

Technology Management

Quarterly newsletter of the Centre for Technology Management

February 2000



UNIVERSITY OF
CAMBRIDGE

Technology management in Europe, US and Japan

I took the opportunity before Christmas (made possible by a release from teaching duties) to visit selected institutions and companies overseas at the forefront of new thinking in technology management.

The purpose was to renew contact with individuals who we believe to be involved in some of the most interesting and relevant work in this area, and at the same time map the work of the Centre onto a wider international picture. Several key findings emerged from the visits, and some new project partners for the Centre were established.

US advanced in technology management

The 'national awakening' happened in the US in 1987, with the publication 'Management of Technology: The Hidden Competitive Advantage' by the National Academy of Science. Since then many universities have mounted teaching and research programmes, often as a collaboration between the engineering and business schools. Industry is an active supporter of both teaching and research and, at the same time, there are many examples of leading industrial practice. Of the communities contacted at MIT, Harvard, Northwestern, Minneapolis and Berkeley, one new collaboration stood out as particularly lively. This is the MATI consortium based at the Kellogg Institute at Northwestern University under the leadership of Prof

By David Probert

Mike Radnor. With 25 member companies they have task forces working on roadmapping, strategy/portfolio management, technology sourcing, technology transfer, bio-tech and intra-organisational issues. We have agreed to keep each other informed of activities and events and a party will be joining us at the Symposium in July.

The new Cambridge-MIT Institute is also relevant in this context – see the announcement inside by Prof Mike Gregory.

Europe fragmented!

I found a wide variation in approach amongst the academic institutions visited in Europe. Economics, management, science and engineering all formed the conceptual base at one location or another. Policy and firm level issues were tackled by various research groups; useful perspectives on a conceptual framework to support an integrated approach to technology management were found at most locations. Continuing dialogue and exchange has been set up with a number of institutions in Sweden, France, Netherlands, Germany and Switzerland.

Japan most challenging

Japan is currently experiencing its national awakening in technology management and this makes it a most

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Thirteen-metre marvel of bronze technology management completed in 1252 at Kamakura, Japan. It has survived 750 years of tidal waves, storms and earthquakes. The image, which visitors can go inside, is a patchwork of pieces of cast bronze weighing 121 tonnes.

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Software project wins outline approval

An outline proposal for the Centre's new project looking at the management of software technology has been accepted by the Engineering and Physical Sciences Research Council (EPSRC). A full proposal for funding of £185,000 will be submitted in mid-February.

Project aims

The project is investigating key issues of technology management in relation to software. It aims to:

- identify which software development practices are effective in meeting the business objectives of companies in different industry sectors
- formulate measures of effectiveness for these practices that match the organisation and culture of the developers in particular industry sectors
- develop ways to transfer effective practices between industry sectors whilst preserving their measurable effectiveness

We are still seeking companies keen to be involved in the project. If you would like further information, please contact Francis Hunt (01223 339816 fhh10@eng.cam.ac.uk).

Re-use study needs more industrial partners

The Centre's engineering reuse project is looking for further industrial partners. It was launched in January 1997 in collaboration with Marconi Avionics and Aspect Development as an IMI-EPSRC project with objectives to:

- review state-of-the-art, including current practices for monitoring and assessing reuse
- estimate current and potential reuse, including the source and scale of cost advantage
- develop methods to support quantitative reuse decisions, linking them to other business areas
- propose information structures necessary to support the reuse decisions

Workshop

Pioneering work by Raoul Antelme has established a conceptual framework for engineering reuse practice in companies. We'd like to check its general validity and also support it with company guidelines, quantitative decision support tools and IT recommendations. To do this, we are organising an afternoon workshop on Wednesday March 8 with representatives of a select group of companies to work on these issues. If you would like to be invited or simply hear more about this work, please contact Francis Hunt (fhh10@eng.cam.ac.uk).

Industrial sustainability findings

Researchers investigating the many ways which industry has available to shift to more sustainable modes of production are busy analysing nearly 100 responses to an online survey of research organisations active in sustainable manufacture.

The survey is part of a project being undertaken within the Institute which will map the activities of key research groups in the UK, US, Japan and EC who are working on industrial sustainability issues. In addition it will assess the current capacity of the research community to provide support to the design, development and implementation of sustainable business and industrial production processes in the UK.

Key findings

The group has identified a number of key findings:

- most industries have very limited knowledge regarding the sustainability issues which are critical to their future profitability

- researchers are sharply divided concerning the role that legislation should play in achieving industrial sustainability goals more rapidly. Those closely aligned with industry appear to be against broad legislative actions, while those further from industry believe it will be a critical catalyst in achieving a higher value for sustainability issues.
- different terms for, and definitions of, 'sustainability' and 'green' are causing unnecessary confusion in the field. There is a need for a common language so that multi-disciplinary issues can be discussed.
- excellent research is being carried out in specialised areas but broader issues, including longer term strategy, are less well researched

The team's final report is due to be presented to the Engineering and Physical Sciences Research Council at the end of January.

Peter Jansson

Manufacturing to have close links with Cambridge MIT initiative

Detailed planning is now underway for the Cambridge-MIT Institute announced by the Chancellor of the Exchequer last November. Programmes will fall under four main headings:

- undergraduate education
- integrated research
- professional practice programmes in innovation and entrepreneurship
- a National Competitiveness Network

We already have good working contacts with the Management of Technology Program at MIT and we expect these and other collaborations to develop under the new initiative.

*Prof. Mike Gregory
Institute for Manufacturing*

Fast-start technology roadmapping

A 'start-up' process has been developed as part of our project 'Strategic Technology Management'. It comprises a series of facilitated workshops that bring together various functions in the business, including technical and marketing people, to develop a time-based chart which links technology developments to future product and market requirements.

Company applications

The process was developed at Domino and has been applied in Bewator-Cotag, Episys and Mason Coatings. It will be introduced at MacDermid Canning shortly. Work continues with the Post Office Research Group who are using technology roadmapping within research planning.

Clare Farrukh & Rob Phaal

New members of the Centre team



James Moultrie has joined CTM as an Industrial Research Fellow working with Pete Fraser on the 'Good Design Practice' project. James is a graduate in Mechanical Engineering with an MBA and an MA in Industrial Design. He has industrial experience in the design and product management of optical instrumentation.



Oliver Hugo has joined us to work with Dr Elizabeth Garnsey for a PhD on the growth of high technology enterprises. Oliver has substantial experience in marketing (Procter & Gamble) and private equity (The Carlyle Group).

He holds an MPhil from Cambridge's Judge Institute where he conducted research on the development of nanotechnology.

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Technology management in Europe US and Japan

stimulating area at present. Universities have traditionally maintained a detachment from industry for many reasons, including the form of contract of employment under which the academics worked. Legislation has now changed in this area and practical interaction with industry is increasing. Technology management is at the forefront of this new spirit of collaboration, with many universities proposing courses of teaching and research.

Simultaneously the continuing economic recession is causing Japanese corporations to re-examine their traditional industrial practices and there is great interest in the work of overseas Centres such as ours. Working contacts were developed with Hitachi, Toshiba, Sumitomo Electric Industries and Mitsubishi Chemical Industries. We shall keep them informed of our project activities and welcome their future contributions to our public meetings.

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

Workshop report

Strategy and technological innovation

Evening Workshop,
Møller Study Centre, Cambridge
January 17th

This evening workshop was the first of three in the Centre's series 'The Challenge of Technology Change'. Thirty five delegates were kept on their toes by a fast moving workshop which included analysis methods and case studies as well as providing attendees with the chance to air their views.

Elicia Maine from the Engineering Design Centre and the Centre for Technology Management at Cambridge presented several business/technology models to help

companies choose relevant historical precedents and ask the correct questions (about IP, partnerships, supplier relationships, distribution channels, barriers to entry, financing, etc.) when thinking about technological innovation.

Danny Chapchal, Executive Chairman of Cambridge Display Technology Ltd, gave an insight into the roller coaster ride involved in redefining business strategy and securing finance for a fast developing technology - in this case light emitting polymers for high quality, thin, flat panel displays. He emphasised the importance to his company of strong IP and imaginative marketing input and described CDT as a 'licencing and technology transfer company with strong joint development activity'.

They worked to stimulate commercial interest, which then resulted in a pull on the technology.

Lively discussion groups were held on technological innovation, the role of technology strategy, technology time to market and knowledge management as an enabler.

Please see below for details of the remaining two evening workshops in this series. Centre members are entitled to two free places at each of these workshops.

Clare Farrukh

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Quarterly Diary

February

10th	5 - 7.30pm	Evening Workshop Cambridge	<i>Managing the unexpected - disruptive technology</i>
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March

9th	5 - 7.30pm	Evening Workshop Cambridge	<i>Implementing change - product development processes</i>
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April

6th	10am - 4pm	Network Forum Manchester	<i>Technology management - tools, techniques and education</i>
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