CREATING THE CONDITIONS FOR
GROWTH

Working with national, regional and local policymakers to develop joined-up industrial strategies

IfM | Education and Consultancy Services

UNIVERSITY OF CAMBRIDGE

About us

Institute for Manufacturing: IfM

The IfM is part of the University of Cambridge. The range of its research programmes means that it is uniquely placed to understand and address the challenges facing governments in their efforts to create sustainable, industrially-focused economic growth. Key research areas include:

- how publicly-funded R&D can most effectively be translated into new technologies, industries and economic wealth

- methods, such as roadmapping, which bring together key stakeholders to create coherent strategies, policies and programmes

- the increasing complexity of global value networks and how policymakers can support the design of these networks to achieve national competitive advantage in key sectors

- how to create a sustainable and resilient manufacturing sector that is also low-carbon and resource-efficient.

Alongside its research interests in policy and management, the IfM also carries out laboratory-based research into next-generation production processes using laser, inkjet and nano technologies. IfM research in all disciplines benefits from the insight these activities provide into the technology and engineering challenges inherent in turning experimental research into manufacturable products.

IfM Education and Consultancy Services: IfM ECS

IfM ECS works with national and regional governments to support and help grow their industrial sectors and with companies of all sizes to build stronger businesses. We work with:

- **governments and their agencies** to identify national opportunities and competences as the basis for developing strategies and priorities to support economic growth

- **government agencies and industry bodies** to underpin the development of industry sector strategies through roadmapping and by using structured approaches to the mapping, design and integration of their value networks

- **large manufacturers** to develop their innovation and technology management capabilities and to design their production, supply and service networks

- **OEMs, large manufacturers, government agencies, industry bodies, mid-size and smaller companies** to develop robust supply chains

- **government agencies** to help create the conditions in which innovation and entrepreneurship can flourish and **founders of high-impact start-ups** to build new businesses.

How we can work with you

Our team of experienced consultants uses the research-based approaches and techniques outlined here to support and inform policy development. We recognise that each collaboration is different – the methods we use are highly flexible and are customised to fit your circumstances and requirements.

Working with you to support long-term growth and create economic value

Supporting a thriving industrial sector in which science and technology can be translated into sustainable economic growth is a major preoccupation for governments around the world. Countries want to understand how industrial innovation can be more reliably harnessed to create and capture value. We can work with you to develop industrial strategy based on a real understanding of the global context, the opportunities that it presents and how they relate to your national priorities and industrial strengths.

IfM ECS has a team of experienced consultants who have worked with government and government agencies at the national, regional and local levels both in the UK and around the world to support industrial innovation. We use powerful methods, developed by IfM researchers, to identify opportunities for growth, understand which capabilities and competences are needed to make the most of those opportunities and to put in place plans that will bolster existing capabilities and, where appropriate, develop new ones.

Among others, we have worked with:

At the national and regional levels

- The UK Government and Technology Strategy Board to help define its high value manufacturing strategy.
- The Liverpool City Region in the UK to identify how to achieve both long-term competitive advantage and short-term 'quick wins' through its industrial strategy.
- The State of Yucatán in Mexico to develop a strategy for industrial growth and job creation.

Sectors

- The UK Government to roadmap more than 15 key sectors, such as automotive, rail, marine and oil and gas.
- Leading UK pharmaceutical companies and the University of Strathclyde to reconfigure the UK's supply chains.
- The Australian Government to define the future for its automotive and rail industries.
- Chile's Antofagasta region to develop strategic roadmaps for its mining and food production industries.

Technologies

- The European Union, through its Factories of the Future public-private partnership programme, to develop a roadmap for IT architectures that will support innovation in manufacturing.
- The UK Government to roadmap technologies such as synthetic biology and robotics and autonomous systems which can support growth within a range of UK sectors.
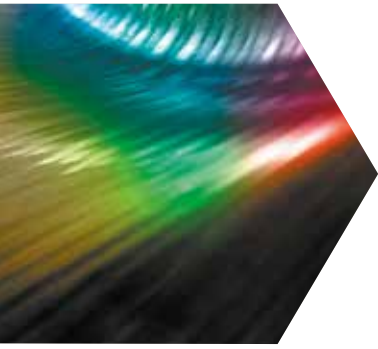
Seeing the big picture

IfM ECS has, in conjunction with IfM researchers, developed and put into practice a set of interlocking techniques to help policymakers address the opportunities for – and barriers to – creating sustainable long-term growth.

While these methods can be used individually to focus on a particular area of interest, they can also be used together to understand the big picture: **national** and **regional sector** and **technology** opportunities and priorities. Collectively, they help bring government and industry together to help drive economic growth and create high quality jobs.

How does this work?

After an initial review of the global and national industrial context and the opportunities and threats arising from it, **landscaping** is used to understand where national competences and industrial capabilities need to be developed to address the threats and capitalise on the opportunities. This understanding can then inform policy and targeted investment in R&D, education and skills, business and innovation support, legislation and regulation.

Some clear priorities either at the sector or technology level, or regionally, will emerge from this process. Landscaping can explore these in more detail while taking account of national priorities.

Roadmapping techniques can then be applied to the results of the landscaping process in order to bring key stakeholders together to develop both a shared vision and an action plan for industry sectors, key technologies or regions.

In those sectors where disruptive technologies or new business models are creating high levels of uncertainty or change, the results of roadmapping can be further enhanced by the use of **ecosytem mapping**. This technique supports the redesign of value networks within their industrial ecosystems – either nationally or regionally – to achieve competitive advantage.

Sector road- or ecosystem mapping may expose areas of weakness in the supply chain. If this is the case, IfM ECS can provide a **supply chain development** programme to help smaller and mid-sized manufacturers both to grow their own businesses *and* to create a strong supply chain which will benefit the national economy, as well as the sector's OEMs.

Finally, science and technology-led **innovation** plays an important part in a healthy industrial ecosystem. IfM ECS can use its landscaping and roadmapping approaches alongside IfM research into technology enterprise, to help policymakers and entrepreneurs understand and create the conditions in which technology-based start-ups can thrive.

Talking a common language

One of the challenges facing all governments is how to develop coherent policies and programmes nationally, regionally and across sectors when this involves large numbers of departments and agencies, all with their own objectives and priorities. By using these interlocking and scaleable methods, based on stakeholder engagement, IfM ECS can help overcome these barriers. Fundamental to this approach is the use of a common language that accurately reflects the underlying concepts and principles and creates a more unified approach to policymaking.

Joined-up approaches to increasing national and regional competitiveness

These research-based techniques can be used individually to focus on key areas of interest or they can be used collectively to address the whole system. Together they can support policymaking that fully integrates national, regional, sector and technology perspectives and decisions.

1. Landscaping

To understand national and regional opportunities for growth and the industrial capabilities needed to achieve competitive advantage.

2. Roadmapping

Sector roadmaps

To understand threats and opportunities for key sectors at the national or regional levels, identify technology, skills and industrial capability gaps and develop an action plan to address them.

Technology and innovation roadmaps

To understand the opportunities for specific technologies, particularly where they apply across sectors, and develop a plan to maximise their potential.

Company roadmaps

Informed by sector and/or technology roadmaps, these ensure that a company's innovation and technology strategy supports its business objectives. They can also support – and be supported by – national and regional policy and funding, and inform priorities for innovation in the supply chain.

3. Reconfiguring sector supply and value chains

To understand the industrial ecosystem in order to effectively reconfigure value networks, particularly in the context of disruptive technologies and/or new business models.

4. Improving supply chain performance

To improve the competitiveness of small and mid-sized manufacturers within the supply chain, through strategy and capability development.

5. Supporting science and technology-led innovation

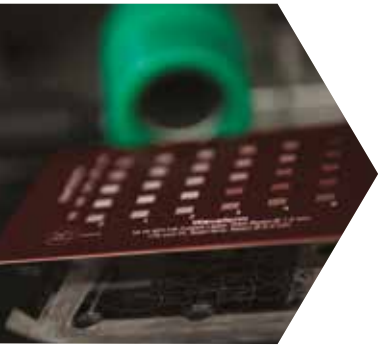To understand and put in place plans to help create the conditions in which research can be successfully commercialised.

1. Understanding the landscape:

opportunity, capability and competence mapping

All governments need to ensure that they are investing in those sectors and technologies which have the greatest potential for growth and which they are best placed to serve.

IfM ECS has developed methods that help policymakers understand the global industrial context, their position within it and, crucially, their own capabilities and competences and how well they match market needs, both now and in the future. They also help identify those capabilities and competences which will support growth across a number of different sectors and which will therefore give a better return on investment.

This understanding can be used to prioritise publicly-funded R&D and the development of the knowledge, skills and infrastructure needed to compete in those markets. Putting a development strategy into practice requires a highly collaborative approach across national and local government, research councils, funding bodies and delivery agencies, all of which will be working to different sets of priorities and objectives. Yet all these stakeholders need to be fully engaged with, and committed to, a shared strategic vision and implementation plan.

What is landscaping?

Landscaping is a methodology for identifying opportunities for growth and the national capabilities and competences needed if companies are to capitalise on those opportunities. It combines desk research, stakeholder consultation and roadmapping techniques developed by researchers at the IfM to capture and make sense of the huge amounts of connected information needed to understand these highly complex industrial systems. The landscaping approach is underpinned by new research led by the IfM's Centre for Science, Technology and Innovation Policy into how industrial systems affect national innovation capabilities.

The process is designed to engage all stakeholders, acknowledge their contributions and hence build consensus around a clear set of national and regional opportunities, priorities and action plans.

Informing regional as well as national policy

Once the national industrial landscape has been agreed, it can be used to frame regional and local landscapes and development plans. This helps policymakers and delivery agencies understand and agree how best to put in place the plans that will deliver economic growth and high-quality jobs in line with national priorities.

As with national landscaping, this process starts with building a clear picture of the region's position in the global and national industrial landscape in order to identify the strongest opportunities for growth. This provides the context for more detailed regional planning and consensus-building across the public and private sectors.

Case study 1: National landscape

Developing the UK's high value manufacturing strategy

The UK Government's Technology Strategy Board (TSB) commissioned a report from the IfM and IfM ECS to support the growth of high value manufacturing in the UK and, specifically, to identify those sectors in which the UK has the potential to become an important player in large global markets.

Using its landscaping techniques, a cross-disciplinary team produced *A landscape for the future of UK manufacturing* looking at the global manufacturing context in which UK companies compete and how that context is expected to evolve over the following 15 to 20 years. It drew upon a wide consultation with industrial, academic and government stakeholders to understand how companies can successfully deliver innovation in manufacturing across a broad range of industry sectors.

The report was instrumental in establishing the Government's £140 million High Value Manufacturing Catapult strategy, creating technology and innovation centres where the UK's businesses, scientists and engineers can collaborate to generate economic growth.

The approach has been – and continues to be – used to carry out in-depth analyses ('deep-dives') of key sectors and cross-sector technologies including: the pharmaceutical and biopharmaceutical sectors, food, health technology, electronic systems, energy, oil and gas, and construction.

"The output from the study was very significant in establishing the TSB High Value Manufacturing Catapult strategy, and provides the framework for an additional £25 million per annum investment by the TSB in economic growth through funded innovation projects in manufacturing."

Lead Technologist, Technology Strategy Board

Case study 2: Regional landscape

### The future of advanced manufacturing in the Liverpool City Region

Liverpool City Region (LCR) has a long history of manufacturing as home to companies such as Jaguar Land Rover, Unilever and Cammell Laird. Alongside these household names are plenty of smaller, innovative and agile manufacturers often playing an integral part in their larger counterparts' supply chains.

Manufacturing currently generates £3.2bn for the LCR economy. The LCR Local Enterprise Partnership (LEP) recognised its potential to create both jobs and economic growth. IfM ECS worked with the LEP, the Department for Business, Innovation & Skills and the TSB, to produce a detailed study which develops: an understanding of the global and national landscape and the region's position in it; a shared vision of what is possible within the region; a set of short-term opportunities that builds on existing strengths and provides the foundations for the future; and a focus on the competences the region needs to achieve competitive advantage in line with established national priorities.

Case study 3: State-level landscape

Developing a state-level industrial strategy in Mexico

The state of Yucatán's government is looking to develop a long-term strategy for industrial growth and job creation and to help it become an attractive location for large manufacturers. IfM ECS, using a combination of landscaping, roadmapping and ecosystem mapping to bring together government, industry and academia, is developing a shared vision for Yucatán's industrial future in line with both federal and state policies.
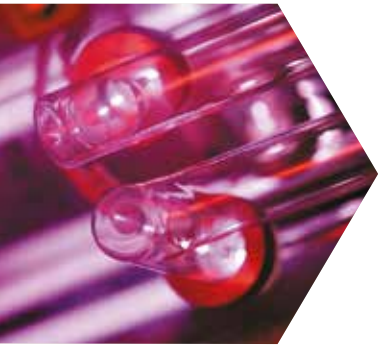
2. Roadmapping for industry sectors and key technologies

Developing industrial policy and putting it into practice in a rapidly changing landscape is a complex and challenging task. Having used landscaping to establish the priorities for developing national capabilities and competences, roadmapping can help underpin policy development for particular **sectors** or **technologies**, and explore **cross-sector** opportunities for productive collaboration. It does this by identifying the threats and opportunities facing the sector, prioritising those opportunities and developing a clear plan to exploit them.

The roadmapping process is also a highly effective way of building consensus among a diverse group of stakeholders and gaining their commitment to an action plan that will deliver long-term competitive advantage.

What is roadmapping?

Roadmapping was pioneered by Motorola in the 1970s as a powerful technique for planning its technological capabilities to ensure they met its strategic goals. The IfM's Centre for Technology Management has been researching and extending the application of roadmapping for more than a decade and its techniques have helped more than 250 public and private sector organisations with their strategic and technology innovation planning.

By using graphical templates in a workshop environment, roadmapping can capture, make sense of and communicate large amounts of complex and connected data to develop a shared vision and action plan across different functions and organisations. It does this by looking at the key trends, drivers and enablers and the opportunities and threats associated with them and uses this as the basis for prioritising R&D in those areas that are going to deliver the most value. It also helps to inform investment in education and skills, business and innovation support and legislation and regulation.

A highly flexible and scaleable methodology

Roadmapping is effective when used with any size or type of organisation, from national governments and multinational companies navigating their way through complex and rapidly changing industrial systems to technology start-ups faced with the uncertainty associated with new technologies and new business models.

In the UK, IfM ECS has been working with the UK Government's Department of Business Innovation and Skills, the Technology Strategy Board, its various Knowledge Transfer Networks and Special Interest Groups to carry out numerous roadmapping projects looking at key sectors and cross-cutting technologies. Together, these roadmaps now cover a significant proportion of the UK's technology base.

Internationally, IfM ECS has worked with governments and major energy companies, sometimes in conjunction with local partner universities, to develop key industry roadmaps.

Case study 1: Industry sector

A strategy for Australian rail

Working alongside Australian National University (ANU), IfM ECS provided its roadmapping expertise to help the Australian rail sector identify the opportunities for growth and improvement that will support the development of a strong, innovative and globally competitive rail industry through to 2040.

This project followed on from a roadmap undertaken for the Australian automotive sector, which gave the Australian Government a clearly articulated vision and strategic direction for its automotive industry.

Case study 2: New technology

The future of synthetic biology in the UK

Synthetic biology is an emerging technology which has enormous potential for both the UK economy and for meeting some of the world's major challenges. However, it is still in the very early stages of development, involves a large number of interest groups and raises issues of public concern. If it is to achieve its economic potential, the research, commercial and legislative communities need to share a vision of the way forward.

The UK Synthetic Biology Roadmap Coordinating Group asked IfM ECS to design and facilitate a roadmapping process. This involved a series of workshops attended by more than 72 experts from 55 different organisations, representing a broad range of interest groups.

Case study 3: New technology

A roadmap for robotics and autonomous systems across three key sectors in the UK

Robotics and autonomous systems are an important technology providing a common platform for a number of key sectors. IfM ECS was asked by the TSB's Robotics and Autonomous Systems (RAS) Special Interest Group to facilitate a roadmapping exercise across three key sectors bringing together market, user and technology perspectives in: transport and monitoring, health and domestic, and manufacturing and logistics.

The aim was to identify shared opportunities for value creation and capture across these three priority application areas and find common themes which will guide the RAS strategy.

"The structure [IfM ECS] provided stimulated the full engagement of all participants in the discussion and contribution of ideas. As a result, we were able to meet our main objective which was to start building a broad community, sharing ideas and concerns and identifying issues where changes to policy or putting in place supporting structures would help. The team was very effective, enabling progress to be made rapidly."

Chairman of the UK Synthetic Biology Roadmap Coordinating Group

UK roadmaps include:

Sectors

Aerospace
Automotive
Built environment
Construction
Electronic systems
Energy
Food
Health technology
Living with environmental change

Marine
Metrology
Oil and gas
Pharmaceutical and biopharmaceutical
Rail
Regenerative medicine
Stratified medicine
Synthetic biology

Cross-cutting technologies

Algal technologies
Bioprocessing
BioScience
Hydrogen
Quantum technologies
Robotics and autonomous systems

Recent international roadmapping projects include:

Australia: rail and automotive industry (with Australian National University);
Kazakhstan: oil and gas industry (with Shell); **Chile** (Antofagsta region): mining and food production (with the Pontifical Catholic University of Chile).
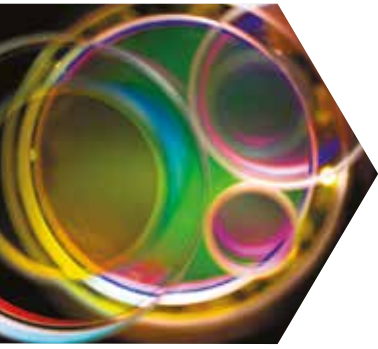
3. Reconfiguring sector supply and value chains

In those sectors experiencing disruption from new technologies or new business models, both policymakers and leading firms need to understand the industrial ecosystem in order to effectively reconfigure their value networks.

Researchers at the IfM's Centre for International Manufacturing have developed new approaches to configuring value networks which involve three related activities: mapping, design and integration. These approaches can be used to support sector development either nationally or regionally.

Mapping uses a structured visualisation approach to better understand the value network and its ecosystem for a specific sector. Mapping the ecosystem is important because, as well as the firms within the supply chain, it takes account of the range of external stakeholders who have a strong interest in, and influence on, reconfiguration, such as investors, governmental institutions, research agencies and universities.

A key output of the process is a template which can be used to explore existing and desired states in different scenarios and to make comparisons with other sectors. We have used mapping in a wide range of sectors including photovoltaics (globally), industrial biotechnology and aerospace in the UK, maritime in Norway as well as in UK pharmaceuticals and automotive in the North West of England (see opposite page).

Network **design** uses this mapping template as part of a structured approach which describes the various stages of global value network evolution from technology origination through cycles of reconfiguration and disruptive change. This enables the development of different scenarios for the key elements in the value network – production, supply and service – in line with different governing trends and strategic horizons. This, in turn, allows us to explore a range of intervention strategies leading to staged transition plans.

Network **integration** develops a deeper understanding of the drivers of, and interactions between, the main sub-systems that make up complex, multi-tier value networks. Network performance is often impaired when semi-autonomous sub-systems become disconnected; this approach supports the reintegration of these sub-sytems.

By combining mapping, design and integration methodologies, it is possible to capture and understand the complexity inherent in value networks and their industrial ecosystems and understand how to support the growth and sustainability of key sectors, at a national or regional level.
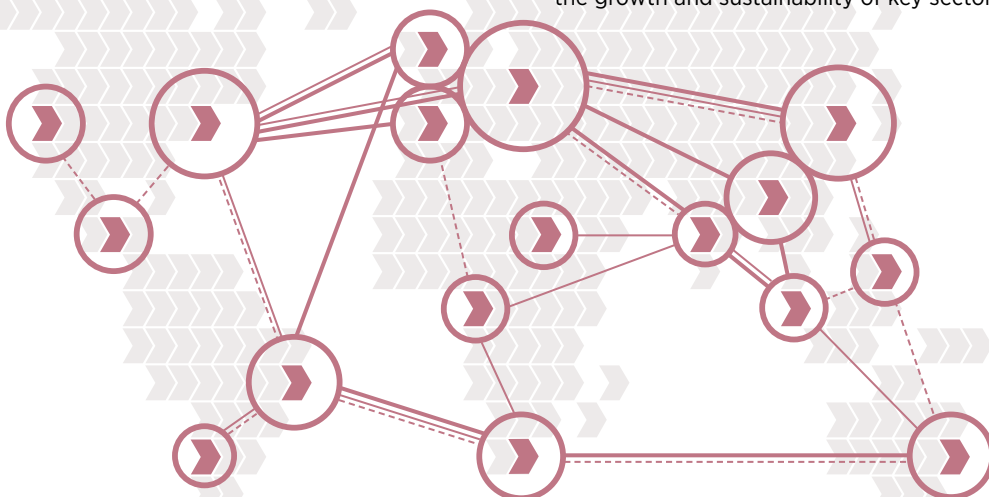
Case study 1: National industry sector

REMEDIES: reconfiguring UK pharmaceutical supply chains

REMEDIES is a £23m project (including £11m of UK government funding) to reconfigure existing pharmaceutical supply chains in the UK by exploiting the latest technology advances in medicines and patient-centric delivery models.

Part of the UK Government's Advanced Manufacturing Supply Chain Initiative (AMSCI), this sector-wide project is led by GlaxoSmithKline, providing major inputs on clinical supply chains, with the IfM's Centre for International Manufacturing (CIM) leading on commercial supply chain and overall research coordination, AstraZeneca focusing on formulation developments and the University of Strathclyde team within the Centre for Continuous Manufacturing and Crystallisation looking at continuous processing of active compounds.

Other industrial partners include the major contract manufacturing organisations, equipment manufacturers and technology and system providers spanning the end-to-end pharmaceutical supply chain.

The collaboration also involves key institutional bodies across the UK pharmaceutical ecosystem (skills agencies, user representatives, regulators and health sector specialists) to ensure more adaptive future supply chain models are supported by consistent standards and a unified approach to regulation. Activities include two sector-wide platform projects focused on the end-to-end clinical and commercial supply chain, and several technology-specific application workstreams.

Case study 2: Regional industry sector

Automotive sector in North West of England

This sector study was commissioned by the Northwest Automotive Alliance (NAA) to help vehicle manufacturers in the North West of England, and their tier 1 suppliers, address some of the challenges facing the automotive sector in general, and this region in particular. The findings were used to inform a supply chain improvement and strategy development process for the region.

The industrial ecosystem mapping process led to a clear understanding of the firm and Tier 1 supply chain and its challenges, the strengths and weaknesses of the sector as a whole and the strategic priorities to be addressed.

The report made a number of key recommendations, including that the automotive sector in this region would benefit from institutional support to mitigate the effects of economic downturn. It also recommended that the skills and activity gaps it had identified could be addressed by introducing a number of measures, such as: putting in place a supply chain capability development programme; developing new value networks specifically to target those market segments which have potential for high growth; and addressing sustainability issues by setting up projects to look at more efficient use of resources and the implications of climate change for the automotive sector.

"This funding brings together 20 partners from across industry and academia in an innovative partnership with the aim of transforming how medicines are made and ensuring we are even more responsive to the changing needs of patients. This project, which will focus on areas such as continuous manufacturing and new technology platforms, creates and safeguards jobs across the partnership and helps keep the UK at the forefront of life sciences."

President, Global Manufacturing and Supply, GlaxoSmithKline

CAPTURING VALUE FROM GLOBAL NETWORKS

The Centre for International Manufacturing's research and its application with industry and government is described in a recent IfM publication: *Capturing value from global networks* edited by Jagjit Singh Srai and Paul Christodoulou.
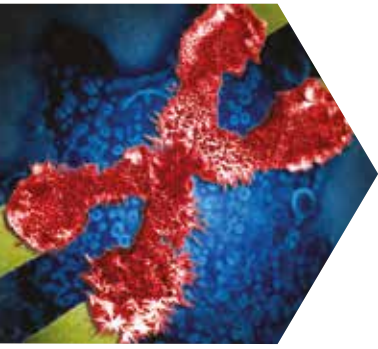
4. Improving supply chain performance

Why?
To support growth throughout the supply chain and help smaller firms focus their scarce resources on the 'right' opportunities.

How?
Processes and structured workshops for: prioritisation, business strategy, innovation and technology management capability development.

Who for?
National government, OEMs and their Tier 1 suppliers, industry bodies, smaller and mid-size firms.

Sector roadmapping or ecosystem mapping may identify limitations in the capabilities of smaller and mid-sized manufacturers within a supply chain. These need to be addressed in order to improve national competitiveness and sustain a thriving innovation base.

In most sectors, changes driven by external factors are occurring at OEM and Tier 1 level leading to dramatic changes in key systems (such as propulsion or control systems in aerospace) and their sub-systems. This means that those further down the supply chain need to become more innovative in terms of their business strategy and model, their products and services and their process technologies, while continuing to improve quality, cost and delivery performance.

However, the people in smaller and mid-size firms who are responsible for strategy and capability development tend to have 'day jobs' such as leading operations, sales or finance teams, so strategic planning does not always get the attention it deserves. These firms also tend to have more limited resources at their disposal, which need to be focused on those activities that will make the most difference to the business.

IfM ECS has developed a set of business intervention tools which help the management teams in smaller and mid-size firms agree their ambitions, understand both their context and opportunities *and* their internal capabilities, and to put in place a plan to achieve their ambition. The tools have been specifically designed for rapid and efficient deployment in resource-scarce SMEs and to work alongside and add value to conventional, publicly-funded SME support programmes. They are based on the work of a number of IfM's research centres including: Strategy and Performance, Technology Management, and International Manufacturing.

Our team of highly experienced consultants has worked with hundreds of SMEs and mid-size firms across a wide range of sectors to agree robust strategy and capability development plans which meet changing customer and supply chain needs. The tools are also being used as a key part of government-funded supply chain development programmes in key UK sectors, such as aerospace and nuclear.

Case study

Supply chain development in the UK aerospace sector

IfM ECS is one of the partners delivering a government-funded programme – Sharing in Growth – aimed at developing the capabilities of small and medium-sized suppliers to the UK aerospace sector. This sector is expected to double in size over the next 10 years and the forecast is for 27,000 new passenger aircraft and 40,000 commercial helicopters by 2030.

The programme provides training and development to help smaller and mid-size firms in the supply chain overcome barriers to growth, boost exports and increase the number of high-value jobs in the UK's aerospace and associated high-value manufacturing sectors.

Sharing in Growth UK Ltd has been set up with support from the UK Government's Regional Growth Fund and Rolls-Royce to work with 40 to 50 UK suppliers over a five-year period.

To find out more about how we can support supply chain development or innovation systems, contact: **Peter Templeton** pwt23@cam.ac.uk

5. Supporting science and technology-led innovation

Creating the conditions in which innovation can be commercialised is an important component of national and regional strategies for growth. Bridging the so-called 'valley of death' in which publicly and privately funded research fails to translate into long-term economic growth is a major concern for governments around the world – and one which is likely to emerge from national and regional landscaping and roadmapping activities.

Two complementary approaches are needed to address these challenges: supporting a strong national innovation ecosystem and working with new ventures to help them make smarter decisions – including the ability to recognise at an early stage if they are going to fail.

Creating a thriving ecosystem

IfM ECS has a set of structured approaches, building on landscaping and roadmapping methods, which engages key stakeholders to understand the current national or regional ecosystem, identify threats and opportunities, agree priorities and a plan to implement them. IfM and IfM ECS's direct participation in the Cambridge innovation ecosystem – Europe's largest technology cluster – gives us valuable first-hand experience of the challenges and opportunities involved.

IfM ECS's support for policymakers and new ventures is underpinned by research from the IfM's Centre for Science, Technology and Innovation Policy and the Centre for Technology Management. Research areas include:

- detailed analyses of national innovation systems, to understand why some countries are better than others at turning new technologies into economic wealth
- tracking the development of different types of technologies – through all levels of technology and manufacturing readiness – to understand the underlying principles and patterns that characterised their emergence
- understanding issues relating to partnerships between universities and industry aimed at the commercialisation of research
- investigating the role of business investment and incubators in supporting the development of new ventures with high growth potential.

Supporting the development of early-stage ventures

IfM ECS is also directly involved with supporting start-ups in Cambridge through ideaSpace and more broadly across the East of England, through our PrISMS programme.

Why?
Support the successful commercialisation of publicly and privately funded R&D.

How?
Mapping of innovation systems, coupled with insights from national and international collaborations, and research and stakeholder engagement.

Who for?
Government, government partner organisations and government agencies.
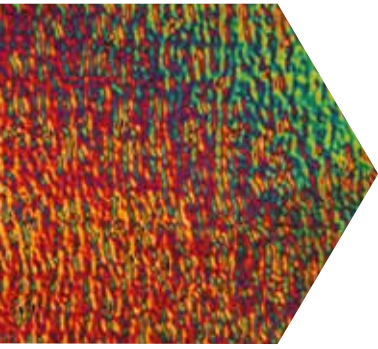
Why?
Help company founders achieve impact through R&D to create new jobs and deliver sustainable economic growth.

How?
Structured processes and workshops for: business model development, starting up the business and validating the business model, scaling up the business.

Who for?
Founders of start-ups, national and regional government and government agencies.

ideaSpace

ideaSpace is a community for founders of high impact new ventures in Cambridge. Its members create new business models which have the potential to benefit millions of people within a few years of start-up. It currently has around 140 members representing 80 new ventures.

PrISMS

A programme for 120 SMEs and start-ups in the East of England, part-funded by the European Regional Development Fund, PrISMS provides support for early-stage ventures as they establish and scale up their businesses.

Additional support for government and government agencies

With tough constraints on public spending, governments need to become more effective (and be perceived to be doing so) at managing all aspects of their administration and delivery of services and at working with the private sector to deliver positive outcomes and good value for money. IfM ECS, using approaches developed by IfM researchers, can help government officials tackle these two, often challenging, tasks.

Measuring performance

As governments strive to be ever more transparent and accountable to their electorates, they need increasingly robust methods for identifying, defining and using key performance indicators across the whole of the public sector.

IfM ECS can support this aspiration with a set of approaches based on extensive research (from the IfM's Centre for Strategy and Performance and from the Cambridge Service Alliance) in designing and implementing KPIs. Tested in hundreds of organisations, the research underpins a structured process for:

• Defining organisational priorities
• Designing key performance indicators
• Establishing appropriate targets and benchmarks
• Deploying key performance indicators across the organisation
• Performance measures for service-based contracts.

This process results in a clear and coherent set of KPIs which supports the organisation's strategy and provides appropriate benchmarks and targets that can be used to track the organisation's progress.

Working with the private sector

IfM ECS can help develop innovative approaches to delivering critical public services by providing governments with clear methodologies for working with private sector providers to ensure that their interests and those of the contractors are aligned, that the contracts themselves are appropriately structured and that effective mechanisms for governance and oversight are in place.

Using research carried out by the Cambridge Service Alliance into new service and solution-based business models, IfM ECS can provide a set of structured approaches to achieve this, derived from service ecosystem mapping and analysis. Service ecosystem mapping provides a comprehensive view of the existing environment, identifies opportunities for innovation, helps prioritise a range of options and select the most appropriate, and establish a model for its implementation.

To find out more about how these performance measurement and procurement methodologies can help your organisation, contact: **Andrew Gill**: ag471@cam.ac.uk

To find out more about the Cambridge Service Alliance, contact: **Andy Neely**: adn1000@cam.ac.uk

IfM research underpinning IfM ECS services

Centre for Science, Technology and Innovation Policy (CSTI)

CSTI is an applied policy research unit exploring what makes some national innovation systems more effective than others at turning new science and engineering ideas into new technologies, industries and economic wealth.

IfM ECS' work with governments and government agencies is informed by CSTI research which takes a distinctively 'engineering' approach to supporting the evidence needs of science, technology & innovation policymakers, in particular those officials in public research agencies who are responsible for programme design, portfolio management and strategy development. CSTI's research agenda is shaped in close collaboration with policy and research agency partners.

Centre for Technology Management (CTM)

CTM researches strategies and processes and practices for identifying, selecting, acquiring, exploiting and protecting technology for business benefit. It is one of the world's leading centres of roadmapping research; another of its major research themes considers the origins, start-up and growth of technology-based ventures and their impact upon national economies.

Centre for International Manufacturing (CIM)

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.

Cambridge Service Alliance (CSA)

CSA, based at the IfM, brings together some of the world's leading firms and academics to understand how to deliver the complex service solutions of tomorrow. Its members include BAE Systems, Caterpillar Inc, GEA, IBM, Pearson and Zoetis alongside the IfM and Judge Business School.

Centre for Strategy and Performance (CSP)

By combining academic research with industrial know-how, the CSP helps organisations of all sizes to create, meet, maintain and exceed their strategic objectives and implement appropriate performance management systems.

Centre for Industrial Sustainability (CIS)

CIS aims to develop the knowledge and tools that will help accelerate the transition towards a sustainable industrial system.

Developing a common langauge: some key definitions

IfM ECS has been working with CSTI and our policy partners to establish a common language which defines some of the key terms and concepts that form the basis of our approach.

Industrial capability – the ability to deliver products and/or services which meet customer requirements, are competitive and can respond to opportunities to capture value.

Industrial competence – a tool, technique or know-how which, when combined with other competences and resources, enables one or more capabilities.

National competence – an attribute of the national manufacturing industry that enables business to respond to the changing global trends and drivers in a way that captures value for a country in the future.

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.

IfM EDUCATION & CONSULTANCY SERVICES LIMITED: IfM ECS

IfM ECS works with companies of all sizes to help them create and capture value and with national and regional governments to support and help grow their industrial sectors. It does this by transferring the new ideas and approaches developed by researchers at the IfM through a programme of education and consultancy services. IfM ECS is owned by the University of Cambridge. Its profits are gifted to the University to fund future research activities.

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To find out more about any or all of the services IfM ECS provides for governments and government agencies, contact:
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