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UNIVERSITY OF CAMBRIDGE

Networking for the knowledge era
Symposium 1999 report

Networking was the theme of this year's Symposium held on July 8 - 9 at the Møller Centre, Churchill College. Ways to organise, communicate, develop knowledge and products in technology-based companies were explored by a variety of speakers. Many new and thought provoking approaches were suggested during the two days of presentations and discussion.

Dr Markus Bayegan outlined the importance of networking and meetings rather than procedures in achieving effective technology management in **ABB**. Commitment to increased investment in R&D, at the most senior level in the company, was central to growth. Dr Charles Davis talked about the creation of value from technology at **Psion** and described how the company had survived and grown in an area where many had failed.

Technology breakthroughs

The contribution of technologists in providing vision and breakthroughs has been a central factor for ABB and Psion. In contrast the **Post Office** develops none of its own technology, working intensively instead with selected suppliers to acquire the new technology it requires to lead an increasingly competitive field. Dr Duncan Hine of the Post Office has developed this approach in recent years and an Innovation Lab has been set up to show how these new ideas

will impact the company's business. Simon Howison, Director and Dean of Engineering at the **British Aerospace Virtual University** gave a wide ranging account of the role of this new organisation. Research and education partnerships with selected universities are being set up to encourage innovation and engineering excellence. Industry/academic collaboration was also the theme taken by Dr Stan Finkelstein. He described the work of the **MIT** pharmaceutical program which has explored the role of public and private research in drug discovery and identified the key role played by public research.

Workshops

Case studies and workshops gave delegates the opportunity to pursue individual topics in more depth, with the workshops on scenario-based foresight planning and virtual reality proving particularly popular. The small group discussion always emerges as a valuable aspect of the event and the

link to current research projects is stimulating for researchers and practitioners alike.

An innovation this year was Consultants' Question Time, which drew on the technology management

Contents

The challenges of managing software technology

The Centre launched an exciting new project in April looking at the strategic management of software technology. How do existing technology management tools and approaches apply to software? What new issues, or new angles on old issues, reside in the software domain? What are the key areas of interest and concern?

To investigate we conducted a round of interviews with managers in software companies and surveyed the technology management and software development literature. Among the key questions identified were:

What is an appropriate level of process formality? How can you orchestrate the process efficiently and effectively without crushing creativity and innovation and how should the necessary knowledge be managed?

What role will open-source software and Linux play in the future? How should requirements engineering incorporate re-use, designing for re-use and COTS software?

Which standards should be adopted? The dominant standard is determined by numerous factors including the number of adopters. Such choices also have implications for business strategy.

We are holding a workshop with software practitioners at the end of July to discuss the results of the initial survey, share knowledge about existing best practices and investigate mutually beneficial directions for further research. If you would like further information or would like to be involved in this programme, please contact Francis Hunt (01223 339816; fhh10@eng.cam.ac.uk).

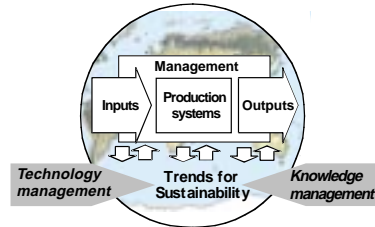# Management of knowledge and technology for sustainable production

The nature of business and industry will be changed in the future by social, technological, economic, environmental and political trends and drivers. The need to shift to more sustainable modes of production and consumption is pressing - current production methods and systems will not be able to meet the needs of a globally developing economy in the 21st century. New business systems, processes and technology will be required to meet these needs, posing ever-greater scientific, engineering and management challenges. Knowledge as a strategic resource increasingly will become a differentiating factor for business.

In response to these trends, the recently launched European Framework V Programme supports collaborative research that not only meets the future economic needs of business and the population, but also the social and environmental aspirations.

A recent project for the European Commission investigated how approaches to knowledge and technology management can support the required shift to more sustainable modes of production, in the context of Framework V objectives.

A total of 22 organisations were interviewed in Finland, France, Germany, Italy, The Netherlands, Sweden and the UK to assess current practice and industrial requirements. The interviews spanned a range of industry sectors, including aerospace, automotive, chemicals, construction, metals processing, petrochemical, telecommunications and utilities.

The project has demonstrated that knowledge and technology management have a significant role to play in supporting and accelerating economic, environmental and social sustainability. Many examples of progressive action were identified, where significant benefits were obtained in terms of both profit and the environment, including both innovative technological and management developments.

Sustainability goals

However, if such approaches are to be adopted more widely, then companies must include sustainability goals in strategy and planning processes. These need to be supported by closely aligned government policy and regulations. The most effective means of achieving these goals is to ensure that sustainability aims are clearly linked to financial and competitive drivers. A 'route map' has been developed to support understanding of the issues and challenges associated with effective migration to more sustainable production systems.
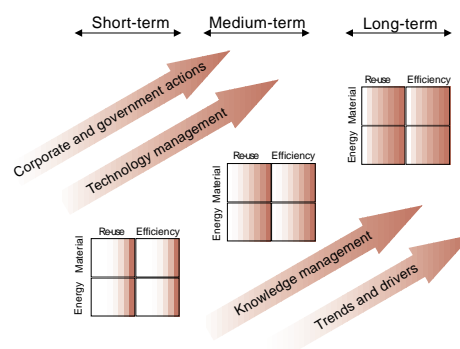
A critical success factor for sustainable development is the creation and maintenance of inter- and intra-organisational networks. These networks provide the essential means for achieving sustainable production, with respect to optimising material, energy and knowledge flows. Other important issues include foresight, strategy, planning and change management; metrics for supporting the migration to sustainable production; re-use of materials, products, energy and knowledge; and appropriate application of information and communication technologies.

Rob Phaal

COM DEV joins the Centre

Our most recent Centre member is COM DEV, a leading manufacturer of microwave equipment and subsystems for space and terrestrial applications. COM DEV, which originated in Canada, has three main operating units - the Space Group, Wireless Systems and the Wireless Group - with facilities in Canada, UK, USA and China.

The **Space Group** designs and manufactures advanced, space-based microwave and electronic products from facilities in Cambridge (Canada), Aylesbury (UK) and Xi'an (China). The Group serves nearly all of the world's leading satellite prime contractors in the commercial space communications industry.

Wireless Systems is COM DEV's newest operating unit, formed in August 1998 following COM DEV's acquisition of 3Dbm in the USA. The division specialises in cellular and PCS base station infrastructure equipment and has design and manufacturing facilities in Camarillo, California and Memphis, Tennessee

The **Wireless Group** designs and manufactures wireless communications infrastructure subsystems and equipment that are applicable to a wide range of microwave and radio frequency systems, including GSM, TDMA and CDMA-based cellular telephony systems and wireless 'local loop' networks. The division's design and manufacturing facilities are located in Dunstable (UK), Moncton (Canada) and Suzhou (China).

The Wireless Group employs approximately 600 staff at its Dunstable and Moncton sites and exports mainly to Europe and North America. The Group's range of RF conditioning equipment includes microwave filters and diplexers, tower-top amplifiers and more complex multi-filter integrated assemblies.

Microwave diplexers for cellular communication system base stations

The nature of the cellular market and strong competition mean that high performance equipment has to be designed and prototyped rapidly, whilst production tends to be in large quantities with minimal unit cost, achieved without compromise in quality. Initially the Centre and COM DEV will be working on a project together to develop a product cost optimisation model for this activity.

Scott Wilson

New Centre team member brings automotive industry experience

Scott Wilson has joined the Centre for Technology Management to begin working on a process cost optimisation project before starting his PhD in New Product Introduction in October.

Scott has a background in the automotive industry having been a member of the business projects team with Federal Mogul Corp.

consulting community which is particularly active around Cambridge. PA Technology, Scientific Generics and Cambridge Consultants responded to comments and questions from delegates covering the whole field of technology management.

The format of the Symposium with keynote speakers, case studies and workshops is now well established. The Symposium reception and dinner in Corpus Christi College provided an opportunity for further discussion and networking. Sir David Davies, President of the Royal Academy of Engineering, rounded off the evening with an entertaining reminder of the importance of networking and clear understanding in all human affairs, not just in technology management.

Many delegates declared this year's Symposium to be the best yet in our five year history. However, in the spirit of continuous improvement, we take this as a challenge to get even better next year. The dates are July 13 - 14, 2000, so put them in your organiser now and come along next year to see if it can be done!

David Probert

Technology management research at Cambridge

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

- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- TM 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 reports

6th International Product Development Management Conference (EIASM)

Churchill College Cambridge
July 5-6, 1999

This event was hosted by the Institute for Manufacturing and chaired by Mike Gregory and Geoff Gardiner.

The conference attracted around 135 delegates from all over Europe, the US and Australia. There were 76 papers covering a broad range of topics in product development research. Common themes were supplier partnerships, product development organisation, process assessment and knowledge management.

Venture economy

The two plenary speakers came from UK industry – Steve Newton from **Rolls-Royce** and Nick Barter from **Jaguar Cars**. Marco Iansiti from the

Harvard Business School gave a closing keynote address describing some of his latest work in the 'venture economy'. He revealed that around one third of Harvard MBAs now go into venture start-ups, to the extent that traditional MBA employers (McKinsey for example) have trouble filling their quota. Many of these startups are internet related. It is suggested that one key factor in the growth of these businesses is a business model which can scale successfully as demand increases.

Pete Fraser

Federal Mogul Technology

2nd Annual University Symposium

University of Warwick
June 29 - 30, 1999

This symposium, hosted by Federal Mogul Technology, is part of a strategy to ensure that research and technology developments are closely aligned with company requirements

and effectively disseminated. This event brought together university researchers and Federal Mogul employees, from both operating companies and Federal Mogul Technology.

Route mapping

Presentations came from a wide range of research programmes sponsored by Federal Mogul. Rob Phaal from the Centre for Technology Management presented the keynote presentation. He described recently completed and ongoing research in the areas of technology management process assessment, strategy and planning, with a particular focus on technology route mapping.

Other presentations covered customer-supplier relationships and management of modelling resources, together with technical areas such as metallurgy, mechanics, dynamics, tribology, simulation and experimental methods.

Rob Phaal

Quarterly Diary

September				
16th	5 - 7.30pm	Evening Workshop Cambridge	*Manufacturing systems - Japan versus the West*	
October				
7th	9.30am - 4pm	Network Day Forum Henley Management College	*Metrics and knowledge management*	
13th	5-7.30pm	Evening Workshop Cambridge	*Benchmarking for business improvement*	
21st	8.30am - 5pm	Day course Cambridge	*Make-or-buy: from strategy to practice*	
November				
3rd-4th		2-day course Cambridge	*Speeding new products to market*	
15th		Evening Workshop Cambridge	*Managing the supply chain*	

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