

Technology Management

The newsletter of the Centre for Technology Management (CTM)

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CTM supports roadmapping initiatives in Mexico

New approach to product planning

An innovative new approach to product planning, innovation and problem solving is being developed as part of a collaboration between CTM and a Mexican technology and management consultancy.

The project aims to combine technology roadmapping (TRM), a methodology for technology and innovation planning, with TRIZ, an approach for systematic inventive problem solving.

It brings together CTM's extensive theoretical and practical knowledge of TRM with the Mexican consultancy Dux Diligens's experience of applying TRIZ. The overall objective is to develop an enhanced, systematic and practical methodology for product planning, innovation and problem solving.

The first phase of the project focussed on conceptualising ways in which TRM and TRIZ can be combined. A report has been produced which is being translated into Spanish. These conceptualised approaches will be further investigated, tested and applied in subsequent phases.

Further information: Imoh Ilevbare (imi22@cam.ac.uk).

Developing industry sector strategies

The IfM has been working for more than four years with the Nakazawa Consulting Group to promote the use of roadmapping techniques by the Mexican government and industries.

Two years ago ProMéxico, the Mexican Government's trade and investment organisation, undertook a project to roadmap Mexican strategic industries. Individual Mexican states went on to develop their own roadmaps for their key sectors.

The State of Sonora, in Northwestern Mexico, was the first to start its own roadmapping process. IfM and Nakazawa Consulting Group have been collaborating with the State of Sonora to provide the necessary roadmapping capabilities.

The first two roadmaps for Sonora – one for the Aerospace Industry and one for the IT Industry – were created during two workshops in September this year, initiated by Dr Rob Phaal of CTM and facilitated by Ricardo Gonzalez of Nakazawa.



New projects

Staying resilient in the face of disruption

IfM researchers are investigating how firms develop resilience to disruptions. The project is a collaboration between CTM and IfM's Distributed Information and Automation Laboratory (DIAL). Resilience has both strategic and operational dimensions and it is anticipated that the strategies required will differ for each – and indeed may often conflict. If you are interested in learning more about this research or attending a prospective event in January, please contact Simon Ford sjf39@cam.ac.uk.

System-of-systems engineering

Over the next two years CTM is collaborating with IfM Education and Consultancy Services and a number of European partners on the Road2SoS project. The objective of the project is the development of strategic research and engineering roadmaps in system-of-systems engineering. System-of-systems engineering involves the operation and management of large complex systems, which are themselves composed of systems that possess operational and managerial autonomy. The project will examine four key domains: (1) distributed energy generation and smart grids, (2) integrated multi-site industrial production, (3) multi-modal traffic control, and (4) emergency and crisis management. We will be looking for experts within these domains so if you are interested in contributing to the project and learning more about system-of-systems engineering, please contact Simon Ford sjf39@cam.ac.uk.

Fukushima nuclear accident – a technology management perspective

In August, CTM hosted and co-sponsored the 2nd International Symposium on Innovation Strategy. The event brought together Japanese academics and senior managers from Japanese companies in the UK to discuss emerging issues in technology and innovation management.



A focal point for the event was discussion and analysis of the causes and implications of the Fukushima nuclear accident. Topics discussed included the importance of technical and scientific knowledge among top management, the strengths and limitations of the traditional Japanese style of management, and the challenges of managing both disruptive and sustaining innovations. Selected presentations from this event can be downloaded from <http://bit.ly/q9xUGP>.

Technology management education in Kyoto

CTM contributed to two programmes at Doshisha University in Kyoto this September. The first of these was a seminar on collaborative innovation for the 'Technology and Business Innovation' Executive Programme. This five-day programme was attended by 18 senior managers from Japanese companies including Omron, Panasonic, Mitsubishi Electric, Kobe Steel and Fuji Film. The theme for this year's TBI Executive Programme was: "Strategies for Capturing Value from Technology - How will Japan make up ground lost to competitors? Creating Global Technology Network". In addition to CTM's contribution, sessions were also delivered by colleagues from Doshisha University, Tokyo University, the University of California Berkeley, Auckland University, the National Institute of Informatics, and Hitachi.

The second programme involved five days of classes on Management of Technology for Doshisha's Executive PhD course. This course is targeted at Japanese managers seeking to develop deeper understanding of technology and innovation management to support their career development. While most of the programme is delivered in Japanese, as part of a drive to give a more international focus to education in Japan, CTM's module is one of a select number that are delivered in English.

JAIST programmes revised to meet future challenges

CTM will be contributing to a revised and updated technology management programme at the Japan Advanced Institute of Science and Technology (JAIST), in Ishikawa next year. Rob Phaal has been visiting JAIST annually since 2003 to contribute to a modular programme for working professionals at the JAIST Tokyo satellite campus. The programme is currently being updated and relaunched as 'iMOST' (Innovation Management of Service and Technology), to address the future challenges faced by organisations and professionals. An increased focus will be placed on services, negotiation and strategy, with enhanced international collaboration. In addition to the roadmapping module already delivered by CTM, David Probert will be running a new module in March 2012, focusing on next generation technology and innovation management.

Doctoral student news

The doctoral students within CTM form a vibrant community of emerging scholars, with a particular focus on peer learning. In addition to sharing information on a day-to-day basis, the learning is formally facilitated by the organisation of lectures, workshops and conferences.

Technology management summer school and conference

CTM's doctoral researchers attended the 21st European Doctoral Summer School on Technology Management in Istanbul in September. Doctoral researchers from different



universities met to discuss their current research projects and share experiences in researching innovation and technology management. Participants received feedback from senior professors at interactive workshops. Students also discussed the challenges faced by different companies in managing technology and new product development at a company workshop.

The following week doctoral students were able to attend the European Institute for Technology and Innovation Management (EITIM) annual conference – also held in Istanbul this year.

EITIMDoc is an ideal community for PhD students to explore ideas and get help from researchers of other European institutes away from their home institute. Receiving feedback at a conferences often requires writing

a paper and presenting results – at EITIMDoc they can also present ideas, discuss preliminary results and talk about research problems.

Sustainable economics and management

CTM doctoral researcher, Julia Fan Li presented a paper on "Technological and social innovation combined: Fighting tuberculosis in India" at a conference in Bangalore. The annual oikos UNDP Conference provides young scholars working on poverty and sustainable development from a management perspective a platform to present and discuss their ongoing research projects. The 2011 event focused on "Models to Markets for Inclusive Development" and topics included affordable healthcare, diffusion of solar technologies and social entrepreneurship.

Conference highlights

Academy of Management

The Academy of Management 2011 Annual Meeting was held in August in San Antonio, Texas. As the leading management conference in the world, the meeting attracted almost 8000 scholars. On the final day of the meeting, CTM researchers, Tim Minshall, Simon Ford and Nicky Dee participated in a symposium organised by fellow IfMers Gregory Theyel and Paul Heffernan, at which research from the Emerging Industries Programme was presented.

International Conference on Manufacturing Research

This year's International Conference on Manufacturing Research was held in Glasgow and Dr Clive Kerr presented a paper describing a toolkit for the strategic planning of fleet transitions and upgrades in complex product-service systems. The toolkit consisted of five tools (concept mapping, capability visioning, roadmapping, project charting and attribute scoring) which are applied in an integrative manner to produce a single composite visual output.

Visual methods

This year CTM decided to expose and test its ideas in foreign pastures by presenting its work on visual strategy at a social sciences conference, the 'International Visual Methods Conference' held at The Open University in Milton Keynes. Dr Clive Kerr gave a presentation entitled

"Images of managers developing strategic roadmaps: Photo-elicitation as a visual method for reinforcing organisational memory". The talk described how photographs are being used as a research tool for capturing/analysing roadmapping workshops and the production of photo-narratives from industrial engagements. Clive also chaired a session on 'Diagrams and Graphical Forms'.

Technology management in the energy-smart world



This year's PICMET conference (Portland International Centre for Management of Engineering and Technology) was held in Portland Oregon. The theme was 'Technology Management in the Energy-Smart World'. CTM contributed four papers and ran a tutorial session including findings from the 'Business Appraisal of Technology Potentials' project, the relationship between industry dynamics (such as industry, product and technology lifecycles) and research on toolkits and visual strategy.

IEEE International Technology Management Conference

Keith Cotterill of CTM presented a paper on entrepreneurial failure at the inaugural IEEE International Technology Management Conference (ITMC) in June. Other IfM presentations at the conference were by Paul Heffernan and David Kirkwood.

Academic Design Management



James Moultrie and Karen Miller organised the first Cambridge Academic Design Management Conference (CADMC) at the IfM in September with the aim of increasing academic discourse in this emerging field. Although Design is widely studied and discussed, the discipline of Design Management receives less attention.

EuroMOT 2011

CTM presented three papers at the EuroMOT 2011 conference in Tampere, Finland in September. The papers covered the following topics:

- The evolution of strategic planning in industrial organisations
- Tools to assist with navigating industrial emergence
- The Expert Scan: A visual mapping process for interviewing

The conference, entitled 'Platforms and innovation: In search of efficiency and effectiveness', featured very strong keynote speakers from industry as well as academia. Participants attended from Europe, USA, Middle East and Asia, providing insight into a range of technology management related topics.

CTM projects

Prototyping for start-ups

Early-stage ventures often lack the resources and knowledge needed to create a prototype and to initiate low volume manufacturing. CTM visitor Patrick Schmithausen is looking at how such firms could be supported through these stages and thus increase their chance of success. Suitable support at this time could reduce required investment, decrease technological uncertainty and build credibility in the eyes of partners, customers and investors. Such support could be regarded as part of the 'industrial commons' of a region and could involve clustered networks of independent organisations or of organisations whose business model is specifically designed to support product-based start-ups. This research will analyse (i) the manufacturing-related resource needs at the prototyping and low volume stage and (ii) possible ways of providing such support. The results are expected to identify resource

needs of product-based start-ups in the prototyping and low-volume manufacturing phase and to highlight the challenges in implementing a sustainable business model around the provision of resources and knowledge for these ventures. Further information: pags2@cam.ac.uk

Impact of consultancy services

The impact of innovation management consultancy services on intra-organisational relationships is difficult to measure. This research project aims to determine the impact of these consultancy services on the relationship between R&D and marketing, within large companies. The results of this project will be helpful in identifying the conditions under which consultancy firms can impact the R&D-marketing relationship and provide some insights into ways to measure such impact. If your company has an experience in this area to share please contact to Luzselene Rincon (lr353@cam.ac.uk). Participants will have early access to the results of this research.

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

New CTM students

Joonmo Ahn is a research MPhil student under the supervision of Dr Tim Minshall. He is studying the relation between policy and open innovation at national level



Chung-Lin Tsai is a first year PhD student under the supervision of David Probert. He will be focusing on platform strategy and dynamic capability in high-tech industry.



Patrick Schmithausen is a visitor under the supervision of Dr Tim Minshall. He is working on an entrepreneurship and open innovation related research project to finish his degree in Business Administration and Mechanical Engineering at RWTH Aachen University with a focus on Production Engineering.



Laurens Chaskel is a first year PhD student under the supervision of David Probert. His research interest focuses on intellectual property and technology protection in a strategic technology management context.



Success for two of CTM's former PhD students

Congratulations to two of CTM's recently graduated PhD students who have won top accolades for their research. A paper by Lan Tao, Towards an integrated framework for managing the process of innovation, co-authored by David Probert and Rob Phaal, has been declared one of the top three most read articles in the R&D Management Journal in 2010. Meanwhile Joseph Zhou's paper, Building the innovative capabilities: An inquiry into the dynamic growth process of university spin-outs in China, has been voted 'Best Paper of 2010' by the International Journal of Innovation and Technology Management.

Diary 2012 www.ifm.eng.cam.ac.uk/events

March		
7	<i>Strategic roadmapping</i>	One-day course IfM, Cambridge
27 - 29	<i>Technology and Innovation Management</i>	Three-day course Jesus College, Cambridge
May		
17	<i>The make-or-buy question: are you getting it right?</i>	One-day workshop IfM, Cambridge
June		
13-14	<i>Strategic roadmapping</i>	Two-day course IfM, Cambridge

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