Technology Management

Quarterly newsletter of the Centre for Technology Management

February 2001

UNIVERSITY OF CAMBRIDGE

Ensuring research is relevant to industry

It is very important that the Centre's approach to technology management is industrially relevant if new research ideas are to find widespread support. One of the best ways to achieve this is for the Centre to engage in practical project work with companies whenever the opportunity arises.

Company projects

Over the last year we have carried out a number of collaborative technology management assignments with a variety of companies, and each one has yielded some new insights. Highlights of these projects have been:

A technology management system for GlaxoWellcome. We conducted a series of four workshops with an international project team to develop a system to support technology management across the business. A key feature of the new system is ownership of the technology management processes by networks of technologists – each network is responsible for a core area of technology.

Technology review in Arcelik. This company is the best known brand name in Turkey, making a wide range of domestic appliances. They are increasing their share of the European market under a variety of brand names (including Beko) and have taken an active interest in the research going on in CTM for several years. Recent collaborations focused on an assessment of technology across the business, the development of technology management processes and an introduction to technology roadmapping.

Future technology in the London Underground (Infraco SSL). The new ownership scheme (Public Private Partnership) has highlighted the need to integrate technological and commercial plans in order to achieve a good business return before the assets are handed back to the state in 30 years time. This is a classic technology roadmapping situation and roadmaps are being developed for two key subsystems of the central part of the Underground.

The use of technology at BT. Many companies now run their own Masters programmes as a way of developing the full potential of young managers. The BT course is accredited by University College, London, and includes a module on 'The use of technology'. CTM was invited to lead the first half-day of this module, to introduce the concepts of technology management and facilitate the generation of a first-pass technology roadmap. Lively participation from the 25 course members resulted in a complete wall chart on which all the market and technology issues to be covered during the module could be positioned.

Technology roadmapping at TRW. The Technical Centre in Birmingham provides research and technology support to TRW world-wide – a first-tier supplier to the automotive and aerospace industries. Technology road-mapping provided an effective means of supporting the development of 'reliability' services to meet the future needs of the company in this area, with training and facilitation support provided by CTM.

These projects give an idea of the range of company projects we undertake. Within the constraints of the time available, we are always willing to discuss interesting ideas.

Industrial events

Our Symposium, forums, evening workshops and seminars provide further key opportunities to engage with industry and explore the current top issues in technology management. A full programme of such events is planned over the next six months (see back page). Don't forget Centre members get free places at many of these events so make sure you book early.

Our Symposium is on 12-13 July, with the title 'Technology Management: Entrepreneurship, Innovation and Growth'. Programme planning is already well under way with some very interesting presentations promised from Philips, ARM and Hitachi. We hope to see you there.

David Probert

Make-versus-buy: it's not just a question of cost

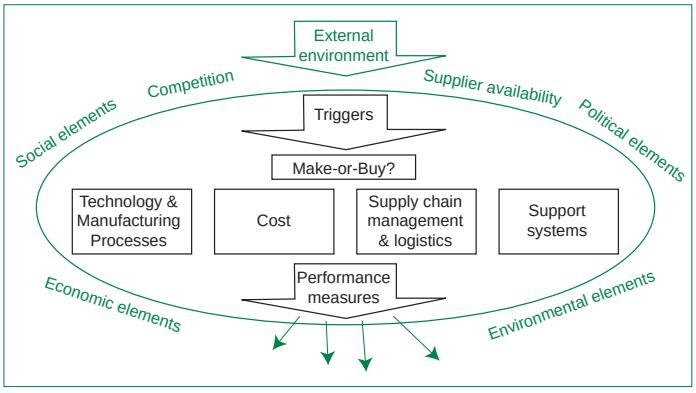
The recently completed project on Industrial make-or-buy decisions has developed a framework and step-by-step approach to help manufacturing managers to make sound decisions when choosing what to do 'in-house' and what to 'buy in'.

It is seldom a good idea to take make-or-buy decisions purely on the basis of cost. The make-or-buy framework developed as part of this research project ensures that other issues relevant to sound make-or-buy decision making are fully considered.

The framework illustrates that factors in the external environment often trigger make-or-buy decisions. It suggests four areas that need to be reviewed:

- technology and manufacturing processes
- cost
- supply chain management and logistics
- support systems

Each of these areas can be broken down into a number of factors that are used to assess in-house and supplier capabilities.



Finally, the framework highlights the importance of having a set of performance measures to evaluate the extent to which the targets suggested by the triggers have been achieved. A simplified version of the framework is shown in the diagram above.

Make-or-buy process

A make-or-buy process, underpinned by the above framework, has been developed to assist manufacturing managers to take make-or-buy decisions in a holistic and structured manner. The process involves comparing 'in-house' and supplier capabilities using the factors identified within the framework. It consists of four main stages, shown in the figure below.

- Stage 1 is the preparatory phase, which entails creating a multi-disciplinary team, selecting the part, assembly or family of parts for analysis and briefing the team.
- Stage 2 is concerned with data collection. Three workshops are organised in order to collect and analyse the information required. Workshop 1 involves assigning appropriate weights to the areas and factors, according to their relative importance to the decision to be made. Workshop 2 is concerned with the assessment of internal and external capabilities. Workshop 3 consists of calculating the costs incurred for both internal and external production.
- Stage 3 consists of data analysis and generating recommendations.
- Stage 4 involves feeding back the results to the team.

Stage 1: Preparation phase	*Create a team and appoint a team leader*	Week 1
	Identify a product family/ sub-assembly for analysis	
	Team briefing and proformas revision and distribution	
Stage 2: Collecting data	*Individuals complete proformas & collect evidence*	
	Workshop 1 (weightings)	Week 2
	Workshop 2 (ratings)	Week 3
	Workshop 3 (costing)	Week 4
Stage 3: Analysing data	*Analysis of the data*	Week 5
Stage 4: Feedback	*Feedback*	Week 6

This process has been successfully tested in a number of companies such as Rolls Royce, Peter Brotherhood, Harris Broadcast, General Domestic Appliances, Biochrom and Xerox. Overall, the companies found the process extremely helpful in assisting make-or-buy decision making.

A general manager of Peter Brotherhood, commented: "It was a structured process that made the team consider ‘all’ factors not just cost." A supply chain manager at Xerox felt the process had helped them "to consider all aspects of the business by incorporating relevant information, experience and discussion in a concise way."

Make-or-buy workbook

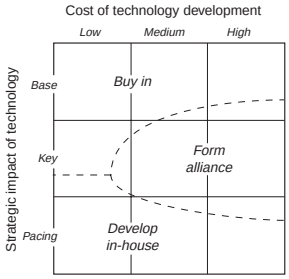
The make-or-buy process described here has been encapsulated in a workbook providing manufacturing managers with a practical guide to taking sound make-or-buy decisions. It will be available for sale from the Institute for Manufacturing, by the end of April.

New 'members only' pages launched on CTM web site

The new Members' Suite on the CTM web site gives Centre members access to information not available on the rest of the site. The aim of the new Suite is to encourage members to network and exchange ideas. The publications section of the site should be particularly useful as it contains proceedings from recent events, full academic papers, research project reports and the latest issues of the Centre's newsletter.

Online tool catalogue

A highlight of the publications section is the online tool catalogue ("T-Cat"), which is being developed as part of the "Strategic technology management" project.



A matrix tool for developing technology strategy (Floyd 1998)

The catalogue focuses on the 'matrix' class of tools, which are widely used to support understanding of management issues, decision making and strategy development and deployment. The catalogue incorporates approximately 850 tools, covering a range of areas including:

- Technology management
- Innovation management
- Knowledge management
- New product and service development
- Business strategy
- Marketing and customers
- Behaviour, culture and human resource management
- Organisation and collaboration
- Change management

We will be updating the tool catalogue in the future and feedback on the catalogue and the new site is welcomed.

The members' suite also includes information on research collaboration opportunities, new Centre developments, minutes of meetings and a summary portfolio for each member company. The portfolio page represents an opportunity for members to post their interests in technology management so that other members with similar interests can make contact. Booking for events is now easier as there is an online booking facility.

Members are encouraged to visit the site regularly to keep up-to-date with any changes. It can be accessed via a link on the regular CTM homepage. A 'user name' and 'password' can be obtained from our offices (ctm-enquiries@eng.cam.ac.uk).

Benchmarking Knowledge Management

Report of members' meeting at the Post Office Innovation Lab on 15 December

Members enjoyed a fruitful meeting at the Post Office's new Innovation Lab in December focusing on ways to benchmark Knowledge Management.

We began with a number of interesting presentations. Sue O'Hare described various Post Office initiatives, including knowledge plans for projects and tools for analysing knowledge landscapes, before highlighting the cultural challenges in moving knowledge issues up the agenda in a large organisation.

Mohan Ravindranathan gave an overview of Unilever's KM activities and explained how these had been justified.

John Wright demonstrated a useful tool developed at BAE SYSTEMS for making explicit project data available and understandable and allowing "what-if" changes to be explored.

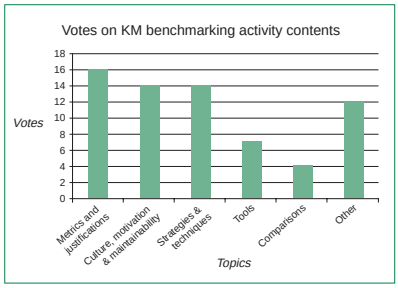
Tony Holden of the Institute for Manufacturing rounded off the first part of the morning with an operational view of KM at BP, focusing on the three KM pillars: information, communication and memory.

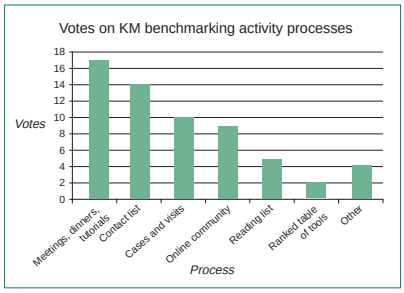
We then moved into brainstorming contents and processes of the KM benchmarking group using the Post Office's creativity software. The favourite topic (see charts) was:

- metrics and justifications for KM

and the preferred process was:

- meetings, dinners and tutorials





It was agreed that KM benchmarking would be a useful activity to pursue further.

Before starting the main business of the day members enjoyed a tour of the Innovation Lab which was set up to encourage managers to think 'outside the box'. It includes displays of new technology, and new twists on old technologies, prompting the viewer to take the next step and ask themselves what business opportunities these suggest.

Full details of the outputs of the meeting are available in the members' area of our web site (http://www-mmd.eng.cam.ac.uk/ctm). Thanks to all who took part and particularly the Post Office for hosting the event.

Technology management research at Cambridge

- New product introduction for SMEs
- New product introduction collaboration
- Strategic technology management
- R&D project selection
- World class software delivery
- Product planning
- Technology change
- Technology management: a process approach
- Decision support
- 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
- Engineering re-use
- Technology foresight

Conference report

The 2000 IEEE International Conference on Management of Innovation and Technology, Singapore

This conference was held in November and David Probert and Professor Mike Gregory attended to present three papers:

- Tools for technology management - structure, organisation and integration
- Engineering reuse: a framework for improving performance
- Analysis and management of organisational competences

There were about 200 delegates from around the world, and particular interest was expressed in the catalogue of technology management tools currently being compiled by the Centre. This is due for publication at the end of the 'Strategic technology management' project later this year but is already available to CTM members on our web site (see inside this newsletter).

CD of proceedings

Other interesting sessions included a workshop on creativity and innovation, as well as papers on innovation success factors, technology evaluation and justification. We have the proceedings on CD if anyone is interested to learn more of the content.

Diary date

The annual meeting of Centre members will be held at Churchill College, Cambridge on the afternoon and evening of Tuesday 15 May. Please make a note in your diaries now.

Coming events

February		
7th	Industrial Forum London (with IEE)	*Managing knowledge for competitive advantage*
27th	Evening workshop Cambridge	*The new product goldmine: innovation without re-invention*
March		
26th	Evening workshop Cambridge	*Creating value from technology - people, process and products*
April		
25th	Network Forum Domino (with Engineering Council)	*Innovative printing technologies - the Cambridge connection*
26th	Evening workshop Cambridge	*The challenge of technology change*
May		
15th	Annual Members' Meeting, Cambridge	
July		
13th and 13th	7th Annual Technology Management Symposium Cambridge	*Technology Management: Entrepreneurship, Innovation and Growth*

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