

Bridging the innovation gap

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Citation for published version (Harvard):

Ioramashvili, C, Billing, C, Yuan, P-Y, Cepeda Zorrilla, MR, Collinson, S & Kitagawa, F 2025, *Bridging the innovation gap: Innovation intermediaries as place-based policy measures*.

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Bridging the Innovation Gap

Innovation intermediaries as place-based policy measures

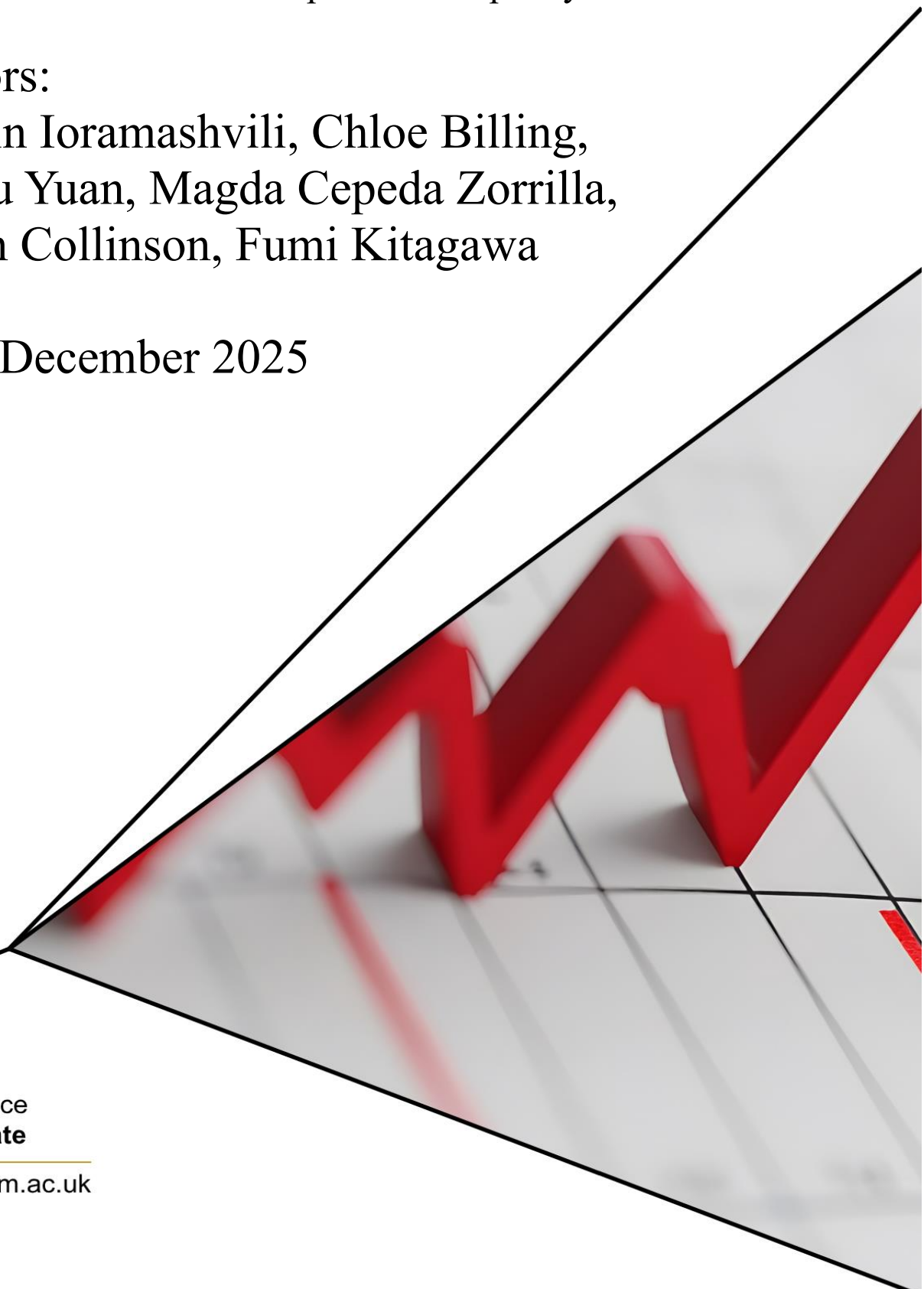
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Date: December 2025

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Summary of key findings

- The presence and activities of innovation intermediaries are critical to shaping both regional and national innovation systems.
- Innovation intermediaries have different focus and prioritisation - some prioritise 'exploration' by responding to societal challenges and frontier-pushing research, often driven by university-led agendas, while others orient their research direction towards 'exploitation' more strongly around collaborations with industry partners and market adoption.
- Through a mixed-methods approach, by comparing the two Catapult Centres within the West Midlands region with an advanced manufacturing focus – Warwick Manufacturing Group (WMG) and Manufacturing Technology Centre (MCT) - the study demonstrates that the organisational structures of the innovation intermediaries strongly influence collaboration patterns, knowledge re-configuration, and project outcomes.
- The two intermediaries show different geographical, sectoral and institutional collaborative patterns. In consequence, the two intermediary organisations improve the diversity of linkages in the West Midlands regional innovation system and beyond.
- The structures of intermediary organisations are often shaped by a combination of path dependency and serendipity, influenced by policy frameworks, funding mechanisms, and the availability of resources.

Policy implications

- **National policy design must recognise the diversity of intermediary structures and avoid assuming uniform approaches to innovation support.** Policymakers should acknowledge that organisational structures condition the role intermediaries play in innovation systems. Some are better suited to unconventional, mission-led projects that push the technological frontier, while others are more effective in supporting incremental innovation and technology adoption for firms further from the frontier. Both types are valuable, and their complementarities should be reflected in innovation policy design. Regional resilience to innovation challenges can be built through fostering diverse intermediary ecosystems.
- **National research funding bodies such as UKRI and Innovate UK need to consider organisational structure when designing and funding intermediaries,** ensuring a balance between experimental, frontier-pushing organisations and commercially oriented centres. At the same time, regional innovation strategies should recognise the importance of hosting heterogeneous intermediaries that fulfil different functions and complement each other within the local innovation system.
- **Policies should promote diverse industry collaborations, recognising the value of unconventional projects that combine knowledge across sectors.** This includes supporting organisations engaged in societal mission-led research as well as those focused on diffusion and adoption. Intermediaries themselves must communicate their strengths and visions clearly to create value as part of wider innovation systems.
- **Sub-national policymakers should be equipped to deploy intermediary capabilities as part of place-based innovation strategies.** This involves recognising regional and local needs, tailoring business support to local firms, and facilitating mission-oriented public-private

collaboration. Regional innovation strategies should also reflect the value of intra- and inter-regional collaborative networks, with Catapult Centres acting as assets to enhance inter-regional collaboration despite their national remit.

- **For individual firms, identifying the type of intermediary best aligned with their needs is essential.** Firms closer to the technological frontier may benefit from intermediaries focused on novel exploration, while those seeking process upgrading or technology transfer may find greater value in intermediaries oriented towards applied research and commercialisation.
- **Further research and evaluation of intermediary impacts are required to better understand structure–performance links.** Current evidence highlights that organisational structures shape collaboration patterns, knowledge re-configuration, and spatial outcomes of innovation. More comparative studies across different geographies and technological domains are needed to clarify contextual success factors.

Introduction- Bridging the innovation gap

Governments in many countries are concerned with bridging the gap between science and technology, notably between universities and firms through the adoption, adaptation and commercialisation of scientific knowledge. A growing number of policies worldwide rely on 'intermediaries' to support innovation and technology transfer by actively coordinating collaborations between private and public organisations engaged in research and development (R&D) (Caloffi et al., 2023; Knockaert and Spithoven, 2014; Meyer and Kearnes, 2013; Russo et al., 2019).

Innovation intermediaries address the 'innovation gap', or so-called 'valley of death', a recognised disparity between the business and academic communities (Knockaert et al., 2014; Rossi et al., 2022). They may provide a way for firms to 'lower the barriers for collaboration and novel knowledge recombination' (Janssen et al., 2020, p.610). In times of rising R&D costs and growing complexity of knowledge production and innovation management with a range of grand challenges, we expect that innovation intermediaries can play an important role in national as well as regional innovation systems, especially in delivering innovation policies (Inkinen and Suorsa, 2010).

Innovation intermediaries operate as strategic hubs to facilitate the translation of innovations into market-ready solutions for businesses. They can foster regional economic development, as policies to stimulate innovation and growth in specific regions (Clark, 2014; Holland et al., 2024). Intermediaries are conditioned by the geographical contexts in which they are embedded, characterised by different institutional capacities related to political, economic and social contexts enabling or constraining the 'design and implementation of place-based policies' (Morisson and Doussineau, 2019, p.101).

Intermediaries can help the formation of relationships that combine complementary knowledge, technologies and resources from different organisations and industries involved in innovation processes (Grassman et al., 2011; Howells and Thomas, 2022; Janssen et al., 2020). Through such re-configuration of knowledge and collaboration activities, it is argued that innovation intermediaries create value for other participants within the innovation system. They do this by facilitating the exchange of information, resources, and collaboration among diverse stakeholders, enabling interactions between multiple actors, and strengthening the innovation system as a whole (De Silva et al., 2018; Rossi et al., 2022; Russo et al., 2019).

However, our knowledge of the actual organisational contexts, mechanisms and outcomes of the innovation intermediation processes in a regional context is still limited. While previous studies reveal different types of functions of intermediaries (Caloffi et al., 2023), the specific mechanisms linking their 'organisational structures' (Albert, 2024; Joseph and Gaba, 2020) to the performance remain unclear. In addition, little is known about the overall effects innovation intermediaries have on R&D collaboration patterns and networks (Janssen et al., 2020). By comparing the two intermediary organisations within the same region with similar manufacturing focus but with different organisational structures and strategies, this study aims to shed light on the ways in which the 'organisational structures' of the innovation intermediaries shape their collaboration and re-configuration of knowledge with their partner firms.

Policy contexts

In this Research and Policy Briefing paper, we examine how innovation intermediary organisations shape collaborations between academia and industry, by investigating their organisational forms, knowledge re-configuration processes and geographical footprint. Set in the West Midlands region in the UK, our empirical study focuses on two innovation intermediaries under the UK Catapult Centres programme: Warwick Manufacturing Group (WMG) and Manufacturing Technology Centre (MTC). Both organisations studied in this paper were brought into the High-Value Manufacturing Catapult (HVMC) in 2011, but they had preceded the formation of Catapults by some time. They also run additional activities beyond the Catapult remit.

Innovation intermediaries have existed in the UK in various forms for a long time. Following the Hauser review, which called for the establishment of a network of technology and innovation centres, building on the role model of the German Fraunhofer Institutes (Hauser, 2010), a network of so-called Catapult Centres was created in 2011. Catapults are organised thematically, encompassing a wide range of sectors including life sciences, semiconductors, transport, digital technologies, renewable energy systems, and satellite applications. The network aims to bridge between basic and applied research by translating academic R&D into innovation, products, services, and new business models, building industry competitive advantage.¹

Research Design

The study employed a mixed-methods approach combining large-scale quantitative data, network analysis, and qualitative interviews to examine how innovation intermediaries shape collaboration. UKRI project data was used to track over 1,000 businesses, matched with company registers and industry classifications to understand partner characteristics. Novel knowledge combinations were assessed by analysing the diversity of industry pairings, while Social Network Analysis explored geographical, industrial, and organisational proximity in collaborative relationships. These quantitative insights were complemented by semi-structured interviews with organisational representatives and partner firms, providing qualitative evidence to triangulate and deepen the analysis.

Through a multi-level investigation, we aim to reveal how intermediaries' roles and impact in the regional and national innovation systems are shaped by their organisational structures.

UKRI data

We gathered data on over 1,000 businesses that have worked with the two innovation intermediaries through collaborative research or knowledge transfer partnerships. Many of the

¹ There are recent evaluation studies conducted on the R&D effects of Catapult Centres. See Vanino and Roper (2023) analysing the externalities of Catapult Centres. <https://www.enterpriseresearch.ac.uk/wp-content/uploads/2023/05/ERC-Report-Catapulting-into-the-Innovation-System-Vanino-Roper.pdf> [last accessed 10 August 24]

projects run by WMG and MTC are funded by UK Research and Innovation (UKRI), the UK's public funding agency, and its different branches. Key information on these projects is made publicly available, including all partner organisations, the funding period, the funds allocated and the total money spent. We extracted data on all projects involving either MTC or WMG. These were matched to the Companies House business register to retrieve information on the size and location of partner businesses. The primary industry classification code at the 4-digit level was extracted from Bureau van Dijk's FAME database.

Measuring new knowledge combinations

To compare the nature of the two intermediary organisations, we look at the partnerships they help broker. We consider collaborative projects that involve WMG or MTC, and at least two businesses. We develop and utilise quantitative 'conventionality indicators' that estimate the 'typicality' of industry pairings based on past partnership norms. Most of the partner organisations in collaborative research projects are private businesses, and for 67% of funded projects (63% for WMG and 76% for MTC), the project involved more than one business. We argue that the types of businesses brought together through these collaborative research projects are an indication of the basic research or applied nature of the projects. In particular, following the literature that analyses novel innovations through patent classes, we assume that more unusual combinations of industries indicate groundbreaking research while common industry combinations indicate applied research (Berkes & Gaetani, 2021). A collaboration between two businesses in industries that hardly ever work together might indicate the development of highly innovative technologies or products that are completely new to the market. In contrast, a collaboration between businesses from industries that frequently collaborate would indicate a project that might improve existing products or make gradual improvements to existing technologies.

Social Network Analysis

This part of the analysis supplements the above by analysing the determinants of collaborations and how they are formed. Utilising the Social Network Analysis (SNA) approach (e.g. Vahidzadeh et al., 2021) in the context of collaborative R&D and intermediaries (Janssen et al., 2020), we examine the spatial, sectoral and temporal aspects of the R&D collaborative relationships and interconnectedness between the firms, universities and the two intermediary organisation by adopting the concept of geographical, industry, and organisational proximity. We calculate 'geographical proximity' using the geographical distance between collaborative partners and the distance to the two intermediaries, namely MTC and WMG. We estimate the 'industrial proximity' (D'Este, Guy & Iammarino, 2013; Janssen et al., 2020) between the firms by comparing the UK Standard Industrial Classification (SIC) code of the project partners. 'Organisational proximity' is measured by the type of organisations and firms in the data by dividing into three categories, namely, University, Large business, and SME.²

Interviews

² The original Innovate UK data includes 11 organisational types (Academic, Catapult, Charity, Large, Medium, Micro, Micro/Small, PSO, PSRE, RTO, and Small).

To complement and triangulate the insights from the quantitative analysis, we conducted semi-structured interviews with relevant stakeholders. We conducted six interviews, each with representatives of the two organisations, plus one interview each with representatives of businesses that were supported by the organisations. The interviews were conducted between September 2021 and April 2022. The aim of the interviews was to gain insights into the processes, practices and incentives which underpin current differences in the two intermediary organisations.

Discussion

The findings from the mixed-method research and evidence from our multi-level analysis suggest that the organisational structures of the individual intermediary organisations have been distinctively shaping their types and processes of collaboration with their R&D partners. By examining their strategies, funding models, and collaborative networks, the study shows that organisational form is a defining factor that influences whether intermediaries lean towards experimental, frontier-pushing research or towards incremental, commercially oriented innovation. This structural variation also shapes the incentives driving their activities, the geographical and institutional patterns of their partnerships, and the ways they support firms of different sizes and capabilities. The organisational structures of the intermediaries condition their role as knowledge and capability brokers, with significant implications for regional innovation systems and policy design.

C-Score Analysis

A key dimension of the analysis concerns the different research orientations and project portfolios of innovation intermediaries, which reveal how organisational structures shape the balance between exploratory, experimental activities and more commercially focused innovation pathways. Both organisations conduct basic research informing industry practices -WMG prioritises societal challenges often driven by university research, while MTC's research direction is primarily steered by collaborations with industry partners as well as universities. The C-Score analysis (**Figure 1, 2**) shows that WMG tends to undertake novel exploration activities through riskier and more experimental projects, with unusual knowledge combinations, while MTC focuses on incremental exploitation activities with projects closer to commercialisation. This might also be a factor explaining their evolution along different pathways. WMG focuses on more novel knowledge combinations, with a larger range of smaller projects and a C-score that increases with project cost. This shows it manages relatively more unusual and experimental projects, including feasibility studies at the lowest technology readiness levels, and this in turn could be driven by its funding model. Compared to MTC, which has a greater reliance on industry contracts, it has a larger portfolio of teaching programmes which provide a more reliable income stream.

Social Network Analysis

Examining the collaborative networks through Social Network Analysis provides important insights into how innovation intermediaries build connections across geography, industry, and organisational types, revealing distinct patterns of proximity and partnership formation. The two intermediaries show different geographical and institutional collaborative patterns (see **Figure 3**). While geographical proximity is generally important, its specific impact varies between the two networks. The MTC network seems to foster collaborations that bridge firm sizes, potentially promoting knowledge exchange between large corporations and SMEs. On the other hand, the WMG network appears to strengthen regional ties and encourage academia-industry (both large and SMEs) partnerships, which may contribute to localised innovation clusters. Together, the two intermediary organisations improve the diversity of linkages in the West Midlands regional innovation system and beyond.

Beyond geography, the study highlights how industrial and organisational proximity shape the diversity of collaborations, with unusual combinations of industries often linked to more experimental projects and conventional pairings associated with incremental innovation. These findings contribute to understanding the path-dependent and evolutionary nature of regional assets within multi-level innovation systems. Importantly, intermediaries are not only ‘knowledge brokers’ facilitating the exchange of ideas between firms and universities, but also act as ‘capability brokers’ across sectoral value chains, developing new brokerage roles and intermediary functions over time. Together, these dynamics enhance the diversity and resilience of regional innovation systems, while also shaping their national and inter-regional linkages.

Interview Findings

Insights from stakeholder interviews provide a deeper understanding of how organisational structures translate into distinct research orientations, SME support strategies, and funding models, highlighting the contrasting ways intermediaries engage with industry and academia. Through interview evidence, we found that WMG, as the university-based organisation, is more directed towards basic research, pushing the technological frontier with public purpose in mind, while MTC, the organisation structured as a company is more focused on innovation diffusion, as well as delivering ground-breaking research in response to industry demand. Additionally, their approaches to SME support differ, with WMG targeting wider business processes and MTC focusing on technology transfer, aiding businesses needing mature rather than cutting-edge technology. WMG has diversified funding streams where collaborative research emerges from both public funding calls and industry-led challenges, whereas MTC formalises long-term relationships through memberships, allowing industry input in its research direction. WMG and MTC are both engaged in market-led skills development and technology transfer, process development and the upgrading of business models. MTC focuses on problem-led activities to fill specific skills gaps, recombine technologies and upgrade processes to improve production efficiency on a contract basis. There are indications from the interviews that WMG was also more involved in helping firms transform their “wider business processes” potentially supporting “business model innovation”.

Choices of organisational structures are often shaped by a mix of historical path dependencies and serendipitous factors, conditioned by policy frameworks, funding arrangements, and

resource availability. In this case, the organisational forms adopted reflect both institutional histories and deliberate policy design. What is striking is that, despite now operating under the shared umbrella of the Catapult Centres, the two intermediaries continue to pursue distinct approaches to collaboration, leading to different innovation outcomes and business trajectories. Their contrasting strategies and business models influence not only the nature of their activities but also the ways they engage with partners and the types of research results they generate. One intermediary is oriented towards advancing the technological frontier, addressing societal and industrial challenges through basic research and the generation of new ideas, while the other is more focused on applied research, emphasising commercialisation, innovation diffusion, and industry-led problem solving.

Conclusion

Intermediary organisations can play an important role in facilitating the re-combination of knowledge and competencies in national as well as in regional innovation systems. By comparing the two intermediary organisations in a specific region, our study provides insight into the role of organisational structures in innovation intermediation and technology transfer. The findings indicate that differences in the organisational structures and strategic choices of the innovation intermediaries may have important implications for spatial outcomes of innovation and the impacts of these collaborative projects.

This research has implications for policy makers, intermediary organisations, and industry. Firstly, for policymakers investing in innovation intermediaries, findings from this research provide important insights. Based on our findings on the innovation intermediaries under the UK Catapult Centres, we argue that the organisational structures of the intermediary organisations and their complementarities need to be better recognised in the innovation policy design. This may involve recognising the value of unconventional projects, promoting diverse industry collaborations, and supporting organisations engaged in societal mission-led research like WMG. In contrast, innovation intermediaries with organisational structures closer to businesses may be conducive to technology adoption for businesses further away from the technological frontier. As key actors in the innovation systems, the intermediary organisations need to communicate their strengths and visions to create value as part of the wider innovation systems. The national research funding bodies – UKRI and in particular, Innovate UK which funds the Catapult Network - need to consider the balance and decide on organisational structure when designing innovation intermediaries. This would depend on the specific needs and specificities of the innovation systems. For individual firms, it is essential to identify types of knowledge and business support that would meet their existing needs as well as future opportunities as part of the evolving innovation systems by linking to the appropriate innovation intermediaries.

There are further policy implications at the sub-national level. Ultimately, like in the case of the West Midlands, it may be beneficial for a region to host several, heterogenous intermediaries that can fulfil different functions. While the two organisations may look similar, this study shows that WMG and MTC fulfil different functions in the regional innovation system that may

complement each other. For sub-national policy communities, understanding of specific strategies of innovation intermediaries would be essential to deploy their capabilities as part of place-based innovation policy making. Meanwhile, sub-national innovation policy measures could support local firms by recognising the regional and local needs and providing business support tailored to local firms as well as facilitating mission-oriented public-private collaboration. Regional innovation strategies could reflect on values from these intra and inter-regional collaborative networks. Innovation intermediaries such as Catapult Centres, while their primary remit is national, can be valuable assets to enhance inter-regional collaboration.

Our study is exploratory in nature and, therefore, suffers from a number of limitations. First, the analysis focuses on two innovation intermediaries (WMG and MTC) in one domain (high value manufacturing) in one national innovation system (the UK). Comparing a broader range of intermediaries across different geographies and technological systems and domains could strengthen generalisability and clarify contextual success factors. The organisational structure and strategies have some path dependency and historical contingencies, which would make direct comparisons challenging. Therefore, controlling for more potential confounding factors could clarify structure-performance links.

References

- Albert, D. (2024). What do you mean by organizational structure? Acknowledging and harmonizing differences and commonalities in three prominent perspectives. *Journal of Organisational Design*, 13, 1–11. <https://doi.org/10.1007/s41469-023-00152-y>
- Asheim, B.T., Isaksen, A., & Trippl, M. (2020) The role of the Regional Innovation System approach in contemporary regional policy: is it still relevant in a globalised world? *Regions and Innovation Policies in Europe*, Cheltenham, UK: Edward Elgar Publishing.
- Berkes, E., & Gaetani, R. (2021). The geography of unconventional innovation. *The Economic Journal*, 131(636), 1466-1514. <https://doi.org/10.1093/ej/ueaa111>
- Billing C, Bramley G, Ioramashvili C, Lynam R, Cepeda Zorrilla M, Collinson S, et al. (2023). The impact of university STEM assets: A systematic review of the empirical evidence. *PLoS ONE* 18(6): e0287005. <https://doi.org/10.1371/journal.pone.0287005>
- Boari, C., & Riboldazzi, F. (2014). How knowledge brokers emerge and evolve: The role of actors' behaviour. *Research Policy*, 43(4), 683-695. <https://doi.org/10.1016/j.respol.2014.01.007>
- Caloffi, A., Colovic, A., Rizzoli, V., & Rossi, F (2023). Innovation intermediaries' types and functions: A computational analysis of the literature. *Technological Forecasting and Social Change*, 189. <https://doi.org/10.1016/j.techfore.2023.122351>
- Clark, J (2014) Manufacturing by design: the rise of regional intermediaries and the re-emergence of collective action. *Cambridge Journal of Regions, Economy and Society*, 7(3), 433–448. <https://doi.org/10.1093/cjres/rsu017>

- De Silva, M., Howells, J. & Meyer, M. (2018) Innovation intermediaries and collaboration: knowledge-based practices and internal value creation, *Research Policy*, 47(1), 70-87. <https://doi.org/10.1016/j.respol.2017.09.011>
- D'Este, P., Guy, F., & Iammarino, S. (2013). Shaping the formation of university–industry research collaborations: what type of proximity does really matter? *Journal of Economic Geography*, 13(4), 537-558. <https://doi.org/10.1093/jeg/lbs010>
- Grassman, O., Daiber, M., & Enkel, E. (2011) The role of intermediaries in cross-industry innovation processes. *R&D Management*, 41(5), 457-469. <https://doi.org/10.1111/j.1467-9310.2011.00651.x>
- Hauser, H. (2010). The Current and Future Role of Technology and Innovation Centres in the UK. <https://catapult.org.uk/wp-content/uploads/2020/12/Hauser-Report-of-Technology-and-Innovation-Centres-in-the-UK-2010.pdf>
- Holland, C., McCarthy, A., Ferri, P., & Shapira, P. (2024). Innovation intermediaries at the convergence of digital technologies, sustainability, and governance: A case study of AI-enabled engineering biology. *Technovation*, 129, 102875, <https://doi.org/10.1016/j.technovation.2023.102875>.
- Howells, J., & Thomas, E. (2022). Innovation search: The role of innovation intermediaries in the search process. *R&D Management*, 52(5), 992-1008. <https://doi.org/10.1111/radm.12534>
- Inkinen, T., & Suorsa, K. (2010). Intermediaries in Regional Innovation Systems: High-Technology Enterprise Survey from Northern Finland. *European Planning Studies*, 18(2), 169–187. <https://doi.org/10.1080/09654310903491556>
- Janssen, M.J., Bogers, M., & Wanzenböck, I. (2020). Do systemic innovation intermediaries broaden horizons? A proximity perspective on R&D partnership formation. *Industry and Innovation*, 27(6), 605–629. <https://doi.org/10.1080/13662716.2019.1618701>
- Joseph, J., & Gaba, V. (2020). Organizational structure, information processing, and decision-making: A retrospective and road map for research. *Academy of Management Annals*, 14(1), 267-302. <https://doi.org/10.5465/annals.2017.0103>
- Knockaert, M., & Spithoven, A. (2014). Under which conditions do technology intermediaries enhance firms' innovation speed? The case of Belgium's collective research centres. *Regional Studies*, 48(8), 1391-1403. <https://doi.org/10.1080/00343404.2012.708405>
- Knockaert, M., Spithoven, A., & Clarysse, B. (2014). The impact of technology intermediaries on firm cognitive capacity additionality. *Technological Forecasting and Social Change*, 81, 376-387. <https://doi.org/10.1016/j.techfore.2013.05.007>
- Meyer, M., & Kearnes, M. (2013) Introduction to special section: Intermediaries between science, policy and the market. *Science and Public Policy*, 40(4), 423–429. <https://doi.org/10.1093/scipol/sct051>
- Morisson, A., & Doussineau, M. (2019). Regional innovation governance and place-based policies: design, implementation and implications. *Regional Studies, Regional Science*, 6(1), 101–116. <https://doi.org/10.1080/21681376.2019.1578257>

Rossi, F., Caloffi, A., Colovic, A., & Russo, M. (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.

<https://doi.org/10.1016/j.techfore.2021.121357>

Russo, M., Caloffi, A., Rossi, F., & Righi, R (2019) Innovation intermediaries and performance-based incentives: A case study of regional innovation poles. *Science and Public Policy*, 46(1), 1–12. <https://doi.org/10.1093/scipol/scy028>

Santos, T. N., Dias, J.G., & Mendonça, S. (2023) University–industry cooperation: a taxonomy of intermediaries. *Science and Public Policy*, 50(3), 457–490.

<https://doi.org/10.1093/scipol/scac078>

Schot, J & Steinmueller, W, E (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change, *Research Policy*, 47(9), 1554-1567.

<https://doi.org/10.1016/j.respol.2018.08.011>

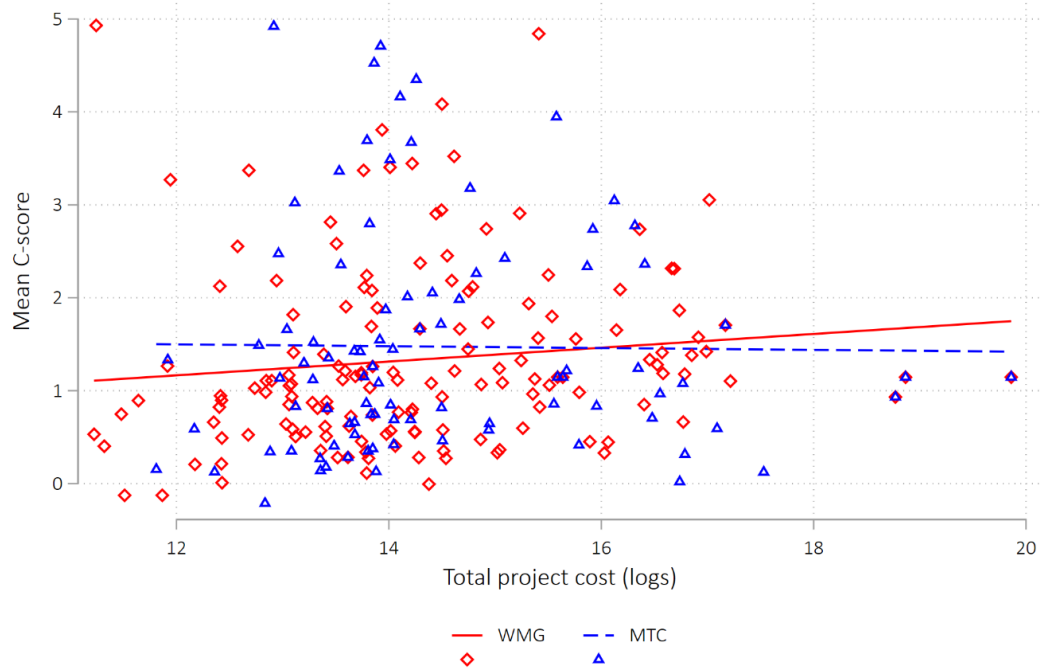
Vahidzadeh, R, Bertanza, G., Sbaffoni, S., & Vacari, M (2021). Regional industrial symbiosis: A review based on social network analysis, *Journal of Cleaner Production*, 280

<https://doi.org/10.1016/j.jclepro.2020.124054>

Vanino, E., & Roper, S. (2023). Catapulting into the innovation system: Direct and indirect knowledge spillovers from Innovation Hubs. Enterprise Research Centre.

<https://www.enterpriseresearch.ac.uk/wp-content/uploads/2023/05/ERC-Report-Catapulting-into-the-Innovation-System-Vanino-Roper.pdf>

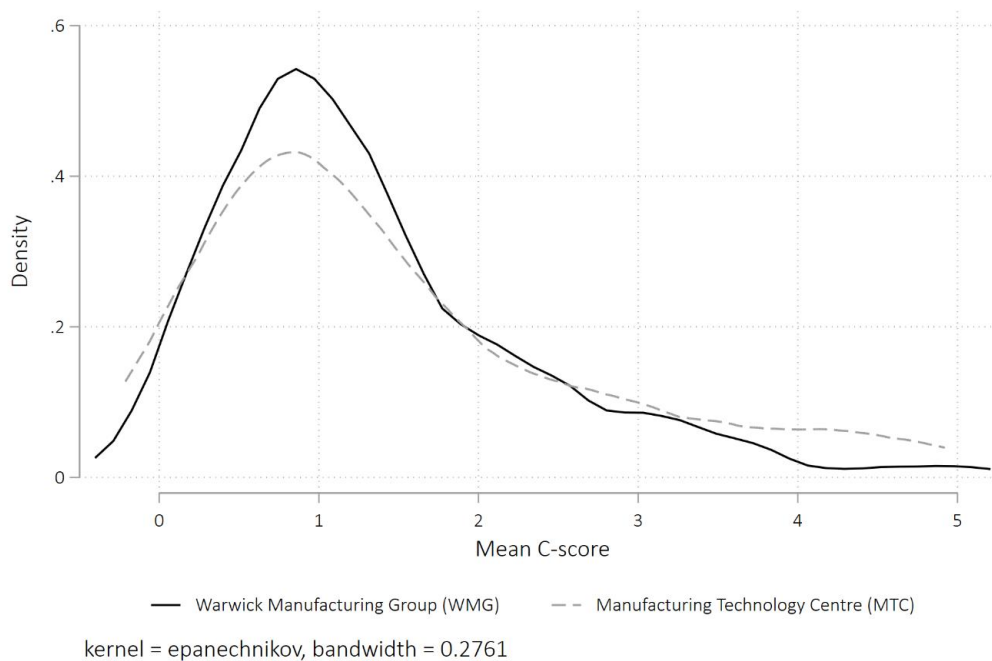
Figure 1: Scatter plot of C-scores against total project costs



Source: UKRI, author's calculations.

Note: The figure shows the mean C-score against total project costs for each project. The lines indicate the linear best fit.

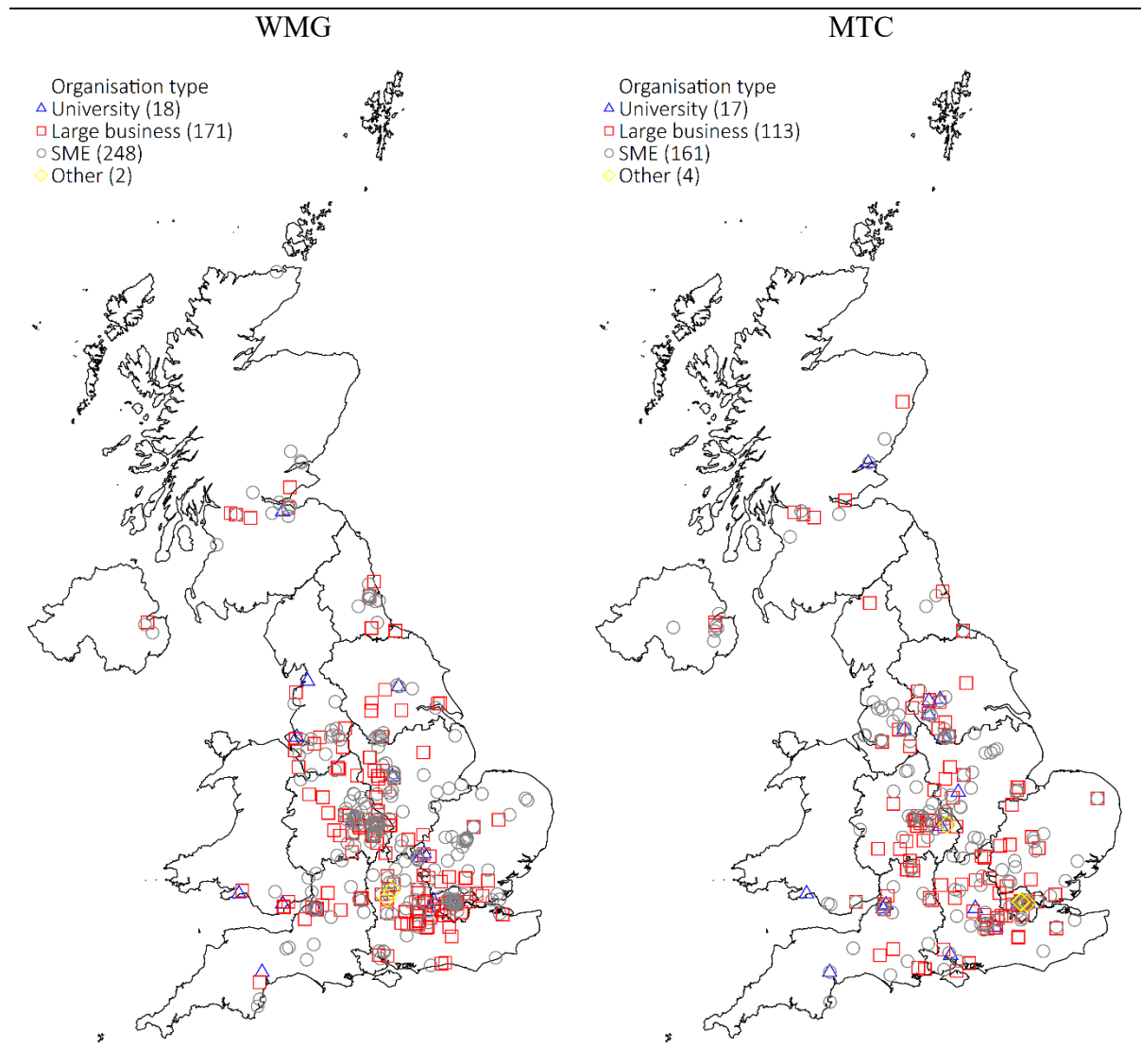
Figure 2: Distribution of C-scores



Source: UKRI, authors' calculations.

Note: The Figure shows the distribution of mean C-scores by project, where each underlying observation is a project. Lower C-scores indicate lower conventionality of the combination of industries included in a project.

Figure 3: Location of project partners



Source: UKRI, authors' calculations.

Note: Partner location identified by postcode as recorded by UKRI.