

Technology Management

Quarterly newsletter of the Centre for Technology Management

February 2007

Scanning for new technologies – spotting threats and opportunities

Companies need to keep abreast of the latest technical developments in their field if they are to take advantage of new business opportunities. Failing to anticipate the impact of a groundbreaking new technology can pose a serious threat to any business – the advent of the digital camera, for example, revolutionised an entire industry.

Acquiring such information in practice is not easy however. What are the best sources? How do you analyse large amounts of data and how do you make sure relevant information is passed on to the appropriate people in your organisation?

Over the last two years two research projects at CTM have focused on these issues, supported by funding from the IfM's Innovative Manufacturing Research Centre programme.

One project studied the technology systems set up by 14 UK technology-based companies – all major players in a variety of different sectors – in order to establish the principles underlying an effective technology intelligence (TI) system.

The project has resulted in a number of outputs which managers can use to help them set up or improve their own TI systems. These include a workbook which allows managers to assess their own company's TI capability and identify areas for improvement.

CTM is running a one-day workshop in Cambridge on 1 March focused on technology intelligence activities.



A new workbook about technology intelligence will be available at a workshop in March

Participants will have the opportunity to preview the new workbook and explore the approaches it contains (see www.ifm.eng.cam.ac.uk/events).

A second project, run in collaboration with the IfM's Centre for Economics and Policy, investigated how to create technology intelligence systems for use by multiple stakeholders – for example a whole industrial sector.

The project developed 'FuturesLab', a prototype intelligence system which provides a platform for users to exchange and archive information based upon their core interests.

The system enables users to define their interests and expertise within a specified field. This allows the community to identify areas of particular interest as well as those in which there is a knowledge shortfall.

Users can upload information and link it to keywords specific to the field. They can also perform targeted searches and be updated with new content in line with their interests.

What is technology intelligence?

Technology intelligence (TI) systems are designed to systematically scan the environment for new technologies that have the potential to disrupt an industry.

Successful TI systems provide information early enough to allow time to take advantage of a new opportunity – or deal with a threat. They collect information from a variety of sources and deliver it to the decision makers in an organisation.

The key to an effective system is the ability to scan large volumes of data, identify what is relevant and transfer it to those who need it.

A TI system is not an IT system. While it may include computer-based components such as digital archives, it relies on human skills and networks.

The system needs to cover sources of information both within and outside the company and to be able to find both existing knowledge and information that is not yet known about.

Advanced manufacturing technologies – IfM part of programme to support new industries

The IfM is part of a major new Cambridge University research programme known as the Integrated Knowledge Centre (IKC) in advanced manufacturing technologies, which aims to exploit exciting scientific developments in molecular and macromolecular materials.

Polymers, advanced liquid crystals and nanostructures

These materials, which encompass polymers, advanced liquid crystals and nanostructures, including carbon and silicon nanowires, are set to have a disruptive impact on current technologies. This is partly because of the cost/performance advantages they offer, but also because they can be manufactured in more flexible ways, provide more functionality and be 'engineered' for a wider range of applications.

Investigating future markets and applications

The IKC will build on the excellent science and technology already developed within the University. It will investigate the future market potential for new products and applications based on these technologies, together with manufacturing and industrial implications of using them to create high-value businesses.

The Centre for Technology Management will contribute to the IKC in a number of areas, including:

- building understanding of the potential structures of new industries and the different ways in which firms can create and capture value within such industries
- developing the skills of scientists and technologists working in emerging technologies to ensure the rapid progress of ideas from lab to market
- using roadmapping concepts and methods to support integration and communication within the programme

Secondment of industrial researchers

The programme will allow the secondment of researchers from industry and universities to the IKC to enable knowledge transfer. In its later stages it will set up pilot manufacturing lines for prototyping. Reciprocal arrangements will also ensure that academics learn the key features of exploitation.

Collaboration partners

The Engineering and Physical Science Research Council (EPSRC) is funding the IKC which involves industry and three other groups at Cambridge besides the IfM: the Cavendish Laboratory, the Centre for Advanced Electronics and Photonics and the Judge Business School. Core funding will last for five years.

Defence companies working towards supplying complete military solutions...

The UK Ministry of Defence is moving away from traditional methods of acquiring complex defence equipment. Whereas in the past they might simply purchase a fighter plane or maintenance contract, there is now a new focus on finding suppliers who can deliver integrated solutions which contribute to 'military capability'.

Such solutions are based on the customer's desired outcome, and offer increased flexibility in the method adopted to achieve them. They comprise combinations of products and services that form a seamless offering, tailored to address a complex customer need.

Suppliers operating across defence environments (land, sea, air and space) are still in the early stages of being able to provide integrated solutions. Current examples include 'equipment availability' contracts, where the supplier develops a close relationship with the MoD to guarantee reliability and performance in operations.

Innovations in procurement and business practice are being implemented collaboratively in newly formed partnering relationships between the MoD and its established supply base of prime contractors, such as BAE Systems, Boeing and AgustaWestland.

CTM researcher Dharm Kapletia is currently investigating these new approaches to supplying the country's defence needs. Dharm's project involves defining MoD integrated solutions, visualising how these solutions might be arrived at, and evaluating current practice.

Defence solutions matrix

The visualisation aspect of the research has led to the development of a conceptual matrix that encompasses existing and next-generation business models. The matrix defines four different approaches, examples of which are given below:

Product systems: supply a fighter jet

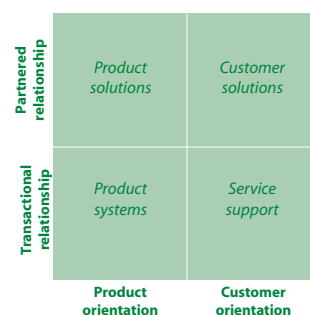
Service support: supply spares or maintenance for fighter jet

Product solutions: provide integrated product and service support to ensure jet keeps flying

Customer solutions: provide long-range strike capability

Current findings of the research suggest the MoD and its suppliers are adopting 'product solutions' but are assessing how far they can migrate towards 'customer solutions'.

The project will study customer-supplier project teams to develop a profile of MoD solutions as well as an evaluation tool to help assess progress towards specific types of solutions. Contact Dharm Kapletia for further information. (dk334@cam.ac.uk)



EITIM Senior Management Forum



The European Institute for Technology and Innovation Management (EITIM) Forum is now a firm fixture for many Chief Technology Officers around Europe. The group met for the third year running for two days in January to review two key areas of research and practice:

- the role of the CTO in technology-based businesses
- partnering for innovation

The role of the CTO

The aim of this work was to provide guidance to companies on how best to set up this role and to assist CTOs themselves in developing their careers.

The work has initially concentrated on the UK, Germany and Japan. Plans were made to extend this work further into Europe and the US. The investigation revealed interesting findings concerning the linking of CTO activities to company conditions.

Open innovation

The growth of the open innovation phenomenon was reviewed by the Forum, with presentations from the research of Prof Colombo of Politecnico de Milano and Prof Granstrand from Chalmers in Sweden. Delegates engaged in debate around the consequences for company practice and the impact on the role of the CTO.

Overall the Forum was considered a very enjoyable and useful interaction between the industrial and academic participants, and dates were fixed for the next event on 14 and 15 January 2008. Contact David Probert for further details. (drp@eng.cam.ac.uk)

Successful technology and innovation management course to run again in March

CTM will be offering a repeat of last year's very successful Technology and Innovation Management course in March.

Aimed at technology managers in companies from all sectors, the course provides an activity-based approach to learning the fundamentals of managing technology and innovation. Feedback from the first group of participants was very enthusiastic and we are looking forward to exploring these ideas with a new group of companies. Contact Jo Griffiths (jg393@cam.ac.uk) if you are interested in booking for this course.

Making 'open innovation' work

CTM is beginning a new research project in collaboration with Unilever to examine the strategic and operational factors underpinning successful open innovation.

Need for research

Unilever has been increasingly vocal in its belief that the ability to innovate and bring ideas to market is key to future growth. The emergence of open/collaborative innovation within an increasingly competitive market underpins the need for such research to be undertaken. Key questions include:

- what are the current approaches to open innovation?
- which types of collaboration are leading to successful outcomes in particular situations?
- what are the key issues for firms to consider when moving to a more collaborative model of innovation?
- what role might collaboration with start-ups play within this model?
- what are the skills required in operating this open/collaborative model?

Practical support for open innovation

This research will draw on the experience of firms from a diverse range of industry sectors. It will develop practical support to help firms implement an open innovation strategy. For further information, please contact Dr Tim Minshall (thwm100@eng.cam.ac.uk) or Dr Sally Ann Forsyth, Business Development Director, Colworth Park (SallyAnn.Forsyth@Unilever.com).

Funding technology – new report looks at how the UK supports innovation

A new report on the way in which funding and support for innovation has evolved over the last 40 years has just been released.

The report, co-authored by CTM's Tim Minshall, examines the changing roles of venture capital, banks, universities, public agencies and professional service providers in getting ideas to market. Britain has had a poor track record recently in generating value from new ideas. The lessons learned from this are used to provide guidelines for improving public and private sector support.

The emerging role of India

The report is the fourth in a series examining contrasting approaches to supporting innovation in the US, Israel and Germany. All of the reports are available for download from www.fundingtechnology.org, and a limited number of printed copies are available on request.

Work is now underway on the fifth report in this series which will examine the emerging role of India. For further information, please contact Tim Minshall (thwm100@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

People news

Johann Napp (top right) joined the Centre for Technology Management as a doctoral researcher in January this year. Johann is investigating collaborative and open innovation. Johann studied mechanical engineering at Hamburg University of Technology.

Dr Simone Ferriani who worked on the Innovation and Productivity Grand Challenge project has left CTM to take up a teaching post at the University of Bologna. However, Simone will be back to contribute to the IPGC project as a research visitor during the summer. The IPGC project is investigating how established firms develop breakthrough innovations. Simone's role at CTM will be taken over by **Simon Ford** who has been working for a PhD at the IfM for the last three years.

Paul Hwang (right) joined CTM in January to work for a PhD with Dr Elizabeth Garnsey on the role of intellectual property in innovation development. Paul has degrees in both Commerce and Law and worked as an IP lawyer for several years.



New book to highlight the UK's innovation challenge

The innovation challenge: putting knowledge into action will be published later this year by Edward Elgar. It provides a comprehensive overview of the challenges facing the UK in this area and is one of the first outputs from the Innovation and Productivity Grand Challenge (IPGC). It will feature contributions from several members of the Centre for Technology Management. Topics include:

- sustaining breakthrough innovation in large established firms
- entrepreneurship in the knowledge economy
- government support for innovation and entrepreneurship over the last forty years.

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Diary

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

Mar

1	<i>Technology intelligence: monitoring science and technology developments</i>	One-day workshop Jesus College, Cambridge
8	<i>Strategic roadmapping</i>	One-day course Hilton Hotel, London
21	<i>Innovation and Design Management Club</i>	Selwyn College Cambridge
22	<i>Technology evaluation</i>	Afternoon workshop New Hall, Cambridge
27-29	<i>Technology and Innovation Management</i>	Three-day course Jesus College, Cambridge

May

2	<i>Innovation and Design Management Club</i>	Selwyn College Cambridge
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