UNIVERSITY OF CAMBRIDGE
Department of Engineering

IfM MANAGEMENT TECHNOLOGY POLICY

Innovation intermediaries for capability building and regional industrial policy

A report from the workshop conducted at the Institute for Manufacturing, University of Cambridge

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About this report

On the 3rd and 4th of October 2024, leading experts in regional industrial and innovation policy and innovation intermediaries came together for a workshop at the Institute for Manufacturing, University of Cambridge. This workshop aimed to share research questions and gaps in the current fields of research and to bring forward the conversation on regional industrial policy, with a focus on the role that innovation intermediaries can play in coordinating and fostering regions' structural transformation and upgrade. The two primary objectives were: (1) promoting a discussion about innovation intermediaries and regional industrial policy, considering different experiences across countries (e.g., France, UK, Japan, US, Singapore, Switzerland); and (2) connecting a community from different disciplines (e.g., innovation economics, operation management, regional economics, public policy, economic geography), while identifying interdisciplinary research questions across academic and policy topics of common interest.

The workshop was convened by the Centre for Science, Technology and Innovation Policy (CSTI) at the Institute for Manufacturing, University of Cambridge. We are grateful to the workshop participants for their presentations and engagement with the topics discussed.

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Executive Summary

Innovation intermediaries are organisations that bridge the gaps in innovation ecosystems by facilitating the development, adoption, and diffusion of knowledge and technology. They connect firms, universities, and research institutions through activities such as technology scanning, networking, resource mobilisation, and institution-building. Typically (yet not exclusively) funded through a mix of public and private resources, innovation intermediaries evolve in response to changing market and technological landscapes, playing a pivotal role in socio-economic transformations (e.g., digital and green transitions), often facilitating the coordination between different actors of innovation systems.

This report discusses the relevant points emerged from a two-day workshop on innovation intermediaries and regional upgrading, particularly looking at the former's role in fostering the latter. The first day of the workshop had two main sessions. The first session focused on innovation intermediaries; we reviewed and discussed empirical efforts to map innovation intermediaries, their evolving business models, and their expanding activities. Different organisations, from university incubators and RTOs (Research and Technology Organisations) to digital and green innovation platforms, provide a diverse set of activities to better respond to technological and organisational challenges in the innovation process. The second session discussed regional upgrading and regional policy, emphasising recent challenges about regional productivity and diversification. Here, debates centred on how regional factors such as infrastructure, skills availability, and localised innovation ecosystems shape policy design and implementation and how intermediary actors might support regional restructuring and levelling-up strategies.

During the second day of the workshop, cross-cutting research themes were discussed. It is critical to continue recent efforts in categorising innovation intermediaries, especially in light of fast emerging trends and challenges; this would include their dynamic roles in regional innovation systems and an assessment of their capacity to fill gaps in technology-related domains such as workforce. There was also significant discussion on the division of labour between various innovation actors and how intermediaries can effectively serve as policy tools by integrating with broader industrial and innovation policy frameworks.

Looking ahead, the future research and policy agenda calls for a more nuanced analysis of innovation intermediaries. This includes developing typologies that account for sector-specific challenges, exploring the evolving functions of these actors over time, and understanding their role in fostering regional diversification and productivity.

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Introduction

Regions are complex systems where the coordination for knowledge creation and knowledge transfer result in the emergence of different actors across time, with different roles depending on the failures and gaps characterising the knowledge creation process.

Within the literature on innovation systems and regional innovation systems, existing studies focused on the role of universities in the knowledge generation process and less on the role of other institutional actors; most actors in charge of technology transfer, such as innovation intermediaries, have been largely overlooked. This report, being the result of a workshop on regional policy and innovation intermediaries, will look at the latter as a dynamic and critical actor in promoting regional industrial innovation systems' upgrade.

Innovation intermediaries have been key in orchestrating innovation and knowledge transfer by filling scaling-up/commercialisation gaps along the innovation cycles. Such organisations are also becoming key players within regional ecosystems and are increasingly in a position (where it is not already happening) to engage in regional restructuring and diversification processes. They can actively contribute to related and unrelated innovation processes and leverage their role as knowledge repositories and facilitators within and across industrial value chain structures.

Such aspects are particularly relevant since the journey from new technologies and innovation breakthroughs to new industrial activity has faced several barriers that, in some countries and regions, prevented the translation of value creation into value capture. More complex product and process innovations, interrelated value and supply chain production networks, together with a higher interrelation of technologies, where each new generation builds on the previous one, contributed to increasing existing gaps, barriers and challenges to diffuse technologies across different ecosystems.

The actors dominating the innovation process have also changed their activities, as well as the allocation of resources; for example, the decline of big corporate R&D labs and the emergence of service engineering-specialised firms have redefined the landscape of innovation. Research institutes of various types, from universities to innovation intermediaries, have a key role in promoting innovation, scale-up and collaboration between different actors.

As knowledge creation and diffusion are the cornerstones of economic growth and industrial development, it is key to address the increasing fragmentation of firms' production and organisation activities. This reorganisation led in most cases to the emergence of specific clusters of capabilities across regions.

Such regional clusters increasingly emerge as the preferred lenses to study innovation and industrial systems, especially in the field of economic geography, in a way that allows to capture the heterogeneity of the different layers that shape socio-economic output, including business, institutional and research-based dynamics. The literature on Regional Innovation Systems has discussed the need to shift from a firm-level analysis to a system-level perspective to give further consideration to institutional actors that contribute to knowledge creation and transfer.

Approaching these topics requires an interdisciplinary approach, where regional and innovation literatures benefit from insights from operations management and industrial economics. These approaches are key to explaining different aspects of the industrial-innovation dynamics.

The workshop discussed these concepts, specifically examining current debates and emerging research questions in the domain of regional innovation systems and innovation intermediaries. It also discussed a policy-inspired research agenda in which the role of innovation intermediaries could be explored both as a tool for policymakers and as an actor facilitating the 'division of labour' in the knowledge transfer process.

The workshop was divided into three sessions discussing (i) the role of innovation intermediaries, (ii) regional innovation policy in the context of regions' diversification (day 1) and (iii) emerging research domains to explore the relationship between innovation intermediaries and regional diversification/upgrade (day 2). The report follows a similar structure.

Session 1. The Role of Intermediaries in a changing landscape.

Innovation intermediaries (IIs) are organisations that facilitate the development, adoption, and diffusion of knowledge and technology. They can be public or private entities; however, in most cases, they have a funding model that incorporates both public and private support. Their overarching role is to bridge the gap between various actors in the innovation ecosystem, namely firms, universities, research institutions, and end-users.

Some innovation intermediaries are established specifically to ensure that innovation is translated into higher technology readiness levels (TRLs) (e.g., public innovation agencies), while others perform intermediary functions alongside their primary activities (e.g., consultancies, industry associations, or university-linked centres). In recent years, there has been a rising interest in the field of digital and green innovation intermediaries, with increasing research exploring how their roles, missions, functions, and activities are evolving to sustain the innovation process in the digital and green sectors.

Despite the differences in mission and context, the activities of intermediaries typically involve some or all of the following: technology scanning (identifying promising solutions), networking (matching firms with potential suppliers along the value chain and other relevant actors), knowledge transfer (training, consulting, or direct engineering assistance), resource mobilisation (facilitating funding and partnerships), and institution-building (shaping new norms, standards, and policies).

The funding of innovation intermediaries is a key element, as changes in funding availability over time have influenced and reshaped the activities they perform and their overall role. Despite their differences, over the past three decades, IIs have undergone financial restructuring and tightening. A general decrease in public resources has led to less core funding available and an increasing necessity to seek alternative resources, for instance, through a greater number of collaborative projects and more extensive use of their infrastructure facilities.

In more detail, IIs (particularly those that operate at the interface between firms and research organisations) have responded to the reduced availability of resources by maintaining large technology infrastructure and equipment specialised in certain technological domains, which might increase the risk of lock-in and diminishes the opportunity to explore various research areas without a business partner. This has tilted their activities/services towards greater openness to a broader range of users. Furthermore, the scarcity of resources has prompted the expansion of the types of activities they engage in, such as education and training services, thereby adding complementary activities to core technology development based on firms' requests.

Three main themes emerged during the first session of the workshop on innovation intermediaries: (i) mapping innovation intermediaries, (ii) changing the business model of innovation intermediaries, and (iii) evolving activities within innovation intermediaries.

1.1 Mapping Innovation Intermediaries

Innovation intermediaries vary greatly in governance, mission, and sectoral-technology-actor target. Some are university incubators, targeting early-stage innovations, while others are placed to fill gaps along higher Technology Readiness Levels (TRLs). Others function as open innovation platforms or ecosystems orchestrating actors, aggregating external expertise for their customers (i.e. firms). They can be embedded into local development agencies or be classified as KIBS (Knowledge-Intensive Business Services) that specialise in technical consultancy for SMEs or 'transition' intermediaries dedicated to large-scale digital or sustainable transformations. Most IIs sit along different TRLs; some are early-stage research and are often embedded into universities or act in close collaboration with them. Others promote higher TRLs or even beyond technology development, focusing on technology adoption, especially in relation to smaller companies that face an organisational challenge, besides a technological one.

In between, there is a third type, often treated in isolation, which acts across TRLs 4-6, the so-called valley of death; this type is often referred to as Research and Technology Organisations (RTOs) that have been less explored in the academic literature, while they received more attention by the grey literature, e.g., OECD[1] and EARTO (European Association for Research and Technology Organisations). RTOs have a unique role in filling the gaps across the so-called valley of death, which is intended as the space along the knowledge transfer process where innovations require commercialisation and scale-up activities (and funding), yet their early-stage development makes it not appealing for private investors given the (still) high risk. The building up of RTOs in some countries, such as the UK and the US, was a response to a loss of capabilities in translating early-stage innovation into production capabilities that could benefit the broader ecosystem[2]. In other countries, for example Japan, RTOs have over 100 years of experience and they have adjusted to different technologies and market needs, and many of them helped local businesses to evolve in a competitive way. Another example is Singapore, where different types of RTOs developed capabilities to integrate and complement each other over time; SIMtech was set up in 1993 to engage with SMEs and to help in overcoming their barriers for knowledge generation and transfer, while ARTC was founded in 2015 to engage mainly with big companies and focused on testing and developing technologies.

During the workshop, special attention has been given to IIs that are performing their activities in digitalisation; beyond connecting researchers and firms, digital innovation intermediaries often reshape institutional frameworks by setting new standards, influencing policy debates, or changing how local stakeholders perceive and adopt digital technologies. Many intermediaries do not initially recognise this broader role but, in practice, engage in regulatory advocacy, promote new norms (e.g., data-sharing or open innovation), and educate communities on the potential benefits of digitalisation. Increasing intermediaries' awareness of these institution-building functions could boost their impact on regional and national innovation systems.

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[1] Recent OECD report: https://www.oecd.org/en/publications/the-contribution-of-rtos-to-socio-economic-recovery-resilience-and-transitions_ae93dc1d-en.html; https://www.earto.eu.

[2] The UK created the Catapult network in 2011, and the US created the network of the Manufacturing USA institutes in 2014; both aimed at creating commercialisation and scaling up capabilities in countries with high innovation capabilities that did not manage to translate into higher diffusion of technologies and increases in productivity.

Given the pace at which IIs evolve and how they respond to changes across various areas, there is a growing demand to develop typologies of intermediaries[3] that focus on functional definitions of different IIs, thus continuing efforts to characterise their functions and activities over time. Simultaneously, categorising these organisations and identifying which models are most effective under varying regional or technological regimes is an area of interest.

1.2 Changing the Business Models of Innovation Intermediaries

Innovation intermediaries have transitioned from basic support (e.g., incremental upgrading or simple technology transfer) to a more systemic role. In their early stages, they primarily provided direct training or facilitated the transfer of research results from universities to firms. Over time, however, they have developed into ecosystem builders, bringing together multiple actors and catalysing large-scale changes across markets and value chains.

Those engaged in the digitalisation process are rapidly experiencing changes in their business models, driven by internal and external pressures to reorganise in response to new challenges and emerging actors. For example, an intermediary might organise workshops where different specialised SMEs jointly develop a complex solution for a large manufacturing client. By coordinating these activities – pitch sessions, prototyping, and knowledge sharing – the intermediary ensures the client receives a robust digital solution while SMEs benefit from pooled expertise and minimised risks. Similarly, groups of small technology suppliers can join forces through an intermediary to offer an integrated product or service to a major automotive or aerospace firm, thus strengthening their negotiation power and collective market reach. For example, in Switzerland, a group of small firms in the engineering sector formed a ‘club’ thorugh which they pooled together resources to leverage problem focused research and a targeted collaboration with university (see case study at p. 11).

Recent research on IIs’ business models emphasises how they are increasingly shaping the system in which they operate, rather than merely providing support; they evolve within the ecosystem in a responsive and adaptive manner that tends to occur organically. For example, one participants discussed a study about how innovation intermediaries in the UK and France focused on IoT technologies started to create complex networks of players to solve complex problems, acting as system builders[4]. In recently established innovation intermediaries, their changes of activities and role seems to be part of a two-phase system that follows IIs' establishment: a first exploratory phase during which the new organisation interacts with other actors to establish connections and relationships, and a second, more mature phase characterised by collaboration and coordination among different organisations and actors.

[3] Howells, J. (2024). Innovation intermediaries in a digital paradigm: A theoretical perspective. *Technovation*, *129*, 102889.
[4] Rossi, F. (2022). New business models for public innovation intermediaries supporting emerging innovation systems: The case of the Internet of Things. *Technological Forecasting and Social Change*, 175, 121357.

1.3. Evolving activities within Innovation Intermediaries

The channels through which IIs act with firms, universities and other actors are reflected in their activities. Activities are themselves a response to the overall function, which, depending on the type of IIs, is either well defined (e.g., in the case of KIBS they tend to have a consultancy-based model for their customers on a specific set of activities) or left sufficiently broad to maintain flexibility for a dynamic response to different needs (e.g., in the case of some RTOs). Activities are also shaped by the segment of the value chain they serve; IIs might aim at collaborating with SMEs, large firms, university incubators, suppliers of a specific sector that requires further development, and they have different channels of engagement. The type of business actor that IIs target is of critical importance to determine their activities. For example, SMEs have fewer resources to engage with universities and might have higher barriers (and sunk costs) in terms of developing new ways to collaborate and organise; this, in turn, determines how an innovation intermediary decides to interact with them.

Activities are both changing and expanding. Most of the value propositions revolve around three aspects: first, networking activities (which include both convening efforts to provide matching between customers and suppliers, and a general network to support new research projects); second, licensing and patenting services, where this can be a service for SMEs that require support in co-patenting and more generally support with university-industry partnership. Among the different organisations, some can be more or less efficient depending on the actors involved, the sector where IIs operate and what is ultimately required for the technology transfer process. Firms require the right incentives to initiate a relationship with an innovation intermediary; learning how to collaborate (a specific code of action) is an act of irreversible investments and trade-off between the intensity of the partnership and the sunk costs taken by the organisation. Third, access to knowledge infrastructure and collaborative R&D projects. Access to knowledge infrastructure is increasingly important given how the R&D landscape has changed; even most big firms nowadays have experienced a decrease in the corporate R&D labs that characterised the period of fast industrialisation and technological discovery in the 1950s-1970s (especially in the US and Western Europe). When firms access IIs that have existed for a long time, accessing the infrastructures might entail access to a broader ‘knowledge repository’ of the ecosystem.

Recently, there has been an increasing push from policy and pull from business requests to engage in activities that have been outside of IIs usual borders. In the context of digitalisation, for example, IIs are increasingly required to provide different types of activities, both in the usual technology development realm and outside of it, with complementary activities. Technology activities might include a mix of the more standard technology development activities (e.g., through the provision of specific types of production technologies that are required for scaling up and adaptability to new environment) as well as technology adoption and demonstration types of activities; in the context of new emerging technologies, both big and small firms increasingly require demonstration types of activities. Other activities include workforce development, which encompasses training programs such as professional courses and skills foresight exercises.

An emerging topic in this context is the “division of labour” between different types of IIs and between IIs and other actors in the ecosystem. This aspect is related to an efficient allocation of resources, given that IIs should avoid replication yet ensuring that gaps along the innovation cycle/process are filled. The ‘division of labour’ argument is also related to the types of activities and the flexibility (both in the infrastructure and missions) that IIs might require to move/shift and coordinate, depending on the change required. Such division of labour remains largely unexplored in the existing literature, yet there is increasing acknowledgement that coordinating different activities is required for innovation diffusion and good management of public and private resources.

Case Study: Inspire

The *right* type of IIs depends on several conditions related to the structural dynamics of the industry, the institutional and production ecosystem and its overall capabilities. This box introduces a case study of an intermediary in Switzerland called Inspire. It is a consortium of 25 SMEs in collaboration with ETH Zurich (a leading technical university) to protect and expand access to top-tier research in mechanical engineering and related fields.

By forming a club of SMEs, and creating aggregate demand, Inspire achieved the critical mass needed to engage ETH effectively. Inspire staff – typically engineers with industry experience – act as the bridge between academic labs and firms, translating cutting-edge research into practical applications. Professors at ETH remain involved in a supervisory capacity, yet Inspire’s dedicated teams handle day-to-day collaboration with SMEs, ensuring quick turnaround, shared language, and relevant solutions.

This arrangement addresses two main problems that often block university-SME collaborations (and more generally, early stages research institutes and SMEs): lack of scale (one small firm alone cannot sustain a relationship with a major research institute) and divergent interests (academic research timelines differ from commercial needs, especially of SMEs).

Inspire solves SMEs’ challenges by pooling SMEs’ demand, offering them advanced knowledge and project support at a manageable cost, and enabling ETH faculty and students to stay connected to real-world challenges. Over time, this approach has proven sustainable and replicable, with Inspire continuing to launch new research groups, spin-offs, and industry partnerships.

This case study indicates one example of the variety of business models that might work in different contexts and with different actors involved; SMEs face very specific market and systems failures and have barriers that require tailored approaches, both at the institutional and technology levels. Also, sectoral specificities matter for the type of IIs and the related activities; the mechanical engineering sector is dominated by SMEs that often lack a single OEM that pulls them together in terms of technology and organisational innovation and resources.

Session 2. Regional Policy

There has been extensive research on the role that regional factors play in the process of growth and upgrade; specifically, *places*' characteristics such as infrastructure reliability, skills availability, university-related networks, and other institutions that might act through public procurement have all been elements studied in the literature, especially of economic geography.

Once mostly focused on the role of firms, this literature has recently welcomed a shift towards a multi-actor perspective. Specifically, the Regional Innovation Systems literature argued for the need to better understand and qualify the linkages between firms and other (non-business) actors in the ecosystem. Part of the research in this space looked at the need to connect the knowledge generation sub-system and knowledge exploitation sub-system, focusing on the role of universities, partially neglecting in recent years the role of those technology focused organisations, whose main aim is to purposefully building technology related capabilities.

Taking the debate at the regional level and opening the black box of innovation requires looking at innovation comprehensively. Innovation is not just about generating new technologies; it also requires adaptation to the ecosystem where knowledge can be effectively utilised. This requires cohesive policy frameworks that integrate regional, national, and local levels. Given the policy-oriented nature of our workshop, two overarching elements were in the background.

First, when talking about regional policy, there is an existing tension between regional policies that foster regions' innovation closer to the technological frontier and policies that are aimed at levelling up. The literature considers this a regional innovation paradox[5], where lagging regions are increasingly unable to absorb innovation policies because they lack the necessary capabilities to upgrade. Going beyond such paradox would require actors in the ecosystem to organically provide (and coordinate) the network, infrastructure and technological capabilities to ensure that higher spending in lagging regions is matched by programs and resources to increase their absorption capacity. In other words, policies should ensure a strict matching between the policy goals and the capabilities available at the local/regional level.

Second, policies should be better able to link objectives with place-based elements that are key to align with local realities. A lack of consideration of the spatial and regional dynamics led to the fragmented implementation of policies.

In the second session of the workshop on regional policy, two main topics emerged: (i) regional productivity challenges and diversification, and (ii) mission-oriented regional policy.

[5] Oughton, C., Landabaso, M., & Morgan, K. (2002). The regional innovation paradox: innovation policy and industrial policy. *The Journal of Technology Transfer*, *27*(1), 97-110.

2.1 Regional productivity challenges and diversification

Stagnant productivity trends in the UK and most advanced economies are (still) a major source of concern. Yet a closer look reveals that country-level decreases in productivity hide a fragmented picture of some regions that lagged considerably behind and other regions where productivity remained on a stable trend or even increased.

Despite wide research on this topic, questions remain about how productivity growth and successful diversification relate. The unexplored configuration of other (non-business) organisations might provide a further element to analyse and understand these processes of structural change.

In the attempt to unpack some key determinants for productivity, three sets of topics were discussed. First, unpacking productivity requires a different analysis on the nature of innovation adoption and diffusion, especially given recent changes in the technological and organisational domains. Acknowledging the different types of needs in terms of adoption and diffusion would promote a debate on the type of public R&D (e.g., basic or applied) in different contexts, thus considering the complexity of regional governance and place-based industrial policy. Understanding productivity dynamics in advanced economies today is related to an analysis of innovation and its diffusion across different sectors.

Second, the debate on workforce development, either in the form of a lack of skills or of further training programs requires to be developed both in the academic and policy spaces, it is key to understand the role of different types of skills to support innovation in its broader meaning. The ability to map skills and to understand where gaps are in the ecosystem is a precondition to sustain the innovation and industrial capabilities in the region.

Third, it is critical to have better evidence through new datasets (i.e., data collection process) both from sectoral perspectives and more granulated spatial perspectives; within a region, there are disparities and diffusion and adoption issues, which are not well captured within the existing data/methodology.

The provision of skills and the type of innovation activities that regions require to increase their productivity levels call for increasing coordination between policies and actors. Innovation intermediaries discussed above could contribute to a broader effort to coordinate workforce activities and match it with firm needs.

In terms of the role that innovation intermediaries might play in regional restructuring, there are different dimensions to consider. On the one hand, their role as a ‘repository’ of technical and institutional knowledge is unique and as such could contribute in a more systematic way to regional policy design and implementation. On the other hand, and relatedly, IIs are increasingly performing a networking and orchestrating role in their ecosystem and they are likely to be in a strong position to ensure that industrial priorities and firms’ network capabilities align with regional priorities. Overall, the different experiences prevent reaching a typology of IIs activities at the regional level and there is scope to critically analyse different models where IIs contribute to regional upgrading and restructuring.

2.2 Mission-oriented regional policy

In recent years, innovation policy has undergone a significant shift. Rather than viewing innovation as an end, policymakers and scholars now see it as a tool for tackling pressing societal challenges, such as climate change and inequality. This perspective, defined as mission-oriented policy, targets specific goals and mobilises diverse stakeholders to achieve transformative change.

Several elements act as a barrier to mission-oriented implementation; the ambition of the policy objective often clashes with the need for practical and deliverable programs and the crowding in of financial resources. One of the major obstacles has been the lack of spatial sensitivity in policy design, which frequently undermines the democratic legitimacy of missions, neglects bottom-up experimentation and can exacerbate regional inequalities.

Place-based strategies have been proposed to contextualise missions, balance national objectives with local capabilities, and ensure that solutions are effectively anchored to the unique conditions of specific areas. The shift from national innovation systems to regional innovation systems is happening also in the realm of policy design and implementation, with the shift to regional mission-oriented policies that recognise the importance of leveraging local strengths while addressing specific challenges. There are a number of coordination issues that IIs can help with.

The regional perspective would also allow the inclusion of regional actors (in the design and implementation of policies) that are key for the successful implementation of policies. Gathering deeper insight into how locally contingent conditions can shape the emergence, development, and implementation of regional policies is key for meaningful policies. Grounding mission-oriented policies in specific regions often broadens engagement beyond science, technology, and innovation domains, attracting diverse groups that might otherwise remain on the periphery. A regional mission-oriented approach could be particularly useful to inform the development of new skills and capabilities, thus addressing the pressing need to develop new skills and reskill the existing workforce. This inclusive approach can also clarify which scale – local, regional, or national – is best suited for the involvement of particular actors, resources, and governance mechanisms.

Smart specialisation policies were one of the first versions of this place-based approach; the Europen Commission previously designed the regional innovation strategies as a bottom-up, inclusive and place-based policy. Regional mission-oriented policies interpret a similar need, yet they refer to broader socio-economic challenges rather than single problems. In a similar way to smart specialisation policies, regional mission-oriented policies have to engage with an analysis of the regional capabilities that can act as leverage for further development, considering and comparing it with the capabilities of similar regions to have a higher chance of success.

3. Cross-cutting themes for a future research agenda

The first two sessions of the workshop led to the final session, where participants discussed research questions that could be further addressed by the research communities working on this topic and that are areas of interest from the practitioner side. We briefly review the four main areas. Such areas are not exclusive and point to interdisciplinary research agaps: (i) qualifying different types of innovation intermediaries across sectors and regions, reviewing changing functions and activities; (ii) analysing the role of IIs in filling gaps in the workforce and skills domains, exploring increasing activities they are performing in this field; (iii) the role of IIs in regional policymaking, given their networking and orchestrating role between different actors and phases of the innovation process; relatedly, (iv) their role as policy tools for regional government and institutions.

3.1 Exploring the types of IIs across sectors and regions

Despite a recent wave of contributions on different types of IIs, there is a broad field of research in the categorisation and systematisation of different IIs. Given the evolving nature of IIs business models, it is important to study how their roles, missions, functions and activities change over time and if (and how) this is a response to the evolving conditions of the innovation transfer process and the productive structure.

- What are the problems that IIs are trying to solve? Starting from the (very) specific problems (which are likely to be sector-related and shaped by the institutions) that IIs try to solve could be a useful way to categorise them in a policy-relevant way.
- Innovation intermediaries require a microanalysis of institutions, national or regional, to create the conditions to respond to the following question: Are IIs in a good position to solve the regional problems?
- Which organizations are best suited to which objectives? Should public policy selectively fund certain intermediaries over others?
- A related research approach would start from considering the different types of business actors IIs refer to, SMEs, MNCs, system integrators, service-based companies and posing questions such as: What organizational structures maximize efficiency for SMEs of varying sizes and capabilities?
- Research related to SMEs and their challenges in engaging in high-cost R&D partnerships. Some intermediaries can address this by reducing the barriers to entry and providing tailored support.
- How are functions and activities of IIs changing over time? Could we group such changes in IIs that address challenges in the same sectors or technological domain?

3.2 The role of IIs (and other institutions) in filling the gaps in workforce/skills

One of the most relevant cross-cutting themes that emerged during the workshop is about skills and workforce development activities, particularly around the role of IIs to somehow contribute to a reorganisation of workforce along the innovation and industrial cycle.

- How do organisations in a given ecosystem organise and coordinate to support the transition of PhDs and postdocs into industry roles?
- What training programs or incentives can help SMEs attract and retain highly skilled workers? Where and how should these training programs be designed?
- After more than 40 years of (uneven) waves of labor market restructuring what do we know about regional resilience and labor market flexibility?
- Given that such resilience depends on the functioning of labor market institutions and intermediaries to manage transitions as they occur, how can their role be promoted?
- It is important to rethink regional problems beyond path dependencies given that all regions undergo restructuring; in this process, the devolution and shifting of power to regions might allow to build up capabilities that can better respond to the regional related challenges.
- How are functions and activities of IIs changing over time? Could we group such changes in IIs that address challenges in the same sectors or technological domain?

3.3 The role of IIs in regional policy

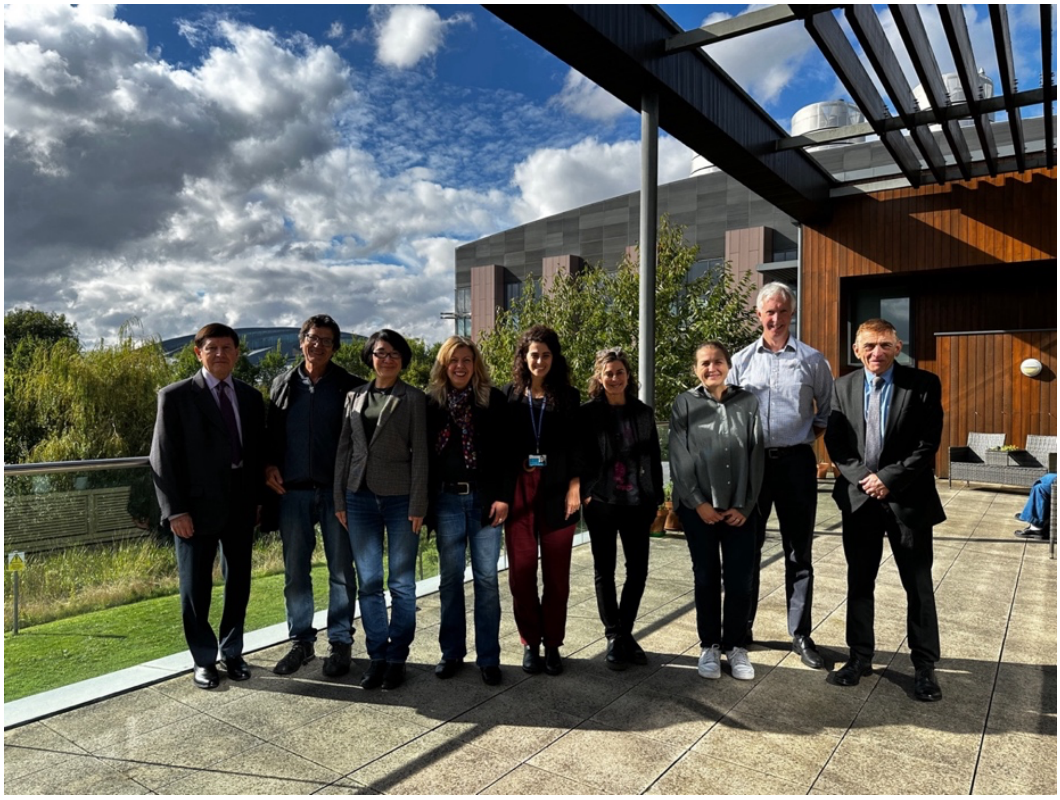
IIs are key actors in their ecosystem; their nature at the interfaces of different innovation (and production) functions makes them natural bridges between different stakeholders and related challenges. Regions are a complex unit of analysis where heterogeneity is key, yet the characteristics of regions are key to understanding the functioning of IIs.

- What is the role (if any) of innovation intermediaries in transforming and reshaping regional innovation systems and industrial paths? Do they have any role in the evolution of regional innovation systems?
- There is some evidence of an 'orchestrating' type of role, as well as a 'knowledge repository' and 'ecosystem shapers' roles of some innovation intermediaries. What specific combinations of IIs-capabilities can inform a path of regional diversification driven by innovation?
- The point raised on the relationship between productivity and innovation calls for a characterisation of industrial innovation systems, their interrelation and their interdependency. This research area would also inform the emergence (recently in the US) of the policy discussion about industrial innovation policy.
- It is important to rethink regional problems beyond path dependencies given that all regions undergo restructuring; in this process, the devolution and shifting of power to regions might allow to build up capabilities that can better respond to the regional related challenges.
- How are functions and activities of IIs changing over time? Could we group such changes in IIs that address challenges in the same sectors or technological domain?

3.4 Innovation intermediaries as policy tools

Some IIs have the potential to become an active part of the policy process, at least in two ways: contributing to gathering policy-relevant data that can inform the policymaking process and specifically act and target policy objectives, adapting their role and functions over time.

- What is the role of various stakeholders (e.g., IIs, universities, businesses, civil society organizations) in supporting regional challenge-oriented innovation?
- How should innovation intermediaries, especially those unaware of their broader impact, be integrated into policy agendas aimed at technological and socioeconomic change?
- Given the market-shaping role of IIs, how can they become a more integrated part of the effort to join mission-oriented policies and regional needs?
- Since missions' formulation and implementation are shaped by complex political dynamics, how can the policy process be more anchored into places where the local leadership has the knowledge and the ability to influence both the direction and the feasibility of missions?
- How are functions and activities of IIs changing over time? Could we group such changes in IIs that address challenges in the same sectors or technological domain?
- Can IIs become a tool to redefine the role of public policy, recombining industrial innovation policy into one analytical category?



The picture was taken during the second day of the workshop at the Institute for Manufacturing, University of Cambridge.

FOR FURTHER INFORMATION OR ENGAGEMENT WITH THE RESEARCH

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IfM MANAGEMENT TECHNOLOGY POLICY

Cambridge Industrial Innovation Policy is based at the Institute for Manufacturing (IfM), a division of the University of Cambridge's Department of Engineering. CIIP brings together the Centre for Science, Technology & Innovation Policy at the Institute for Manufacturing, the Policy Links Unit from IfM Engage, and the Babbage Policy Forum.

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