

# Technology Management

The newsletter of the Centre for Technology Management (CTM)

July 2015

## A busy conference season for CTM

The summer period will be busy for CTM researchers, with a large number of papers being presented at all of the key conferences on technology and innovation management.

Several of the PhD students will be reporting on their research. **Elliott More** will be attending the Portland International Center for Management of Engineering and Technology (PICMET) conference, where the theme is 'Management of the technology age'. Elliott will present his findings from a qualitative analysis of environmental scanning activities that examined the use of the STEEPLE framework. He found that participants' perspectives were dominated by events rather than trends, comprising 70% of the 886 factors.



This year's International Association for Management of Technology (IAMOT) conference will be held in Cape Town with the theme of 'Technology, innovation and management for sustainable growth'.



PhD student **Dominik Deradjat** will present his paper on the implementation of additive manufacturing for mass customisation, which deals with technical and economic challenges involved in adopting rapid manufacturing for higher scale production.

Two of our PhD students, **Judith Shawcross** and **Nazri Mahmud**, will be attending the Engineering Education Symposium in Dublin to share their work in this area. Judith's paper will report on a study which set out to improve theory and practice by studying the innovative aspects of IfM teaching practice through the lens of 'Engaged Scholarship'. Nazri's paper on 'Enquiry-based interdisciplinary learning in engineering practice' will describe his PhD case studies on how engineers learn to integrate the knowledge from the life sciences, based on data from five interdisciplinary projects.



In terms of the wider research team, **Letizia Mortara** will be in Budapest for the International Society for Professional Innovation Management (ISPIM) conference where the theme is 'Shaping the frontiers of innovation management'. Letizia's paper is entitled 'Communicating intelligence'. Building on the literature on communication and persuasive recommender systems, her paper reviews a number of real examples of intelligence delivery failures and presents a framework for intelligence delivery.



**Simon Ford** will be in Tokyo for the conference on 'Advances in production management systems' organised by Working Group 5.7 in the International Federation of Information Processing (IFIP). Simon will be presenting two papers on 3D printing: 'Defining the research agenda for 3D printing-enabled re-distributed manufacturing' and 'The role of additive manufacturing in improving resource efficiency and sustainability'.



The bulk of the research team will be in Pisa for the 2015 R&D Management Conference. There will be a number



of tools-related papers. **Rob Phaal** will be reporting on an experiment that tested a new self-facilitating roadmapping chart and will present findings showing the significant performance improvements evident from deploying structured templates in interactive strategy workshops. **Clive Kerr** will be presenting his work on a scalable toolkit platform, composed of three types of tool (roadmap, portfolio matrix, interlinked grid) operating at two hierarchical levels. To demonstrate the use of the platform, Clive will outline a series of toolkit arrangements for potential deployment in workshop-based engagements to support the development of technology and innovation strategy.

In parallel, Clive will be chairing a track on 'Visual approaches' which includes industrial contributions from Renault and Pirelli. **Clare Farrukh** will present a paper on SME innovation practice and needs based on casework with seven manufacturing SMEs enrolled in a European-funded development programme. **Letizia Mortara** will present a paper on how companies measure technology intelligence, which investigates activity and outcome-based metrics for evaluating the quality of intelligence activities. **Hyunky Park** and **Tim Minshall** have a paper which provides an overview of research trends in additive manufacturing using bibliometric data.

### R&D Management Conference 2016

CTM will be organising the 2016 R&D Management Conference, to be held in Cambridge on 4-6 July. Given that R&D lies at the heart of all technology intensive enterprises and is a critical resource to be managed for societal, environmental and economic benefit, the theme will be: 'From Science to Society: Innovation and Value Creation'.

## News update

The conference will address the challenges that this raises, including the following topics:

- Tools, toolkits, techniques and processes for managing technology, R&D and innovation;
- Entrepreneurship, investment, open innovation, business models and intellectual property;
- Technology and innovation policy, systems of innovation, innovation impact and university-industry interaction;
- People, organisation, skills and learning for R&D effectiveness.



The programme will feature keynote speakers, academic and industrial tracks, workshops, tutorials and a range of social events including a conference dinner.

It will be preceded by a two day PhD Colloquium. Further information can be found at [www.rnd2016.eu](http://www.rnd2016.eu)

There are opportunities for company collaborations. Please contact David Probert [drp1001@cam.ac.uk](mailto:drp1001@cam.ac.uk)

### Development of UK National Strategy for Additive Manufacturing/3D printing

Researchers from CTM and colleagues from the IfM's Centre for Science, Technology and Innovation Policy (CSTI) have been helping to coordinate a nationwide Call for Evidence to support the development of a national strategy for additive manufacturing/3D printing (AM-3DP). The strategy aims to not only bring together the voices of those involved in the development and use of AM-3DP technologies, but also to highlight specific areas of need that could be addressed through public and private sector mechanisms.



To learn more about the strategy development process and to add your input, please see [www.amnationalstrategy.uk](http://www.amnationalstrategy.uk)

### 15th anniversary celebrations for Cambridge University Entrepreneurs

In 2000, a new student society was established to run a business plan competition for students and researchers from the University of Cambridge. Cambridge University Entrepreneurs (CUE) has gone on to be one of Europe's most successful student-run business plan competition programmes, helping thousands of people to develop their entrepreneurial skills, and supporting the start-up of over 100 new ventures.

CTM is proud to have been involved in CUE since its inception, with CTM researchers taking on key management roles and CTM staff providing financial oversight and organisational support.



The CUE founding team in 2000, led by CTM PhD student Dr Matt Schofield.

For more information visit [www.cue.org.uk](http://www.cue.org.uk)

### Research project: Understanding the impact of equipment sharing on user innovativeness

**Dr Frank Tietze**, in collaboration with Tom Oberquelle (Kiel University) and Thorsten Pieper (Hamburg University of Technology), has completed a survey to understand the impact of equipment sharing on user innovativeness. The project builds on prior work to understand how lack of equipment ownership impacts the way users innovate. The project has collected data from German farmers organized in "Maschinenringen" (MR), local organizations that provide a sharing platform enabling farmers to jointly use their equipment, and is supported by the German MR federation. The MR concept has been highly successful for 50 years and can be seen as a pioneering example of the sharing economy. Over 1,000 farmers from more than 100 MR participated in the survey. Data analysis is currently ongoing.

[www.mr-feldstudie.de](http://www.mr-feldstudie.de)

### IfM student projects tackle challenging problems

Several students have chosen CTM to develop research projects as part of their curricula of studies. These are opportunities to open up new areas of research. Examples of current projects include those by **Karsten Schroer** and **Federico Baravalle**, from this year's ISMM cohort. They are working with **Letizia Mortara** to develop research on Business Model Innovation, particularly in the nascent Additive Manufacturing Industry.

Whilst Karsten is interested in understanding the different choices of business models of incumbent firms versus the new entrants, Federico is focusing on the cognitive aspects which limit business model innovation.

Opportunities for interaction with both projects will be available during the summer.

CTM is also hosting undergraduate students through the Engineering programme UROP - Undergraduate

Research Opportunities Programme. **Johnson Pak** will collaborate with the Bit by Bit team to support the understanding of the adoption of additive manufacturing by established industries. **Kyriacos Bagdades** will work with Frank Tietze on patent informatics for strategic decision making.

Finally, this year's MET students have just finished their seven-week project placements. They have tackled practical in-company problems as diverse as assessing the rheology of jam, optimising production methods in LED lighting and reviewing roadmapping implementation in a large technology consulting organisation.

One project, in particular, was research-oriented and looked at the use of patent citation indicators to determine technological impact studying the most highly-cited 3D printing patents.

Enquiries about student collaboration are always welcome - e-mail **David Probert**: [drp@eng.cam.ac.uk](mailto:drp@eng.cam.ac.uk)

### People news

**Tom Oberquelle** is visiting CTM from the Institute for Innovation Research at Kiel University. He is working on the project "Understanding the impact of equipment sharing on user innovativeness" under the supervision of Dr Frank Tietze. The project lasts until the end of July and results will be documented in Tom's Master Thesis.



**Thorsten Pieper** is a visitor from Hamburg University of Technology (TUHH), Institute for Technology and Innovation Management (TIM). Last year, he conducted a research project with Frank Tietze to explore if absent product ownership impacts users' innovativeness, published in *Technovation*: Tietze et al. (2015), "To own or not to own: How ownership affects user innovation - An empirical study in the German rowing community".

Building on the results of this study, he is now involved in the research project on "Understanding the impact of equipment sharing on user innovativeness" with Frank and Tom Oberquelle. Thorsten studied Industrial Engineering and is currently a PhD student and Research Assistant at TIM in Hamburg. Prior to his visit to Cambridge, he worked as a student employee for Airbus in Hamburg and Toulouse. He will be here until the end of July.

**Bernhard Hilgert** is a graduate student from Technical University Munich majoring in Technology Management. He is supporting Frank Tietze by conducting research on how patent information supports strategic decision-making in innovation processes.



**Man Hang Yip** has successfully passed her PhD viva in April and will be graduating in July. Yip's dissertation is on "Healthcare product-service system characterisation – implications for design". She has developed a product-service system (PSS) characterisation scheme that clarifies design specifications and a method to systematically apply this scheme, the "PSS characterisation approach". The scheme contributes to the development of a PSS classification scheme for engineering design and also to the literature of PSS classifications. Yip was a part-time student matriculated in 2010 Michaelmas term.



### CTM Teaching Travels

CTM's characteristic interactive teaching style is in constant demand at overseas institutions – both at universities and in companies. Recent collaborations include:

- **Josef Stefan International Postgraduate School, Ljubljana, Slovenia.** A group of about 30 postgraduate science student and local company representatives took part in a three-day Technology and Innovation Management course run by **David Probert, Simon Ford** and **Dominik Deradjat**. The focus was on exploring the commercialisation of early stage technology projects.
- **Portland State University and Bonneville Power Administration, Oregon, USA.** **Rob Phaal** spent an interesting week working with the BPA to support its strategic roadmapping initiative. Centred on an open two-day training workshop, BPA arranged a series of review and consultation meetings, relating to specific initiatives and stakeholder groups. The trip concluded with a visit to PSU to deliver a research seminar, hosted by Professor Tugrul Daim.
- **Pirelli, Italy with Strategie & Innovazione, based in Milan.** In April, **Letizia Mortara** developed and delivered a customised one day training workshop on Technology Intelligence for Pirelli. This event is the last of the series of many previous interactions with S&I in Milan which include the delivery of courses, personalised training, and research.

### Strategic Intellectual Property Forum and interest group

CTM is preparing the launch of the Strategic Intellectual Property Forum (SIPF), with a kick-off event to be held on 7 July at the IfM. The half day event focuses on strategic IP topics from a business perspective.

SIPF offers an opportunity for decision makers (e.g. CTOs, portfolio managers, VPs Technology, heads of IP/licensing) in large, mid-caps but also small companies and high-tech start-ups from the Cambridge cluster and beyond to engage in an expert community.

The programme is available at: [www.ifm.eng.cam.ac.uk/events/sipf](http://www.ifm.eng.cam.ac.uk/events/sipf)

We are also preparing the launch of an **IP interest group** taking place in the morning of 7 July. The group will provide a trusted platform for its members to engage in in-depth discussions on strategically relevant IP topics.

Expression of interest to join the group can be sent to Dr Frank Tietze at [frank.tietze@eng.cam.ac.uk](mailto:frank.tietze@eng.cam.ac.uk)

### EITIM meeting October 2015

CTM will host the next meeting of the European Institute for Technology and Innovation Management (EITIM) in early October. The meeting is expected to be a landmark event bringing together a new generation of researchers from our field across different European countries, such as Denmark, Sweden, Germany, Norway, Italy and The Netherlands.

More information: [www.eitim.info](http://www.eitim.info)

### CTM working paper series

We are continuously publishing research output in our own working paper series. All papers can be downloaded from the following website:

[www.ifm.eng.cam.ac.uk/research/ctm/ctmpublications/ctmworkingpapers](http://www.ifm.eng.cam.ac.uk/research/ctm/ctmpublications/ctmworkingpapers)

### Recruitment

CTM is seeking applications for two research associate/senior research associate positions to support CTM's work on open innovation/ intellectual property management.

More information can be found at: [www.jobs.cam.ac.uk/job/7148](http://www.jobs.cam.ac.uk/job/7148)

# Technology management research at Cambridge

- Strategic technology management
- R&D project selection
- Software sourcing in manufacturing
- Enhancing creativity in new product development
- New product introduction collaboration
- Technology management: a process approach
- Technology selection
- Technology evolution in hi-tech firms
- Innovation management in hi-tech firms
- Emergence of technology based industry
- Technology scanning and intelligence
- Technology acquisition
- Intellectual property management
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and technology insertion
- Technology valuation
- Technology foresight

## New publications

Bocken, N.M.P., Rana, P., Athanassopoulou, N., Llevbare, I. and Phaal, R., (2015), 'A strategy process for early stage ventures to develop sustainable value opportunities', *2nd International Conference on Sustainable Design and Manufacturing*, Seville, 12-14 April.

Derbyshire J. and Garnsey E., (2015), 'Are firm growth paths random? A further response regarding Gambler's Ruin Theory', *Journal of Business Venturing Insights*, Volume 3, July 2015, Pages 9-11.

Despeisse, M., and Ford, S. (2015). The Role of Additive Manufacturing in Improving Resource Efficiency and Sustainability. Institute for Manufacturing, CTM working paper series, (03/15), Cambridge, UK

Farrukh, C., Athanassopoulou, A., Phaal, R. and Tietze, F., (2015), 'SME innovation – practice and needs, lessons from the PriSMS programme', *R&D Management Conference*, Pisa, 23-26 June.

Ferriani, S., Garnsey, E., Lorenzoni, G., and Massa, L. (2015). The Intellectual Property Business Model (IP-BM) - Lessons from ARM Plc. Institute for Manufacturing, CTM working paper series, (02/15), Cambridge, UK

Garnsey, E., Lubik, S., and Heffernan, P., (2015), 'Organizational Emergence and Firm Formation', In: James D. Wright (editor-in-chief), *International Encyclopedia of the Social & Behavioral Sciences*, 2nd edition, Vol 17. Oxford: Elsevier. ISBN: 9780080970868.

Garnsey, E. and Hang, C.C., (2015), 'Introduction to Special Issue of Technovation on Opportunity Recognition and Creation', *Technovation* Vol. 39-40 (2015).

Granstrand, Ove. and Tietze, Frank., (2015), 'IP Strategies and Policies for and Against Evergreening', CTM Working paper, March 2015.

Hang, C.C., Garnsey, E. and Ruan, Y., (2015), 'Opportunities for Disruption', *Technovation*, Vol 29-40 May-June 2015, Pages 83-93.

Kerr, C. and Phaal, R., (2015), 'A scalable toolkit platform: configurations for deployment in technology and innovation strategy workshops', *R&D Management Conference*, Pisa, 23-26 June.

Lubik, S., and Garnsey, E., (2015), 'Early Business Model Evolution in Science Based Ventures', *Long Range Planning* Vol xxx pp 1-16.

Lütjen, H., Schultz, C., and Tietze, F., (2015), 'Escaping the commodity trap: Towards service innovation', *R&D Management Conference*, Pisa.

Oliveira, M.G., Rozenfeld, H., Phaal, R. and Probert, D., (2015), 'Decision making at the front end of innovation: the hidden influence of decision criteria', *R&D Management*, 45 (2), pp. 161-180.

Phaal, R., Kerr, C., Llevbare, I., Farrukh, C., Routley, M. and Athanassopoulou, N., (2015), 'Self-facilitating templates for technology and innovation strategy workshops', *R&D Management Conference*, Pisa, 23-26 June.

Thiesse, Frederic., Wirth, Wirth., Kemper, Hans-Georg., Moisa, Michelle., Morar, Dominik., Lasi, Heiner., Piller, Frank., Buxmann, Peter., Mortara, Letizia., Ford, Simon., and Minshall, Tim., (2015), 'Economic Implications of Additive Manufacturing and the Contribution of MIS', *Business & Information Systems Engineering*, DOI: 10.1007/s12599-015-0374-4.

Tietze, F., Smed, M., Schultz, C., and Salomo, S., (2015), 'The Implications of Partner Fit on the Innovation Output From Uni-Industry Cooperations', *PICMET*, Portland, USA.

Tietze, F., and Probert, D., (2015), 'Patent informatics for collaboration management', *The Partner* (May), 109-111.

Zhao, B., Hirose, Y. and Phaal, R., (2015), 'A framework for characterising technology ventures for valuation purposes', *R&D Management Conference*, Pisa, 23-26 June.

## Diary 2015

[www.ifm.eng.cam.ac.uk/events](http://www.ifm.eng.cam.ac.uk/events)

### September

22-23

*Realising the Potential of Early Stage Technologies*

Two-day course  
IfM, Cambridge

### October

21

*Strategic Roadmapping*

One-day course  
IfM, Cambridge

## Contact us

Centre for Technology Management  
Institute for Manufacturing  
Department of Engineering  
17 Charles Babbage Road  
Cambridge, CB3 0FS UK

Tel: +44 (0)1223 766141  
Fax: +44 (0)1223 464217  
[ctm-enquiries@eng.cam.ac.uk](mailto:ctm-enquiries@eng.cam.ac.uk)