology Management Symposium</i>	Two-day symposium IfM, Cambridge
21	<i>Service innovation</i>	One-day industry conference Møller Centre, Cambridge

### October

12	<i>Strategic roadmapping</i>	One-day course IfM, Cambridge
13	<i>Technology intelligence</i>	One-day workshop IfM, Cambridge
18	<i>Open innovation for small firms</i>	One-day workshop NRP Innovation Centre, Norwich

### November

10	<i>Valuing and selecting technology projects</i>	Afternoon workshop IfM, Cambridge
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