

Technology Management

The newsletter of the Centre for Technology Management (CTM)

November 2014

Dr Frank Tietze, University Lecturer in Technology and Innovation Management: New research directions and collaboration opportunities



For manufacturing firms, intellectual property (IP) is becoming increasingly relevant as a business asset whose effective management can enhance competitiveness. With the recent appointment of Dr Frank Tietze, CTM extends its capability in teaching and research in that field. His experience complements CTM's expertise in technology intelligence and roadmapping, also building on ongoing visualization research activities.

With more than 10 years of experience in IP research, Frank's areas of expertise include external technology acquisition and exploitation strategies, patent transactions, intermediaries (non-producing entities), IP extension strategies ("evergreening"), design rights as innovation indicators and patent informatics for technology intelligence (open innovation) and strategic decision support.

Efforts are under way to establish an active IP community bringing together IP professionals from corporate management, patent and licensing departments of manufacturing firms, IP analytics software providers, IP consultancy firms and patent law firms. Please get in touch with Frank if you are interested in joining that community.

Besides his interest in IP management, Frank's research focuses on innovation processes for product-service systems (PSS), also known as product-based service solutions. Examples range from free-floating car-sharing

systems to industrial remote monitoring services and tele-medical solutions. As value creation and capture will be different for manufacturing firms in the future, value networks and innovation systems currently undergo profound and often technology-driven changes (eg 3D printing, ultra-precision robotics, nano-materials). With a shift towards technology-based service offerings, it is increasingly relevant for firms to understand how they can address these changes through innovative business models, and how this impacts their innovation processes.

Frank regularly collaborates with firms of all sizes ranging from large multinationals and mid-caps to SMEs and start-ups. He has conducted projects for federal and local governments as well as governmental agencies.

Frank was assistant professor at the Institute for Innovation Research at Kiel University (Germany) and is research fellow of the Innovation and Intellectual Property Research Group at Chalmers University of Technology (Sweden). He holds a doctoral degree in economics and social sciences from the Institute for Technology and Innovation Management at Hamburg University of Technology (Germany).

In 2008, he co-founded the venture backed start-up ARKTIK GmbH, an award-winning climate care company, where he was member of the executive management board until end of 2009. He is board member and Secretary General of the European Institute for Technology and Innovation Management (EITIM).

We look forward to developing this new dimension in CTM's activities, and enquiries to explore collaboration opportunities are very welcome.

Please contact Frank at frank.tietze@eng.cam.ac.uk

Brussels scale up workshop report

Frank Tietze attended the fourth and final workshop of the EC-funded multi-KETs (Key Enabling Technology) pilot lines project: "Towards a tentative policy roadmap for the support of Multi-KETs pilot production activities" in Brussels.

The workshop took place in the context of the European KETs strategy, which is a priority action of the EU industrial policy. Involving different stakeholder groups and based on evidence collected throughout the two-year project, it aimed at elaborating a common policy roadmap. Funding schemes and support actions were discussed for facilitating pilot production targeted at specific actor groups (multi-partner consortia and large enterprises, mid-caps, SMEs, start-ups).

mKET-based product manufacturing appears highly relevant for IfM's future research agenda, and not the least with regard to technology management-related questions such as how multi-stakeholder consortia manage intellectual property to effectively facilitate and not prevent mKET dissemination.

A busy conference season for CTM researchers

The summer months provided many opportunities for the CTM research team to present its work at international conferences and network with the wider academic community. Conference papers often lead on to journal papers, and meeting key people in the field builds collaboration interests.

The conferences attended this year were:

PICMET '14 Conference



Under the theme 'Infrastructure and Service Integration', this year's PICMET was hosted by our research and teaching collaborator JAIST (Japan Advanced Institute of Science and Technology) in Kanazawa, Japan.

Rob Phaál, Many Hang Yip and David Probert attended, delivering the following six papers:

- 'Architecting Strategy: Visual Form and Function of Roadmaps'
- 'The Influence of Product and Service Ratio on Stakeholder Interaction in Software System Development'
- 'Tool Fingerprinting: Characterising Management Tools'
- 'Characterising Product-Service Systems in the Healthcare Industry'
- 'Light-Weighting Innovation Strategy: A Roadmap-Portfolio Toolkit'
- 'Scoring Methods for Prioritizing and Selecting Innovation Projects'

The conference was very well attended, with many delegates from Asia, providing the opportunity to meet many new academic colleagues from that continent, including Dr Joseph Zhou, a previous PhD student at CTM, now a Professor at Tsinghua University.

A highlight of the conference - for David Probert at least! - was the Awards Banquet where he was presented with a PICMET Fellowship.

International Product Development Management (IPDM) Conference

Frank Tietze attended this conference in Limerick, Ireland. He presented a paper co-authored with Carsten Schultz, Robert Lorenz and IfM alumni Kah-Hin Chai entitled

'Organizational design for service innovation development'. Based on survey data from German manufacturing firms, they investigated the impact of three organization design elements (autonomy, strategic orientation and formalization) on firms' service innovativeness.

Strategic Management Society Conference

CTM doctoral student Chung-Lin Tsai attended the Strategic Management Society (SMS) 34th Annual International Conference in Madrid, Spain on 20-23 September 2014.

He presented his paper, co-authored with David Probert, entitled 'Linkage between Industry Platform Implementation, Environmental Factors, and Network Effects: Evidence from the ICT Industry'.



Engineering Education Conference

Two CTM Members, Judith Shawcross and Mohd Nazri Mahmud, participated in the Annual Conference of the European Society for Engineering Education (SEFI) held in Birmingham from 15th to 19th September 2014.

Judith presented her paper on 'Completing the SIP activity framework - what through placement activities should they, and do they, do?' Nazri discussed his research work on 'The application of Repertory Grid interview method for improving the identification and understanding of competencies required for engineering practice'.

IEEE International Conference on the Management of Innovation and Technology

Two CTM-related papers were presented at ICMIT 2014 in Singapore on 23-25 September.

The first was by David Weiss and Tim Minshall, entitled 'Negative Effects Of Relative Proximity And Absolute Geography On Open Innovation Practices In High-Tech SMEs In The UK', was one output of David Weiss's recently submitted PhD research. The paper focused on the largely unexplored issue of how moving into a thriving high-tech cluster can present many challenges for smaller companies. We were delighted that this paper received the 'Best Paper Award' from the conference committee.

The second CTM-related paper was co-authored by our new colleague Frank Tietze and was entitled 'Excavating the Role of NPEs in the Innovation Process: Did We Start a Mission Possible?'. This paper explored the issue of how the emergence of Non-Producing/Practicing Entities (NPEs) may be changing the way in which some management teams implement patenting strategies, and was based upon research undertaken with Rob Dekkers from the University of Glasgow.

Taiwan Program on Entrepreneurship, Innovation and Participant-Centered Learning

One current and two past CTM members presented their work at an event organised by the National Taiwan University of Science and Technology.

Tim Minshall gave two talks - one on trends in open innovation and its impact on innovation education, and one on sharing lessons from the emergence of the Cambridge innovation ecosystem.

Dr Vincent Kuo and Dr Caren Weinberg (both former CTM PhD students) contributed talks on open innovation and the structure of the Israeli innovation ecosystem as part of the broad theme of developing an understanding of how Taiwan can best support new technology ventures.

Open Source Convention



The Open Source Convention is the biggest international conference about OSS in the world. The 2014 edition was held from 20-24 July in Portland, USA.

The technology case for open source is well established, and the collective intelligence of the open source community ensures open innovation and user innovation.

Michelle (Xiaohong) CHEN participated in this conference for the EC-HVEN Project.

Michelle's research compares OSS practices in China and other parts of the world.

CityCar New Product Introduction Simulation for Executive Education

The CityCar New Product Introduction Simulation has been a popular element of the three-day Technology and Innovation Management course that CTM runs each year in March/April. In September, the CityCar simulation was run by CTM for the first time as part of our in-company Executive Education training courses.

The team of Simon Ford, Dominik Deradajat and Elliott More was responsible for running the simulation with Scott Bader Ltd, helping 35 of its employees from across different functional groups gain a better appreciation of their roles in the new product introduction process.

In the CityCar simulation, participants are grouped into teams, with each person taking on a specific functional responsibility as the team attempts to successfully launch a self-parking vehicle. During the 2.5 hours of the simulation, the team must design and build a self-parking vehicle using Lego Mindstorms, develop a financial plan, and devise manufacturing and marketing strategies, before demonstrating their vehicle at the Geneva Show.



The final task is to present the product at the Geneva Motor Show

Through participating in the simulation, a better understanding of the new product introduction process is obtained, including recognition of the multiple causes of failure that can arise during the new product introduction process, and the importance of leadership, teamwork and communication during the project.

If you're interested in running the simulation within your organisation then please contact Simon Ford for more information at sjf39@cam.ac.uk

STIM 2015

The Strategic Technology & Innovation Management (STIM) Consortium is a practice-oriented research and networking collaboration between industrial member companies and the Centre for Technology Management. In its second year, STIM 2014 includes an active portfolio of 10 research projects covering a range of technology and innovation management topics of practical and theoretical interest.

STIM is an annual programme, and a meeting will be hosted in Cambridge on Wednesday 19 November to help

explore and define the research programme for 2015. New member companies are welcome to join, working with current members to build an ongoing platform for industrially relevant research and knowledge exchange.

If you are interested in attending the 19 November meeting, or would like to find out more about the STIM programme, please contact Dr Robert Phaal: rp108@cam.ac.uk
+44 (0)1223 765824

Website: www.ifm.eng.cam.ac.uk/research/ctm/stim



IfM Student Project Opportunities for Collaborating Companies

Every year CTM works with Masters students at the IfM, to supervise their industrial project work. This often takes place in collaboration with external host companies, and can be a great source of new ideas and practical help.

Topics may be anything related to manufacturing industry, which is of mutual interest to the host, the student and the supervisor. If you think this could be of interest to you, please don't hesitate to get in touch with David Probert at drp@eng.cam.ac.uk

Ideas will be offered to the students, who have a large degree of freedom to pick a topic that appeals to them. See also www.ifm.eng.cam.ac.uk/education/studentprojects

Meanwhile, here is a message from one of this year's collaborators:

AND Technology Research are pleased to report that since partnering with students from the Institute for Manufacturing (IfM), they have been able to expand the market for their "Smart Factory" offering. AND have developed a novel range of technologies that can provide businesses that consume high levels of energy with a greater insight into their energy usage and needed to understand how they could maximise the returns on investment.

The students researched the macro environments affecting energy monitoring products and completed an in-depth competitive analysis of the "Smart Factory" offering. The project highlighted significant market opportunities matching the unique selling points of the "Smart Factory" solution.

Valerie Lynch, CEO and Consultant at AND says: "Our work with the students from the IfM had a considerable impact on the way we have planned our future marketing strategy for 'Smart Factory'. Through working with the IfM we have been able to use the marketing techniques and methods suggested to target new market areas."

We welcome:

Our visitors

Jan Sternkopf is visiting CTM until the end of October. His research focuses on process innovations in health care, in particular in hospitals.

Jan has been a doctoral student at the chair of Technology Management at Kiel University since February 2012. He studied business administration at Kiel University and BI Norwegian Business School in Oslo focusing on marketing and innovation management.



During his studies, Jan worked for a mid-sized company in the signal-technology sector and completed various internships in Melbourne and Qingdao.

Daniel Beiderbeck is a Master's student in industrial engineering at RWTH Aachen University in Germany. He joins CTM and IfM for six months, writing his thesis under the supervision of Dr Tim Minshall.



His research will support the EPSRC project on 3D printing and it will focus on the exploration of topics relating to the adoption of Additive Manufacturing (AM) in different industrial sectors.

In the course of his studies, Daniel concentrated on production technologies and worked for a leading German automobile company. He also studied abroad at Harvard University and MIT, focusing on behavioural economics and innovation management.

During his stay in Cambridge, Daniel is a member of Wolfson College.

For any further information, please contact him at daniel.beiderbeck@rwth-aachen.de

Our New PhD students

Hyun Kyu Park is a PhD student under the supervision of Dr Tim Minshall. He has a BA in Anthropology and MA in User Experience (UX). His research interest lies in the connection between UX and open innovation, user research, CSS and basketball.



Bingqing Zhao is a PhD student under the supervision of Dr. Rob Phaal. Her research interests include early stage technology valuation and technology ventures – ie high-tech



start-ups. She did her bachelor's degree in Financial Mathematics at the University of Liverpool, after which she did an MPhil in Finance at Judge Business School, University of Cambridge.

Yuta Hirose joins the Centre for Technology Management as a doctoral student under the supervision of Dr Rob Phaal. He is exploring the integration



opportunities between innovation system functions and roadmapping to develop a structured approach for understanding and analysing emerging industrial dynamics. He has a BEng in Chemical Engineering and a BCom in Finance from the University of Melbourne, Australia, and a MSc in Sustainability Science from the University of Tokyo, Japan.

Before coming to Cambridge, he worked in international business development at a Japanese trading house and as a consultant at the United Nations Industrial Development Organization (UNIDO).

Sullivan Songhe YE joined the

Centre for Technology Management as a doctoral student in October 2014 under the supervision of Dr Tim Minshall. His research interest lies in Medical Technology Management, Technology Business Investment and Incubation.



Prior to coming to Cambridge, Sullivan obtained a BA and MBA, studying at the Tsinghua University in China, Stanford University in the US and, as a visiting student, at Waseda University in Japan.

Sullivan also has seven years' work experience in the FMCG, Construction Material and Med-tech industries. During those years, he served marketing and management roles in MNC, SME and SOE in Mainland China (Beijing and Guangdong Province), Hong Kong, Dubai and Nigeria.

Sullivan is the founder of The Cambridge-China Union (CCU), President of the Tsinghua Alumni Association in Cambridge and also Vice-secretary of the Tsinghua Alumni Association in the UK.

Email: sy327@cam.ac.uk

Congratulations

Manjusha Thorpe recently graduated with a PhD, which focused on determining the enablers of scaling up and commercialising process innovations.

Outcomes of Manjusha's research include risk identification tools, mitigation approaches and a management process for optimising scale-up activities across a range of industries.

Manjusha is returning to Australia to both build on her research findings and apply them in practical environments. Manjusha welcomes engagement with people interested in scaling up and commercialising new technologies and can be contacted via manjusha.thorpe@cantab.net



IfM ECS: working with industry and government

IfM Education and Consultancy Services (IfM ECS) has published two new documents outlining some of the services it can provide for industry and governments.

'Delivering growth through effective innovation and technology management' is aimed at companies looking to achieve long-term growth through the development of robust innovation and technology strategies and systems.

'Creating the conditions for growth' is for policymakers who are supporting national and regional growth in key industry sectors.

For more information about our activities in these areas, go to: www.ifm.eng.cam.ac.uk/services/overview/large/itm and www.ifm.eng.cam.ac.uk/services/overview/government



New publications

Dekkers, R. and Tietze, F., (2014), 'Excavating the Role of NPEs in the Innovation Process: Did We Start a Mission Possible?' IEEE International Conference on Management of Innovation & Technology, Singapore, 23-25 September 2014.

Farrukh, C., Kerr, C., Phaal, R., Athanassopoulou, N. and Routley, M., (2014), 'Light-weighting innovation strategy: a roadmap-portfolio toolkit', Proceedings of the Portland International Conference on Management of Engineering and Technology (PICMET), Kanazawa, 27-31 July.

Granstrand, O. and Tietze, F., (2014), 'IP strategies and policies for and against evergreening', European Policy for Intellectual Property, European Commission, Brussels, 4 – 5 September 2014.

Ilevbare I.M., Probert D.R. & Phaal R., (2014). Towards risk-aware roadmapping - influencing factors and practical measures. *Technovation* 34(8), 399-409.

Mashhour, A., Probert, D. and Phaal, R., (2014) 'Characterising the acquisition of complex systems – the case of the mission critical communications industry', R&D Management Conference, Stuttgart, 3-6 June.

Mitchell, R., Phaal, R. and Athanassopoulou, N., (2014), 'Scoring methods for prioritizing and selecting innovation projects', Proceedings of the Portland International Conference on Management of Engineering and Technology (PICMET), Kanazawa, 27-31 July.

More, E., Phaal, R. and Probert, D., (2014), 'Addressing resource over-exploitation via cooperative institutions: insights from sector level technology roadmapping', 12th Global Conference on Sustainable Manufacturing, Johor Bahru, Malaysia, 22-24 September.

Mortara, L., Kerr, C., Phaal, R., Farrukh, C. and Probert, D., (2014), 'An approach to the characterisation of management tools based on instances of tools-in-action', Proceedings of

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
- Technology protection
- Strategic make-or-buy
- Industrial make-or-buy decisions
- Sustainability and technology insertion
- Technology valuation
- Technology foresight

the Portland International Conference on Management of Engineering and Technology (PICMET), Kanazawa, 27-31 July.

Mortara, L., Phaal, R., Kerr, C., Farrukh, C. & Probert, D., (2014), 'Tool Fingerprinting: Characterising Management Tools', Proceedings of PICMET '14: Infrastructure and Service Integration, July 27 - 31, 2014, ANA Crowne Plaza Hotel, Kanazawa, Japan.

Phaal, R. and Yoshida, S., (2014), 'Architecting strategy: visual form and function of roadmaps', Proceedings of the Portland International Conference on Management of Engineering and Technology (PICMET), Kanazawa, 27-31 July.

Schultz, C., et al., (2014), 'Organizational Design for Service Innovation Development – an Empirical Analysis of Servitizing Firms', Proceedings of the R&D Management Conference, Stuttgart, Germany, 3 – 6 June 2014, ISBN: 978-3-8396-0746-6.

Schultz, C., & Tietze, F., (2014), 'Produkt Service Systeme als Gegenstand der betriebswirtschaftlichen Innovationsforschung', In C. Schultz & K. Hölzl (Eds.), Motoren der Innovation - Zukunftsperspektiven der

Innovationsforschung (pp. 57-79). Heidelberg: Springer.

Tsai, C. L., and Probert, D., (2014), 'Linkage between industry platform implementation, environmental factors, and network effects: Evidence from the ICT industry', The Strategic Management Society 34th Annual International Conference, Madrid, Spain, 20-23 Sep, 2014.

Weiss, D. and T. H. W. Minshall (2014). 'Negative effects of relative proximity and absolute geography on open innovation practices in high-tech SMEs in the UK'. 7th IEEE International Conference on the Management of Innovation and Technology (ICMIT 2014) 23-25 September. Singapore, Received 'Best Paper Award'.

Yip, M.H., Phaal, R. & Probert, D.R., (2014), 'Stakeholder Engagement in Early Stage Product-Service System Development for Healthcare Informatics, Engineering Management Journal, Vol. 26 (3), p. 52-62.

Yip, M.H., Phaal, R., Probert, D.R., (2014), 'Characterizing product-service systems in the healthcare industry', Proceedings of the Portland International Conference on Management of Engineering and Technology (PICMET), Kanazawa, 27-31 July.

Diary 2014-2015 www.ifm.eng.cam.ac.uk/events

November

4	<i>Visual Approaches for Strategy and Innovation Management</i>	One-day course, IfM, Cambridge
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November

19	<i>Strategic Technology and Innovation Management Consortium</i>	Open Meeting IfM, Cambridge
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March

24-26	<i>Technology and Innovation Management</i>	Three-day course IfM, Cambridge
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