

Technology Management

Quarterly newsletter of the Centre for Technology Management (CTM)

August 2004

Tackling a tricky issue – just what is that new technology worth?

One of the most challenging issues facing technology managers today involves trying to assess the potential value of an early-stage technology. This question will be explored as part of a new, two-year project underway at CTM. The work will build on previous research exploring technology valuation and R&D selection methods.

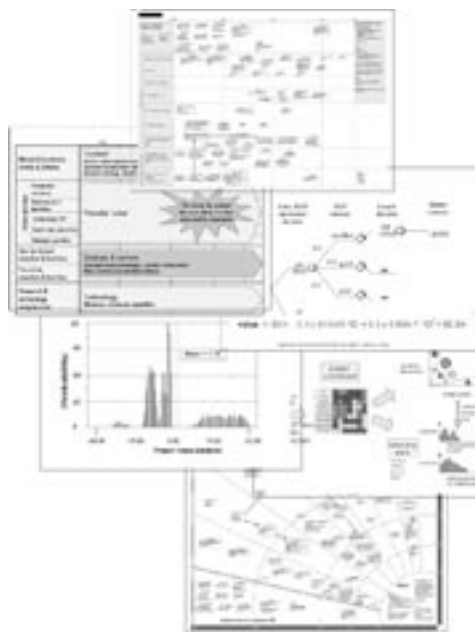
The new project, called Business Appraisal of Technology Potentials (BATP), aims to produce a toolset that will enable managers to make better assessments in this difficult area. Much of the tool development will be carried out in collaboration with partner companies. It will be funded by the Engineering and Physical Sciences Research Council (EPSRC) through its Innovative Manufacturing Research Centre (IMRC) based at the Institute for Manufacturing.

BATP was unveiled at the annual CTM meeting in May. Those attending included ABB, BAE SYSTEMS, Crown, the Faraday Packaging Partnership, GKN, Philips and Rolls-Royce.

Members also heard about some other new CTM research initiatives, as well as an update on three existing projects. Current research work includes:

Strategic sourcing of embedded software

This project is producing guidelines for companies facing make-or-buy decisions in this area. This



Some examples of graphical outputs from technology valuation exercises

is a particular challenge for manufacturing businesses wishing to embed software functionality in their products for the first time.

Acquiring new technologies through technology intelligence/scanning networks

This project is looking at ways that businesses can build their own technology intelligence system. The key to a good system is not just to gather the intelligence, but also to identify information that is important and decide how to react to it.

Rapid distributed innovation

This work is investigating a new business model for product innovation and development. The product development process can be speeded up greatly by working in a network of firms – but what are the risks?

These three projects will be coming to a conclusion within the next nine months and are already producing useful and interesting findings.

New projects just starting within the IMRC, with which CTM is involved, are:

Managing multiple horizons

This will explore ways in which the information and management of short, medium and long-term time horizons can be tackled in an integrated way.

Modelling and visualisation

This aims to develop a database of techniques for modelling and visualisation to support strategic decision-making.

Foundations for reconfigurable supply networks

This will establish a set of mechanisms for assessing supply chain reconfigurability, identifying the capabilities that are required.

All these projects benefit from collaboration with interested companies. This collaboration can take many forms – anyone interested in getting involved should contact David Probert: drp@eng.cam.ac.uk

GKN works with CTM to track new technologies

Dan Ninan, Technology Executive of GKN plc, describes how his company is improving the way it collects and disseminates information on new technologies

When GKN began considering how it could improve its ability to receive and respond to information on new technologies we naturally turned to CTM, with whom we had collaborated on Technology Roadmapping (TRM).

We found that TRM is an effective tool to visualise the timeline of events and make links between technology/market developments and ways in which GKN should respond to them.

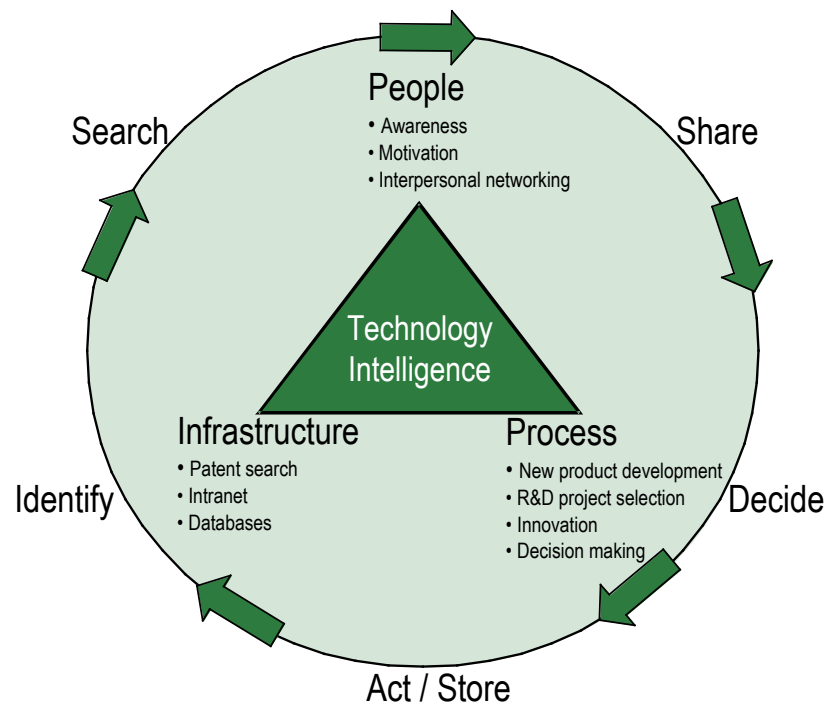
But how could we ensure that we had the most up-to-date picture of the evolution of trends and drivers to help us to populate our roadmap and make business decisions? Were we drawing from a sufficiently diverse pool of knowledge? Did we have the most effective and efficient communications routes so that information entering one part of the organisation would get to the people who make the decisions?

It was these concerns that attracted us towards the new research theme in Technology Intelligence (TI) that CTM is working on.

Tools and techniques

Early research by CTM revealed that there was a range of tools and techniques for TI in a number of companies. A generic cycle of steps that made up the TI system became clear:

- Identify the trends or more specific technologies that are your priorities for tracking
- Search for new sources of information on those technologies, and evaluate the threat or opportunity in terms of technology maturity and impact
- Share the information so it gets to the right people (for example R&D project review committee)



Technology Intelligence process steps

- Act on the information, for example, make some investment decisions or adapt the company strategy

In order to drive this cycle of events the company must also have a number of elements in place, which fall under the three headings of people, processes and infrastructure.

Buy-in key to success

The key to deploying this model, in order to create our easy-to-use and sustainable TI system, was to get the understanding and buy-in from the people in the technology and marketing functions in GKN's main divisions: Driveline, Sinter Metals and Aerospace.

So far two workshops, facilitated by Noordin Shehabuddeen of CTM, have been completed successfully at GKN Driveline Headquarters in

the UK and GKN Sinter Metals in Germany.

These workshops have been particularly effective in helping us to identify gaps in our people networks and to develop a plan for building the business processes to improve our communication.

We still have some way to go in getting our improved TI system fully operational but we are confident that we have made a strong start.

To find out more about the Cambridge TI project, please contact Noordin Shehabuddeen: ntmhs2@eng.cam.ac.uk. We are also organising two evening workshops around this theme, 'Early warning systems for technology intensive companies' on 9 September and 30 November. See www.ifm.eng.cam.ac.uk/events

Bringing technology management to Rolls-Royce manufacturing engineers

CTM recently ran a week on technology management for 20 young professionals from Rolls-Royce, including many from the manufacturing engineering function. The course forms one module of the MSc in Operations Excellence awarded by Cranfield University, with specialist contributions from Cambridge and Southampton.

There are 10 taught modules during the one-year programme, covering all aspects of the supply chain, from introducing new products and operating effective factories, through to managing new technology and working with suppliers.

An earlier module was delivered by our colleagues in the Centre for Strategy and Performance last December and covered Business and Manufacturing Strategy.

The Technology Management module began with Steve Burgess, Manufacturing Process and Technology Director of Rolls-Royce, reviewing the business and technology management challenges facing the company.

The programme then covered both the theory and practice of addressing these issues, including technology audit and assessment, make-or-buy issues, alliances and partnerships, IPR and innovation strategy, technology strategy and planning. During the week, participants worked in small groups using many of the relevant techniques, including technology roadmapping, scenario planning and auditing tools.

The programme was designed to include selected speakers from Rolls-Royce, illustrating how these ideas could be implemented in the company, and providing a basis for group discussion and further idea development. A key feature of the week was groupwork on a case



Rolls Royce engineers listen to CTM's Rob Phaal during the technology management module presented at New Hall, Cambridge

study, focusing on the implementation of an innovative manufacturing technology. This was specially prepared for the course and dealt with a current real issue in one of the Rolls-Royce business units. Participants were able to review the whole history of the development and implementation of this technology, and draw out the important lessons, both for now and in the future.

The course was held in new accommodation in the Cambridge University College of New Hall, which offers excellent facilities. Participants were also able to enjoy the historic surroundings of Cambridge, including a tour of the town centre. A formal dinner in Christ's College provided an entertaining balance to the work programme and Dr Rick Mitchell's after dinner speech was rated a highspot of the week.

The programme will run for at least another four years, so it was very encouraging to get excellent feedback from the participants on this first CTM module. They particularly appreciated the opportunity to try out the tools and techniques presented, while getting an insight into some of the important issues facing Rolls-Royce.

The week provided a solid basis from which to develop the programme next year and keep it up-to-date with developments in leading-edge technology management.

Recent CTM publications

Collaborative technology roadmapping: network development and research prioritisation
International Journal of Technology Intelligence and Planning, 2004.

The technology roadmapping technique is used widely in industry to support strategic technology planning. Roadmaps can take various forms, but the most flexible and generic type comprises a multi-layered time-based chart that links technology and product development to market needs. This paper provides a brief overview of the technology roadmapping

approach and describes the use of a process (T-Plan) for supporting the rapid initiation of the technique in organisations. The application of the method is illustrated by means of an automotive sector-level case study.

Developing an integrated technology management process at Glaxo Wellcome Research Technology Management, July-August, 2004

The lack of a systematic approach to managing technology hampers many companies in their drive for improved organisational effectiveness. A company can have a well established new product

development process, but it will still come up against problems if it attempts to develop technology and products simultaneously. One way of addressing such problems is to complement the ongoing activities of the firm with a technology management process, as shown recently at Glaxo Wellcome. One of the key benefits of the approach taken at Glaxo Wellcome was the appointment of a full-time Technical Director as part of the New Product Supply Organisation and the adoption of a short, medium and long-term portfolio approach to technology projects.

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
- Technology change
- Technology management: a process approach
- Technology selection
- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- Technology management in software production
- Strategic management competences
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and knowledge management
- Technology valuation
- Technology foresight

Events

Technology valuation workshop

CTM held a workshop on valuing early stage technologies in early July. It looked at the fundamental issues of uncertainty and complexity when trying to value these technologies. The standard approach to tackling this problem is discounted cash flow, but this does not always yield valid or useful answers in relation to technology.

The workshop looked at various alternatives, including 'real option' techniques and 'value roadmapping'. The issues involved are to be tackled in a new CTM research project on technology valuation (see front page).

Academic forum on software sourcing

CTM organised a recent academic forum looking at the issues relating to sourcing software.

The viewpoints and interests of the academics ranged widely. Some were looking at testing procedures to validate acquired components. Others were interested in the question of whether software should be developed in-house or sourced externally. Still others were concerned with cultural issues surrounding offshore development. Further issues discussed included nearshore development, open source models and strategies for managing projects that have grown organically beyond the original vision.

Don't forget to book for the CTM Symposium!

Details of this year's Technology Management Symposium on 29-30 September have been sent out and bookings are already coming in.

The Symposium theme is: *Emerging technologies, invention, innovation and implementation*, exploring the technological and business challenges involved in responding to emerging technologies.

Make sure you make an early reservation – and remember, each full member company gets a free place. Full details of the Symposium can be found on our website:

www.ifm.eng.cam.ac.uk/ctm/symposium

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Diary

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

Sep

9	<i>Early warning systems for technology-intensive companies (1)</i>	Evening workshop Cambridge
23	<i>Software sourcing – getting the strategy right</i>	Evening workshop Cambridge
29-30	<i>Emerging technologies, invention innovation and implementation</i>	CTM Symposium Cambridge

Oct

20	<i>Technology roadmapping</i>	Cambridge
21	<i>Make-or-Buy</i>	Cambridge

Nov

30	<i>Early warning systems for technology-intensive companies (2)</i>	Evening workshop Cambridge
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