

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

February 2011

Visualising strategy to improve decision making

Many management frameworks and tools are used to support strategy and innovation. A common feature of these approaches is that they take a visual form. Such tools include technology roadmapping, scenarios, portfolio matrices and quality function deployment. Their visual nature acts as a cognitive aid in supporting communication and decision-making both within and between organisations.

To study the development and use of graphical representations in strategic planning activities, a new strand of research on 'visual strategy' is being undertaken by Dr Rob Phaal and Dr Clive Kerr of CTM.

The work will focus on both the architectural and presentational aspects of management visuals in order to design the structure of the canvas and define the appropriate set of objects which are then overlaid to depict informational content.

The challenge is how to convey a large amount of information in an intuitive format for communication, ensuring the appropriate content for the intended audience. This involves

achieving a balance between function and aesthetic form, taking into account the following aspects:

- Composition layout
- Perception of spatial proximity and concentration
- Psychology of similarity and continuity
- Basic visual variables (position, size, shape, value, colour, orientation, texture)
- Pop-out effects
- Colour associations, colour set selection and contrast
- Typeface and font

The research is being informed by examples of graphical practice from other areas that highlight the powerful effects that can be achieved through the visual medium. Among the examples are visuals from cartography, wayfinding, visual merchandising, infographics, scientific illustration and even weather forecasting. To find out more please contact Clive Kerr (civk2@cam.ac.uk).



Visit reinforces links with Korean university

In early December 2010, David Probert and Letizia Mortara were invited to visit Ajou University in Korea and to give lectures on intellectual property and technology management. The lectures were part of the undergraduate course on intellectual property management held by Ajou University.

David discussed the importance of considering technology protection issues as part of a firm's technology management strategy, whilst Letizia expanded on this theme and talked about the issues of intellectual property management within the context of open innovation.

Their visit was hosted by Professor Sungjoo Lee (*pictured right with Letizia Mortara*) following her return to Korea after a period as a visiting scholar at CTM. Strong links have been forged between CTM and Professor Lee who has translated CTM's workbook on technology intelligence into Korean. She has also organised on-line lectures for her students broadcast live by CTM.

The trip to Korea reinforced existing links between Professor Lee and CTM who share interest in the fields of open innovation and technology intelligence. While there, David and Letizia also met a delegation from the Korean Institute of Science and Technology Information, as well as several of Professor Lee's faculty colleagues and former IfM visitors and students. There were also many opportunities to enjoy a taste of Korean food and culture!



IdeaSpace and IfM join forces to deliver support for innovation and entrepreneurship

A new enterprise and innovation programme has been launched that combines the strengths of IfM's Education and Consultancy Services with those of the IdeaSpace - a 'clubhouse for innovation' - situated close to IfM on the University's West Cambridge campus. The four-year ideaSpace Enterprise

Accelerator (iEA) programme will support the identification and accelerated development of high potential business ventures arising from research conducted across the region. The iEA programme will assist the region's enterprise communities to start and grow new research and

innovation-led businesses, as well as providing strategic direction for the region's technology enterprise and entrepreneurship activities. Early-stage and start-up firms will gain support and training to help them grow and create new jobs.

New report on getting help with open innovation



CTM has recently published a new report that aims to help companies select the most effective source of help with open innovation – the collaborative approach that

helps firms to gain access to new technologies, ideas or skills they require to keep pace with today's evolving markets and changing customer demands. 'Getting help with open innovation' describes the capabilities companies need in order to implement open innovation successfully and the range

of assistance offered by different types of organisations known as innovation 'intermediaries' – including commercial and technical consultancies, government departments, national and local development agencies, academic networks and university technology transfer offices. The report suggests a structured approach to selecting the most appropriate intermediary for a particular company's needs and illustrates this with case studies and examples. The report also aims to help intermediary organisations to present their services more clearly to their clients.

The work builds on earlier research by CTM into the implementation of OI in large multinational companies, and the ways in which companies keep ahead of new technological developments. Both projects highlighted the important role

played by intermediaries in relation to innovation.

Printed copies of the report are available for purchase. Or you can download an electronic copy for free from the IfM website: www.ifm.eng.cam.ac.uk/free/. For further information about this research project contact Dr Letizia Mortara: lm367@cam.ac.uk.

*Dr Mortara is co-author of a chapter on open innovation in a new book: **New Technology-Based Firms in the New Millennium**, recently published by Emerald Group Publishing Ltd. The chapter is entitled 'Implementing open innovation: challenges in linking strategic and operational factors for large firms working with HTSFs (High Technology Small Firms)*

New applications for inkjet printing

A workshop on future opportunities for next generation inkjet printing applications was organised by CTM in December 2010. More than 60 opportunities were identified by participants, with 3D printing, power generation and bio applications voted the most promising.

The workshop was attended by members of the Cambridge inkjet cluster including AtomJet, CDT, Conductive Inkjet Technology, Domino, FFEI, Fujifilm Sericol, Global Inkjet Systems, Pivotal Consulting, Printed Electronics Ltd, Tonejet, Xaar and Xennia. It follows work last year by CTM researchers and inkjet practitioners using mapping exercises to capture the evolution of commercial inkjet in the UK.

A report on the mapping exercises and the outputs of the workshop is currently in preparation. For more information contact Dr Simon Ford sjf39@cam.ac.uk.

Inserting innovations in-service



A new book entitled 'Innovations in Defence Support Systems' which contains a chapter on technology insertion by Dr Clive Kerr has been released by Springer-Verlag. The chapter addresses the question of how to manage the flow of technology for platform modernisation during the in-service phase of the product lifecycle.

Technology insertion is the pre-eminent activity for both maintaining and enhancing the functional capability of a platform especially given the likely changes in future military operations, the pace of change in technology and the increasing focus on lifecycle cost reduction. Dr Kerr's chapter provides an introduction to technology insertion, together with an overview of the key issues that practitioners are faced with, and a decision-support framework for planning technology insertion projects. *Innovations in Defence Support Systems*, edited by A. Finn & L. C. Jain is published by Springer-Verlag.

CTM develops collaborations in China

CTM has recently formed new links with organisations in China as well as strengthening some existing collaborations.

The Head of CTM David Probert was an invited speaker at a Forum organised by the Innovation Method Society of China in Beijing. The event, which was attended by more than 500 people from all over China, discussed new ways to promote creativity, innovation and technological advancement. David's presentation, 'Technology roadmapping: past, present and future', demonstrated how roadmapping techniques could help organisations of all sizes improve their technology-based planning. With China currently engaged in its 12th five-year plan, such techniques are of great interest, and their application is being addressed at a very senior level.

The visit also provided the opportunity to develop CTM's collaboration with Tsinghua University and, in particular, with Professor Su Jun and his team at the Center for Science, Technology and Education Policy (CSTEP). Visits were organised to discuss technology management projects at China Mobile and Nucotech, a fast-growth, technology-based spinout from the university operating in the security scanning market.

A workshop on technology roadmapping was held in Tsinghua to share experiences with government departments, professional engineering



bodies and other organisations engaged in roadmapping. With the Chinese translation of 'T-Plan: The fast start to technology roadmapping' having now gone to a second edition, we have a sound basis for continuing collaboration with CSTEP in the areas of student exchange, research projects, roadmapping applications and executive education courses. The pace and scope of technological development and economic growth in China provides a unique context for the application of technology management methods.

Professor Su Jun commented on the visit and scope for continued collaboration, saying: "David's visit to China was very fruitful. His presentation at the forum was highly acclaimed by audiences including Dr Wan Gang (the Minister of

Science and Technology in China), and Dr Wan signified the implementation of roadmapping techniques in long-term strategic plans (i.e. the 12th five year plan).

"In addition, the corporate visits and the workshop in Tsinghua were also very successful, which have stimulated great interest and intensive discussions about the use of roadmapping in Chinese enterprises and government agencies. China is facing great challenges (and opportunities) in its technological sectors, where technology management methods (and tools) are particularly needed. During the visit, we also discussed our relevant collaboration plans, and CSTEP fully supports our future joint initiatives in China."

Bookings now open 2011 course on 'Technology and Innovation Management'

CTM will be running its popular three-day training course on Technology and Innovation Management from 5-7 April 2011. The course is designed to help managers understand and use the key tools and techniques needed to fully exploit technological investments and opportunities. It is aimed at managers involved in all stages of product realisation from R&D to customer support, including technologists, product managers, manufacturing managers, strategic planners and consultants.

The course has been running since 2006 and previous attendees have included: BAE Systems, Carbon Trust, Dyson, ESAB, FKI Logistex, France Telecom, GKN, ICI, Kodak, Mars, Nestle, Rolls-Royce and Unilever. Attendee feedback reflects the benefits to be gained from attending this programme:

"Good interactive sessions in a comfortable setting" (Research & Technology Manager, BAE Systems - Submarine Solutions)

"Superb course, a good foundation for further learning" (Team Leader, Rolls-Royce)

"The lecturers were approachable, enthusiastic and informative. Exercises were fun and great for learning" (Technology Analyst, ITI)

This three-day course comprises a stimulating mix of taught modules, discussion, cases and practical activities, together with pre-reading and pre-module 'audit'. There is also an opportunity for continuing support by participating in a network of industrialists and academics. The course will be held in Jesus College, a 500-year old college, set in spacious grounds in the heart of Cambridge. Places on the course are strictly limited to ensure maximum opportunities for participation and discussion and early booking is recommended. For further information, please see: www.ifm.eng.cam.ac.uk/events

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

Welcome...



Robert Larcher is a visiting student working on entrepreneurship-related research projects to finish his degree in Business Administration and Mechanical Engineering at RWTH Aachen University. He is working under the supervision of Dr Tim Minshall and focusing on Entrepreneurship and Production Engineering.



Taro Sugihara has joined CTM as a visiting scholar for five months from November 2010. He is an assistant professor at Japan Advanced Institute of Science and Technology. His research has combined engineering and management through a focus on the human factors. His work at CTM involves technology roadmapping of assistive technology for the care and nursing sectors.

Congratulations...

Sarah Lubik has successfully completed her PhD entitled '*Commercializing advanced material research: A study of university spin-outs in the UK*'. Her work sheds light into the early experiences and evolution of firms commercializing radical, generic technologies. The outcomes of the research extend theories on early business models and strategies and provide practical recommendations for entrepreneurs, managers and policy makers.

Lan Tao has also successfully completed his PhD dissertation entitled '*Developing a framework for depicting the radical innovation process in established firms*'. Further details of his research and publications can be found on the IfM people web page.

Maria Rita Massaro, a CTM visitor from the Economic Faculty of the 'Seconda Universita' degli Studi di Napoli', completed her PhD thesis in November. Entitled '*Managing the front end of innovation: Evidence from the aerospace companies in Italy and the United Kingdom*' the research investigated the stage of the innovation process before an idea is formally developed into a technology, product or service.

Diary date: CTM Symposium 2011

CTM's 17th annual Symposium will be held in Cambridge on 15 & 16 September 2011. The latest findings and industrial application of CTM research will be the focus.



Diary April

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

Tuesday 5 -
Thursday 7

*Technology and Innovation
management*

Three-day course,
Jesus College
Cambridge

May

Wednesday 25

*The make v buy question:
are you getting it right?*

One-day workshop,
IfM, Cambridge

June

Wednesday 15 -
Thursday 16

Strategic roadmapping

Two-day workshop,
IfM, Cambridge

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