

IfM BRIEFING DAY

THURSDAY 14 MAY 2015

IfM | CAMBRIDGE | UK

A day of interactive sessions for senior industrialists and policymakers presenting the latest research, approaches and practical applications from the Institute for Manufacturing

IfM BRIEFING DAY

THURSDAY 14 MAY 2015

PROGRAMME

09:15 REGISTRATION

09:45 WELCOME

What's new at the IfM

Mike Gregory

SESSION 1 – PLENARY

09:55 **Business model innovation: research and practice across the IfM**

Chander Velu

10:15 **Sustainable business modelling**

Steve Evans

10:35 **Making the shift to service-based business models**

Veronica Martinez

10:55 **Bit-by-bit – the digital fabrication revolution**

Tim Minshall

11:15 **Developing manufacturing talent**

Judith Shawcross

11:30 REFRESHMENTS

12.00 SESSION 2 – THREE SESSIONS, PLEASE PICK ONE

1. Effective technology and innovation management

Yuta Hirose, Clive Kerr, Michèle Routley, Letizia Mortara, David Probert and Binqing Zhao (Lecture Room 1)

2. Industrial strategies for national, regional and local policymakers

Andrew Gill and Carlos López-Gómez (Lecture Room 2)

3. Capturing value from global networks - strategic approaches to configuring international production, supply and service operations
Jag Srani, Tomás Harrington, Mukesh Kumar and Eric Harris
(Seminar Room 3)



13:00 LUNCH

14.00 SESSION 3 – THREE PARALLEL SESSIONS, PLEASE PICK ONE

1. Industrial information and automation

Duncan McFarlane, Liz Salter, Alan Thorne, Ajith Parlikad and Phil Woodall
(Lecture Room 1)

2. Designing disruption

James Moultrie (Lecture Room 2)

3. Manufacturing footprint strategy

Paul Christodoulou and Don Fleet (Seminar Room 3)

15:00 REFRESHMENTS

15.30 SESSION 4 – PLENARY

15.30 **NanoManufacturing**

Michael De Volder

15.50 **Industrial inkjet technology**

Ian Hutchings and Graham Martin

16.10 **Advanced manufacturing research: A pathway from lab to commercial scale**

Ronan Daly

16:30 **Your IfM**

Meet the team and find out how to get the most from the IfM

17.00 CLOSE

WELCOME

WHAT'S NEW AT IfM

Mike Gregory

09:45

Lecture Room 1

Mike Gregory will highlight new developments at the IfM in research, education and engagement with industry.

SESSION 1 PLENARY

BUSINESS MODEL INNOVATION: RESEARCH AND PRACTICE ACROSS THE IFM

09.55 | Chander Velu

Dr Chander Velu will introduce the Business Model Research Programme at the IfM. The progress of globalisation, the intensity of technological change, and shifts in industry borders have all created opportunities for new business models. This session will outline the importance of business model innovation for firms. The session will provide an overview of the key research projects within IfM in business model innovation such as: technology and innovation management, servitization, sustainability, global value network design and policy development. The session will also introduce the work of IfM Education and Consultancy Services (IfM ECS) in developing and applying research-based toolkits for business improvement.

SUSTAINABLE BUSINESS MODELLING

10.15 | Steve Evans

Professor Steve Evans will introduce the work of the Centre for Industrial Sustainability in helping many industrial collaborators to develop new business models. He will explain why so many companies are now experimenting with their value creation logic and describe some of the trends we observe. We have built tools to help companies through this process of innovating their business model and Steve will briefly show how these work.

MAKING THE SHIFT TO SERVICE-BASED BUSINESS MODELS

10.35 | Veronica Martinez

Increasingly firms are shifting their product-oriented business models to service-oriented ones. Services represent over 70% of the Gross Domestic Products across the UK and Europe. Many of these firms decided to make the shift to services for different reasons – to retain their leadership position in the markets, explore new sources of revenue, de-risk their competitive positions, experiment new growth, increase capacity utilization and broaden the relationship. Despite the widespread adoption of services, firms struggle to make a successful and sustainable shift to services and capture value from these service business models. This session discusses how different firms have made a successful shift to services.

BIT-BY-BIT – THE DIGITAL FABRICATION REVOLUTION

10.55 | Tim Minshall

Dr Tim Minshall will provide an overview of three current projects within the Technology Enterprise Group related to 3D Printing / Additive Manufacturing:

- ▶ **Bit-by-Bit: Capturing the value from the 3D printing 'revolution'.** This project, supported by the EPSRC and ESRC, is exploring the current and potential impact of 3D printing technologies on a range of industries.
- ▶ **3D Printing-Enabled Re-Distributed Manufacturing:** This EPSRC and ESRC-supported programme is funding a range of feasibility studies to explore the connections between the diffusion of 3D printing technologies and the geographical re-distribution of manufacturing.
- ▶ **Development of a UK National Strategy for Additive Manufacturing:** Working in partnership with colleagues in IfM's Centre for Science, Technology & Innovation Policy, the Technology Enterprise Group is helping to run a Call for Evidence to support the development of a public technology strategy for 3D Printing / Additive Manufacturing for the UK: www.amnationalstrategy.uk

DEVELOPING MANUFACTURING TALENT

11.15 | Judith Shawcross

Judith Shawcross will describe the range of IfM's educational activities:

- ▶ developing the next generation of manufacturing leaders through our undergraduate and postgraduate taught and research-based courses.
- ▶ transferring our knowledge to industry through a wide range of open and bespoke education and capability development programmes.
- ▶ carrying out research into how individuals acquire the skills and knowledge to become effective industry professionals.

SESSION 2

PARALLEL : PLEASE SELECT

EFFECTIVE TECHNOLOGY AND INNOVATION MANAGEMENT

David Probert, Clive Kerr, Letizia Mortara, Yuta Hirose, Bingqing Zhao, Michèle Routley

12:00

Lecture Room 1

Technologies lie at the heart of any manufacturing company – whether used in the manufacturing process or forming an integral part of the products themselves. Successfully assimilating existing technologies into the business and anticipating the impact of emerging new technologies are critically important tasks for companies under pressure to bring new products to market as quickly as possible. Close collaboration with industrial partners is a characteristic of our research and practice at the Centre for Technology Management (CTM), and this session reviews some current opportunities to get involved. These include:

Tools and Toolkits

A 'scalable toolkit platform', for supporting the design and deployment of integrated toolkits, is currently under development. The platform is based on a minimum core set of management tools (roadmaps, portfolio matrices, interlinked grids). This arrangement has the necessary flexibility to respond to the breadth of tasks faced within the areas of strategic planning, technology and innovation management.

Communicating Technology Intelligence

This work examines some of the cognitive barriers to effective Technology Intelligence communication. It explores the ways in which intelligence can be better packaged and disseminated to overcome these obstacles and increase the chances that important information could be transferred to decision-makers.

Technology Venturing

Yuta Hirose, a PhD student in CTM, is exploring, from an innovation system perspective, the development of technology ventures from creation to maturity (i.e. IPO). Bingqing Zhao, also a PhD student in CTM, is developing an integrated approach by combining quantitative and qualitative methods to perform an appropriate valuation for technology ventures particularly at the earlier stages of their development. There are collaborative case study opportunities.

Delivering Growth

Given the changing and uncertain environment, companies need to deliver new products and services quickly and efficiently. Some of IfM's comprehensive portfolio of flexible innovation and technology management approaches and tools, based on CTM research outputs, will be described with case study examples.

INDUSTRIAL STRATEGIES FOR NATIONAL, REGIONAL AND LOCAL POLICYMAKERS

Andrew Gill and Carlos López-Gómez

12:00

Lecture Room 2

Manufacturing economic growth: IfM's work supporting policy development

The Centre for Science, Technology & Innovation Policy (CSTI) is an applied policy research unit exploring what makes national innovation systems effective at translating new science and engineering ideas into novel technologies and emerging industries. This presentation will introduce CSTI's work supporting sector, manufacturing and technology strategies both in the UK and internationally. Examples of the range of research tools and approaches deployed by CSTI to support policymaking will be drawn from recent collaborations with the Department for Business, Innovation and Skills (UK) and the state of Yucatan, Mexico. The new 'Manufacturing Policy Portal' hosted by CSTI will also be introduced.

A landscape for High Value Manufacturing

IfM have been commissioned by Innovate UK to further support the development of the UK High Value Manufacturing strategy through a 'landscaping' study currently under way. The objective of the study is to:

- ▶ Outline High Value Manufacturing opportunities which can inform the HVM Catapult Operating Strategy and TSB HVM CR&D calls
- ▶ Refine the analyses in the context of the BIS 'Industrial sector strategies' and other studies such as the Manufacturing Foresight report
- ▶ To support plans for the development of plans for the UK Industrial Capabilities and Competencies

During this session Andrew Gill will outline some interim findings and give delegates the opportunity to input their thoughts and priorities.

CAPTURING VALUE FROM GLOBAL NETWORKS - strategic approaches to configuring international production, supply and service operations

Jag Srai, Tomás Harrington, Mukesh Kumar, Eric Harris

12:00

Seminar Room 3

The IfM's Centre for International Manufacturing (CIM) pursues an extensive programme of research and real-world application of new approaches for the strategic configuration of global value networks, working closely with a community of industrialists, policymakers and academics.

The team will introduce new tools emerging from their research in the areas of 'supply network resilience' and 'disruptive technology supply network redesign'.

SESSION 3

PARALLEL : PLEASE SELECT

INDUSTRIAL INFORMATION AND AUTOMATION

Duncan McFarlane, Liz Salter, Alan Thorne, Ajith Parlikad, Philip Woodall

14:00

Lecture Room 1

This session provides an overview of the toolkit - illustrated with recent applications - and describes how the companies have embedded the approach within their strategy processes, driving significant business benefits. Professor Duncan McFarlane will introduce the Distributed Information and Automation Laboratory (DIAL) which is concerned with helping companies:

- ▶ integrate automatic identification (Auto-ID) into existing business systems
- ▶ develop distributed automated solutions for manufacturing and logistics
- ▶ quantify the value of improved information for better decision making
- ▶ improve whole-life management of industrial assets

He will then go on the focus on DIAL's industrial adaptation pathways, providing examples of different applications and deployments stemming from research projects.

The final session of the talk will overview some of the tools DIAL has developed in conjunction with IfM ECS.

Mr Alan Thorne will introduce an Industrial Automation requirements tool.

Dr Ajith Parlikad will overview a tool for assessing information quality associated with key assets.

Prof Duncan McFarlane will describe an auto tool for assessing industrial resilience.

DESIGNING DISRUPTION

James Moultrie

14:00

Lecture Room 2

Dr James Moultrie will introduce the work of the Design Management Group, which is focused on understanding and improving the ways in which design and new product development are managed. James has a particular interest in the potential for design to enable radical changes by integrating both user and technological perspectives.

This session will specifically seek to explore the ways in which design can result in disruptive change in organisations, resulting in transformational results. A case study from Linde will be presented, explaining the process for engaging external designers, and the challenges of managing a dispersed design team.

The session will conclude by exploring opportunities for collaboration and development of this exciting research theme.

MANUFACTURING FOOTPRINT STRATEGY

Paul Christodoulou and Don Fleet

14:00

Seminar Room 3

The IfM has undertaken many years of research into manufacturing footprint strategy - understanding how to 'make the right things in the right places'. The resulting approaches have been applied in a series of major collaborations with multinational companies, in a wide range of industrial sectors and strategic contexts.

SESSION 4 PLENARY

NANOMANUFACTURING

15.30 | Michael De Volder

The IfM's Nanomanufacturing group focuses on the development of new methods for processing nanoparticles such as carbon nanotubes, graphene and hybrid materials. It is particularly interested in processes that allow tuning nanoscale chemistry and microscale morphology in conjunction with large scale production. These materials may find application in sensors, catalysis, energy storage and water purification.

INDUSTRIAL INKJET TECHNOLOGY

15.50 | Ian Hutchings and Graham Martin

The Inkjet Research Centre (IRC) was established within the IfM in 2005. Its research underpins the rapidly developing technology of inkjet printing. We currently lead a major EPSRC programme involving collaboration with other Cambridge departments as well as the Universities of Durham and Leeds. In this and other recent projects we have been involved in active collaboration with 12 companies and eight other research centres. Research topics in the IRC range from fundamental studies of the behaviour of liquid jets and drops, to applications of inkjet printing in a manufacturing context.

In this session we will show some examples of recent work, including:

- ▶ answers to basic questions about the stability of liquid jets
- ▶ effects of polymers on inkjet behaviour
- ▶ high-speed holography for ultra-precise measurements
- ▶ a new method for generating liquid drops
- ▶ drop impact and coalescence on surfaces
- ▶ application of inkjet printing to medical diagnostic device manufacture
- ▶ printable liquid crystal lasers
- ▶ printing of mammalian cells

In the IRC we use our expertise in inkjet technology, fluid mechanics, complex rheology, high-speed visualisation, analysis and computation to study jet and drop creation, drop flight and drop/surface interactions. We are also very interested in the application of inkjet processes to manufacturing, including the printing of functional and biological materials. We are always keen to discuss opportunities for research and collaboration with new partners.

YOUR IfM

ADVANCED MANUFACTURING RESEARCH: A PATHWAY FROM LAB TO COMMERCIAL SCALE

16.10 | Ronan Daly

Funding bodies emphasise more than ever that engineers need to focus their work to positively drive economic growth by facing the challenges of scaling emerging technologies and bridging the “valley of death”. It is a complex path to navigate but a natural home for manufacturing research, where we examine underpinning scientific and engineering concepts but with a clear link to the real manufacturing environment faced in industry. This talk will share some of the latest manufacturing technology, sensor and self-assembly research to come from the Fluids in Advanced Manufacturing group here in IfM and will then focus on how we are approaching this scale-up challenge. Working with the Centre for Science Technology & Innovation Policy we are learning about how to anticipate the downstream challenges facing emerging technologies along the “Pathway to Manufacturing”.

16.30 | NETWORKING

Meet the team and find out how to get the most from the IfM

INSTITUTE FOR MANUFACTURING (IfM)

The IfM is part of the University of Cambridge. It brings together expertise in management, technology and policy to address the full spectrum of issues which can help industry and governments create sustainable economic growth.

Management: covering a wide range of topics including the development of sustainable industrial practice, capturing value from innovation, optimising global operations networks and moving from product to service-based models. The IfM is an international centre of excellence for roadmapping, a powerful technique for aligning technology and business objectives.

Technology: inkjet and laser-based manufacturing process technologies, carbon nanomaterials, advanced information systems and automated identification technologies, all with a wide range of industrial applications.

Policy: programmes, processes and practices for translating publicly-funded R&D (in particular science and engineering research) into new technologies, industries and economic wealth.

In each of these areas of expertise, the IfM carries out:

Research: bringing together specialists in management, technology and policy to provide a unique perspective on the challenges facing manufacturers of all sizes, from start-ups to multinationals.

Education: giving the next generation of manufacturing leaders a thorough grounding in management and manufacturing technology, based on real industrial experience.

Practice: applying IfM research to help organisations achieve their strategic goals. Findings from these projects directly inform future research.