INNOVATION & RESEARCH CAUCUS

BUILDING WINNERS:

Strengthening the UK Innovation Ecosystem

IRC Report No: 029

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Contents

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About the Innovation and Research Caucus

The Innovation and Research Caucus supports the use of robust evidence and insights in UKRI's strategies and investments, as well as undertaking a co-produced programme of research. Our members are leading academics from across the social sciences, other disciplines and sectors, who are engaged in different aspects of innovation and research systems. We connect academic experts, UKRI, IUK and the (ESRC), by providing research insights to inform policy and practice. Professor Tim Vorley and Professor Stephen Roper are Co-Directors. The IRC is funded by UKRI via the ESRC and IUK, grant number ES/X010759/1. The support of the funders is acknowledged. The views expressed in this piece are those of the authors and do not necessarily represent those of the funders.

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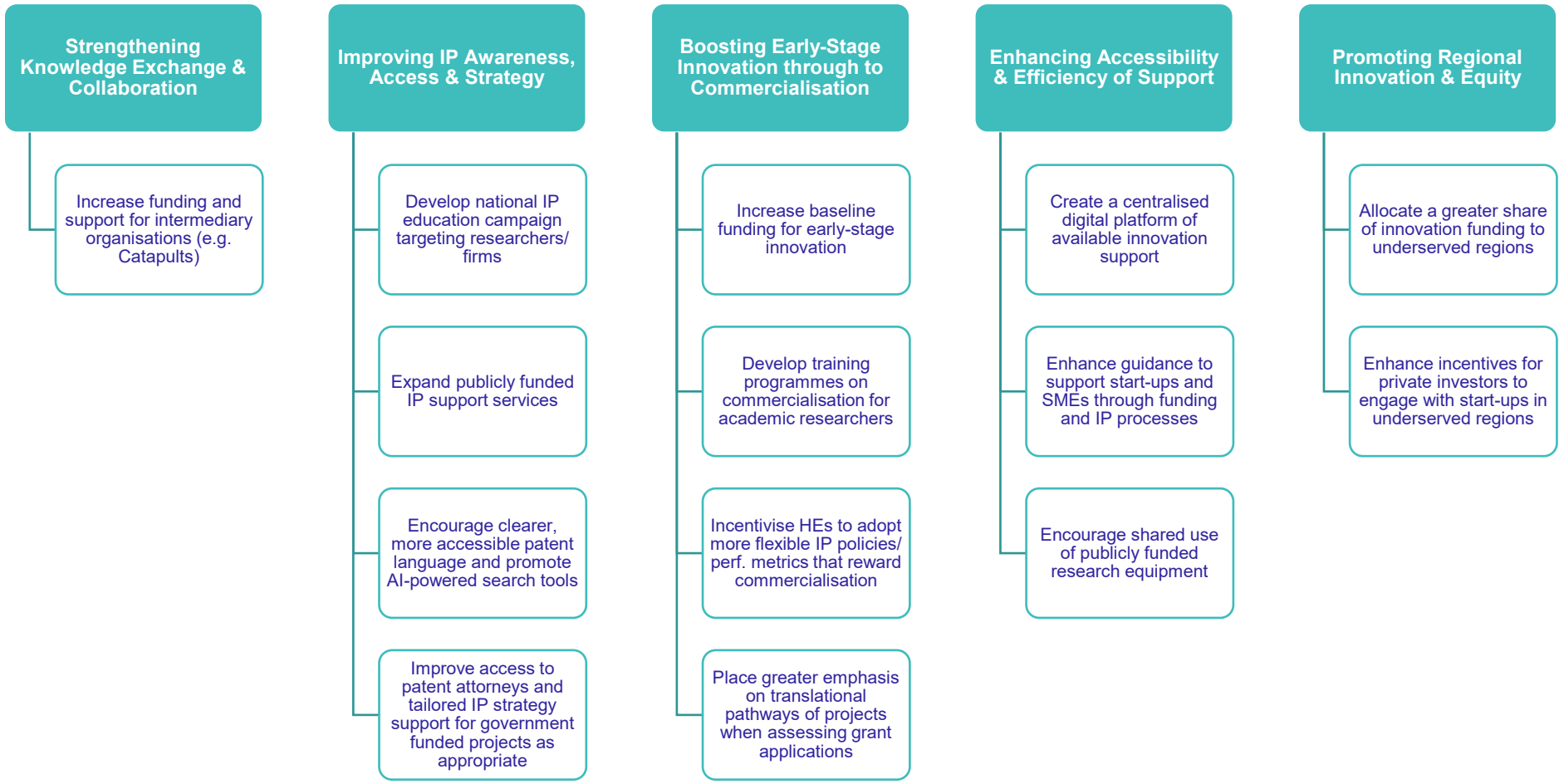
Executive Summary

Innovation is a key driver of economic growth, productivity, and competitiveness. In the UK, its effective generation, protection, and commercialisation are central to building a more dynamic, inclusive and resilient economy. Despite extensive quantitative research on innovation metrics, there remains a lack of qualitative insight into how innovation is adopted, protected and commercialised in practice - particularly by those outside traditional innovation hubs. This project, funded by the Innovation and Research Caucus (IRC), addresses that gap by exploring the structural, institutional, and policy factors shaping the UK's innovation ecosystem. Through interviews with impactful innovators and innovation support bodies, the research investigates real-world experiences of knowledge exchange, IP management, commercialisation pathways, and government support to develop actionable policy proposals that could *build winners,* enhancing innovation outcomes across sectors and regions.

The UK's innovation ecosystem holds significant promise but is hindered by a range of structural, cultural, and systemic challenges. Key barriers include misaligned incentives between academia and industry, restrictive intellectual property (IP) frameworks, and limited access to innovation funding - especially for early-stage ventures and smaller firms. Academic research often prioritises novelty and publication over commercial viability, while businesses seek rapid, market-ready solutions, creating friction in collaboration. Additionally, the complexity and cost of the patent system disproportionately disadvantage start-ups and SMEs. Regional disparities further exacerbate these issues, with innovation funding and infrastructure heavily concentrated in the "Golden Triangle" of Oxford, Cambridge, and London, leaving other areas under-supported and under-represented in national innovation strategies.

To address these challenges, the research proposes a series of policy interventions aimed at fostering a more inclusive and effective innovation landscape. These include enhancing collaboration through better support for intermediary organisations like Catapults, reforming university IP policies, and expanding access to IP education and legal support. Further proposals include improving access to innovation support schemes and public research infrastructure, ring-fencing funding for early-stage innovation, and redirecting a greater share of investment to currently underserved regions alongside developing innovation infrastructure in these areas.

Policy Proposals to Strengthen the UK Innovation Ecosystem



1. Introduction

Innovation has long been recognised as a critical driver of economic growth, productivity, and competitiveness.[1] In the UK, the ability to generate, protect, and commercialise new ideas - and to diffuse their benefits widely - is central to ambitions to raise productivity and wages for building a more dynamic, inclusive, and resilient economy. However, despite a wealth of quantitative research on the drivers of innovation - including research and development (R&D) spending, patent counts and investment levels - there remain gaps in qualitative insights into how innovation is adopted, protected, and commercialised in practice. In particular, there is limited understanding of the real-world experiences and challenges faced by innovators on the ground, especially those operating outside the UK's traditional innovation hotspots.

Research funded by the Innovation and Research Caucus (IRC) - including this project - aims to contribute to this gap. We explore the structural, institutional, and policy-related factors that shape the effectiveness of the UK's innovation ecosystem. Drawing on in-depth qualitative evidence from across academia, industry, and the public sector, the project investigates how knowledge is exchanged, intellectual property (IP) systems are navigated, innovations are commercialised, and government support mechanisms are utilised and experienced in practice.

The project is particularly timely with the election of a new UK government in July 2024, and the renewed interest in evidence-based policymaking to support innovation-led growth. This presents a critical opportunity to rethink how innovation policy can be made more inclusive, effective, and regionally balanced. The government's Industrial Strategy Green Paper – *Invest 2035* – published in late 2024 lays a promising foundation for mission-driven innovation but lacks clarity on the purpose of growth and concrete mechanisms for diffusion, regional equity, and institutional engagement.[2] While it recognises the importance of sectors, technologies and places, it requires stronger frameworks for implementation, including support for innovation adoption and devolved powers. To be effective, the work associated with the recently published White Paper

[1] Hall, B. H., & Sena, V. (2017). Appropriability mechanisms, innovation, and productivity: evidence from the UK. *Economics of Innovation and New Technology*, *26*(1-2), 42-62.
[2] White, G., Tyler, P., & Warnock, C. (2025). *Making sense of Labour's modern industrial strategy.* Bennett Institute for Public Policy.

(June 2025) – *The UK's Modern Industrial Strategy* - must refine these elements and ensure innovation policy delivers broad, inclusive, and transformative economic impact.

By addressing the following research questions, the project seeks to generate practical proposals for key policy stakeholders and government departments - including Innovate UK, the Catapult Network, and the Department for Science, Innovation and Technology - for strengthening the UK's innovation ecosystem:

1. How do innovators generate, access, and exchange knowledge, and what factors enable or hinder effective knowledge transfer?
2. How is IP managed and protected, and how do IP policies and legal frameworks influence innovation outcomes?
3. What are the dominant models and key barriers to commercialising innovation?
4. How effective are current UK government support mechanisms in enabling innovation?

2. Approach

The evidence and policy proposals in this report draw on research undertaken between June 2024 and May 2025. Following an initial desk review of academic and grey literature to map and scope out the existing innovation knowledge landscape, we conducted 20 interviews with *impactful* innovators from industry and academia to provide rich, contextual data on the experiences, effectiveness and challenges relating to knowledge exchange, IP protection, commercialisation pathways, and government support mechanisms. The interview questions can be found in Annex 1. We carried out a further two interviews with innovation support bodies to help contextualise the experiences of innovators within the broader policy and support environment.

Interviewees were selected through a process of patent holder identification and snowballing. To begin, we identified some of the most (forward) cited innovations in a set of five technologies (Biotech, Automotive/EV, Green technologies, Pharmaceutical, Chemistry).[3] Forward citations are an established measure of what could be considered an important or *impactful* innovation in the sense that it has been cited by other patent documents. We counted the number of forward citations for each UK-registered patent, received in the 5-years following its earliest filing date.[4] We selected patent data from PATSTAT Autumn Edition 2023, including in our sample all patents with at least one UK applicant and filed between 2010-2017. Then, we selected the most cited patents - top 10% for number of forward citations - based on this metric and formed our long list of patent holders from across different technologies to invite for interview. We also gained access to four interviewees through gatekeepers and snowballing as interviewing progressed. Interviews typically lasted 60 minutes and took place online via Microsoft Teams. Thematic coding was used for analysis, supporting the systematic review of qualitative data to explore issues in detail. To ensure confidentiality, participants have been anonymised, identified only by technology and sector (see Table 1).

[3] We identify technological fields using the Cooperative Patent Classification (CPC) at the 4-digit level from PATSTAT. For details see CPC.org
[4] OECD. (2013). Measuring Patent Quality. We have 6,630 patents cited by 33,505 patents in the 5 years after filing.

Table 1: Interview participants

	Technology	Sector
Interview 1	Biotech	Industry
Interview 2	Automotive/EV	Industry
Interview 3	Automotive/EV	Industry
Interview 4	Biotech	Higher Education
Interview 5	Green technologies	Industry
Interview 6	Pharmaceutical	Higher Education
Interview 7	Green technologies	Industry
Interview 8	Chemistry	Higher Education
Interview 9	Green technologies	Industry
Interview 10	Green technologies	Industry
Interview 11	Automotive/EV	Industry
Interview 12	Green technologies	Industry
Interview 13	Green technologies	Industry
Interview 14	Automotive/EV	Industry
Interview 15	Automotive/EV	Industry
Interview 16	Chemistry	Higher Education
Interview 17	Chemistry	Higher Education
Interview 18	Pharmaceutical	Higher Education
Interview 19	Chemistry	Industry
Interview 20	Green technologies	Higher Education
Interview 21	N/A	Public Sector
Interview 22	N/A	Higher Education

3. Innovation Policy in the UK

Innovation performance is shaped by a wide range of policies operating at both micro and macro levels, making it difficult to draw clear boundaries around what constitutes 'innovation policy'. Given the central role innovation plays in driving economic and societal progress, it is more constructive to assess the broader influence of public policy on innovation, much like we consider its impact on economic growth.

Innovation policy employs a mix of direct or *demand-pull* instruments and indirect or *technology-push* instruments.[5] Direct support often includes financial assistance such as grants (i.e. Innovate UK grants, innovation vouchers), tax credits (i.e. R&D credits, Patent Boxes), low-interest loans and loan guarantees, public procurement, specialist infrastructure provision (i.e. Catapult Centres), and the designation of areas as enterprise zones and science parks endowed with incentives for businesses to locate in them. Indirect support refers to more generic policies that can impact the innovation endeavours of businesses and individuals. They relate more to regulatory and institutional frameworks, a country's links to other markets via trade agreements, education and workforce development, public infrastructure and supporting collaboration with research institutions (i.e. Knowledge Transfer Partnerships), small business support, and standards and certification.[6]

The results of these policy tools are somewhat mixed.[7] The UK's R&D intensity is below OECD averages.[8] The UK produces more academic research than most other countries but struggles to commercialise its research effectively.[9] Historical policy choices have shifted focus from applied departmental research to curiosity-driven university research, weakening innovation capacity.[10] This can be seen in different aspects of the innovation ecosystem from the institutional landscape to issues with funding and governance.

[5] Billing, C. *Innovation Evidence Review: Local Policy Innovation Partnership*. The Local Policy Innovation Partnership Hub.
[6] The State of Innovation 2024. UKRI.
[7] For more details see Ribaudo, D., Marin-Cadavid, C. & MacBryde, J. (2024). *Innovation and Productivity in Manufacturing: A Rapid Review on R&I Policies*. Oxford, UK: Innovation and Research Caucus.
[8] OECD. (2023). *The Impact of R&D tax incentives: Results from the OECD microBeRD+ project*. OECD.
[9] Cambridge Industrial Innovation Policy (2024). *UK Innovation Report 2024*. IfM Engage. Institute for Manufacturing, the University of Cambridge.
[10] Jones, R. (2022). *Science and innovation policy for hard times: an overview of the UK's Research and Development landscape*. The Productivity Institute.

Universities dominate the public R&D domain, while business R&D is concentrated in large firms and overseas-owned companies, with SMEs contributing relatively little. Catapult Centres, Knowledge Transfer Partnerships and Public Sector Research Establishments fill translational and applied research gaps but lack scale and strategic clarity. Strategic incoherences, bureaucratic overloads, fraud and misalignment with national priorities, and fragmentation of purpose and funds are also limiting the effectiveness of funding allocations.[11]

Innovation policy remains highly centralised, with most R&D funding managed by UK Research and Innovation (UKRI) and central government departments. However, there is increasing recognition of the need to devolve powers and funding to local authorities to better align innovation efforts with regional strengths and needs. While local and combined authorities are becoming more involved - through innovation clusters like Cambridge Science Park and sector-specific hubs such as Sheffield's Advanced Manufacturing District - capacity remains uneven across regions.[12]

Regional disparities are stark, with investment heavily concentrated in the "Golden Triangle" (London, Oxford, Cambridge). Place-based initiatives like the Strength in Places Fund are underutilised and lack sustained commitment.[13] As such, innovation policy could be one of the main strategies linking government levels, enabling collaboration between national and devolved administrations and serving the current government's focus on raising the importance of place-based initiatives.

The discussion above paints a picture of a UK that does not effectively exploit its innovation ecosystem. Recent reports highlight that innovators face multiple barriers that do not necessarily link to direct financial support but with wider, indirect factors such as regulation and legislation or the cost of doing business.[14] Our report draws on the views of innovators in order to shed light on some of these barriers.

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[11] Jones, R. (2022). *Science and innovation policy for hard times: an overview of the UK's Research and Development landscape*. The Productivity Institute.
[12] Billing, C. *Innovation Evidence Review: Local Policy Innovation Partnership*. The Local Policy Innovation Partnership Hub.
[13] Jones, R. (2022). *Science and innovation policy for hard times: an overview of the UK's Research and Development landscape*. The Productivity Institute.
[14] *The State of Innovation 2024*. UKRI.

4. Findings

4.1 Knowledge Exchange and Inputs

- Industry relies heavily on internal R&D capacity and real-world problem-solving for innovation, while academia draws more on traditional top-down knowledge flows, primarily from academic literature
- Industry-academia collaboration is essential but often hindered by structural and cultural divides, including differing incentives and timeframes
- Intermediary organisations (e.g. Catapults) play a valuable bridging role but mistrust and IP concerns are barriers to open collaboration

Where Ideas Begin

Innovation in UK firms is largely driven by internal research capabilities. As one industry interviewee noted, “99% of the data included in our patents comes from our own in-house research teams” (INT11). Firms often conduct “harvesting sessions” (INT14) to bring together expertise across teams and identify innovation opportunities, helping maintain IP control and a competitive advantage during early-stage development. Real-world problem-solving emerged as a powerful catalyst for targeted knowledge adoption, with R&D priorities often shaped by direct engagement with practical challenges.

In contrast, innovators within universities primarily draw knowledge from academic literature and conferences to help form their ideas - “as an academic you spend a lot of time reading things” (INT4). University staff benefit from institutional access to a wide range of academic literature and databases, supporting externally-focused, top-down knowledge flow that differs from industry’s bottom-up, problem-oriented approach.

Despite their internal focus, firms often seek academic insights, though access to academic literature is often restricted by paywalls. One interviewee observed how firms often have to rely solely on open-source materials. This challenge is recognised within academia, with another interviewee stating that many academics and funding bodies are actively advocating for more open access in research publications.

How Collaboration Fuels - and Frustrates - Innovation

Collaborative models are increasingly important to knowledge exchange, in recognition of the need to leverage diverse expertise to address complex challenges and bridge the different approaches and incentive structures between academia and industry.

Universities typically maintain broad collaboration networks spanning multiple countries and institution types for the creation of ideas and the cross-pollination of expertise. These multi-layered innovation networks include partnerships with mainly academic institutions, but also companies and laboratories across national and international levels. Conversations with experts from different disciplines can highlight problems requiring innovative solutions (e.g. “a biologist discussing a problem with an engineer, who then works to develop a solution based on primary literature and existing research” (INT18)). Academic innovators also often rely on a network of specialised partners to serve specific functions within the innovation process, including commercial advisors, patent experts, business development professionals, and technical specialists.

In contrast, industry innovators tend to form more targeted, strategic partnerships to fill specific knowledge gaps within their internal teams - “collaboration depends on what we’re doing and what capabilities we already have” (INT19). Firms tend to avoid collaborating with other firms if they possess the necessary in-house expertise.

Innovative collaboration models across industry and academia include the creation of an arm’s length venture builders to leverage academic expertise in developing technology companies and sponsored PhD programmes where students are embedded in firms to co-develop solutions to specific challenges. Firms may also collaborate with “particular centres of excellence” at universities “that apply to [their] technology” (INT14). Intermediary organisations like The Faraday Institution, a government-funded body with strong industry ties, help bridge academic and industrial expertise.

However, structural differences pose challenges. Interviewees from industry noted that universities operate on longer timeframes, while firms face pressure for rapid results. One participant described how industry partners are more likely than academics to prioritise higher Technology Readiness Level projects closer to market. Alleged universities’ high fees for access to “millions of pounds worth of publicly funded

equipment" (INT9) were also criticised as a financial barrier for firms, stifling collaboration and limiting the societal return on government R&D investment.

IP concerns further complicate collaboration. Disputes over IP ownership can delay or derail partnerships, as parties struggle to agree on ownership of innovations - "… they haven't got a claim because what they've given me isn't innovative. It was just knowledge" (INT9). This tension also reflects a broader ambiguity in how knowledge - distinct from innovation - is valued and protected in collaborative settings.

Some industry interviewees expressed a desire for networks built on mutual support, free from the risk of future IP claims. However, the reality is often more competitive than collaborative. In environments such as 'innovation hubs' and 'incubators' to encourage cross- technology and sector collaboration, interviewees report a culture of mistrust and guarded silence. As one interviewee observed, "you keep deadly silent because you're all competing" (INT1). This is reinforced by a lack of clarity and education on IP rights, leading many to adopt a "say nothing" approach as "the only guaranteed way" to protect their ideas (INT1). Issues concerning IP are considered in more detail below.

4.2 Intellectual Property Protection

- IP protection is most effective when it aligns with commercial strategy and feasibility
- Patent systems are inefficient, opaque, and often inconsistently applied across jurisdictions
- Cost and complexity of IP protection disproportionately affect start-ups and SMEs
- Patents serve multiple roles - from legal protection to investor signalling - but enforcement remains a challenge, especially for smaller firms

Building the Foundation - How Firms and Universities Manage IP

In industry, IP management is typically governed by structured internal processes. Many firms employ a gated review system to assess whether inventions merit IP, which in larger firms is often governed by a 'patent committee'. Digital tools (e.g. Aqua) to log

and date-stamp inventions and external legal teams/ patent attorneys to draft and manage filings and navigate international patent systems also support IP management.

Universities rely on technology transfer offices (TTOs) to support IP management. TTOs play a crucial role in assessing the market potential and patentability of inventions, working with patent attorneys to draft and file patents, and managing the maintenance of granted patents. They also encourage cross-disciplinary collaboration, HE-industry partnerships and offer training on IP policies and approaches to commercialisation.

IP with Purpose - Aligning Protection with Strategy

IP protection is most effective when aligned with business goals and commercial viability. As one industry leader put it, “we have to make sure that what goes through will bring value to the business and it’s not just a case of people sitting around having blue sky ideas… it needs to be relevant to the roadmap we have going forward” (INT7). Similarly, the economic feasibility of ideas is a key consideration, as another interviewee observed, “just because some things are really clever ideas and fix the problem, if it costs £1 million per unit to implement then it’s not a good solution even if it’s a functional one” (INT16).

While patents are widely recognised as a legal safeguard, opinions on their long-term value are mixed. Some view the system as outdated - “an old idea that goes back to the 17th century” (INT10) - and primarily useful in the early stages of development, particularly in sectors like pharmaceuticals where exclusivity is vital. In faster-moving industries, secrecy is often seen as a more effective strategy as one interviewee explains, “…actually if you just want to make as much money as possible, then very often in our line of business you’re better off just not telling anybody what you’re doing” (INT15).

For start-ups, patents are often less about protection and more about signalling credibility to investors, serving as “an instrument to raise finance” (INT10). Patents are also a way of enhancing a company’s valuation and exit strategy - “if somebody’s trying to sell a company then the interest in patents suddenly goes up” (INT15).

The Price of Protection – When IP Becomes a Barrier

IP protection is time-consuming and expensive, especially for start-ups and smaller firms. As one interviewee puts it "it always takes longer than you think, and it always costs more than you think" (INT13). Firms with comparatively small budgets are restricted in their ability to pay for legal assistance. As a result, start-ups are more likely to conduct their own prior art searches (a comprehensive investigation into existing knowledge related to a specific invention or technology) - often without the necessary specialist knowledge and expertise "to really know what [they're] doing" (INT13) - raising the risk of weak or invalid patents. The high costs associated with filing, maintaining, and defending patents further exacerbate these challenges. As the same interviewee claimed, "£20,000 can get eaten up like that" (INT13), with the total cost from idea to international filing and maintenance over 20 years reported as in excess of £150,000 which is "an unsustainable burden for pre-revenue businesses" (INT13).

Too Much Information – The Pain of Prior Art Searches

Both firms and universities conduct prior art searches before patenting an invention to avoid infringement, but the process was frequently described as inefficient and overwhelming, and even "painful" (INT14). Difficulty in navigating vast databases without effective prioritisation mechanisms - "you type in a few key words, and you get a list of 100,000 patents" (INT15) - makes it hard for users to identify relevant prior art. This poses a practical barrier to knowledge adoption and integration, potentially leading to innovation redundancy or missed opportunities to build upon existing intellect.

Interestingly, the data also reveals an incentive for innovators to avoid conducting thorough prior art searches to preserve the novelty of their own inventions. One interviewee described this dilemma - "if you do a really thorough search, you'll find someone who has actually done something similar that might make your patent difficult… so you will sort of walk a tightrope" (INT10). This insight reflects the complex and sometimes paradoxical nature of navigating the patent landscape.

Lost in Translation – The Language Barriers of Patents

Patents are written in complex, opaque language likened to "Shakespeare" - "it's hard for me to read our patents, even though I work here and know what they're about" (INT2). Several interviewees stated how ambiguity in patent titles and descriptions is

often intentional to obscure ideas from competitors - “why do you think they are designed to be pretty much unreadable? To protect other people’s IP” (INT15). Differences in terminology used across disciplines and languages further complicate comprehension and searchability.

Legal Help or Legal Hurdle? The Role of Patent Attorneys

Patent attorneys are essential but not always aligned with innovators’ interests - “you’ve got to be very careful about patent lawyers because they want you to spend money… they make it really complicated so they get lots of follow up work” (INT10). The disconnect between legal and technical expertise was also highlighted, underscoring the importance of employing legal expertise with domain-specific knowledge.

A Patchwork of Protection – Navigating Global IP Systems

Jurisdictional variations in claim allowances, renewal fee structures, and legal standards complicate international IP strategies. Interviewees highlighted how the United States (US) allows broader, more flexible claims than the EU - “[in the US] they’ll write that in a really general way to provide as much protection as possible across as many areas as possible, whereas in Europe it’s all about what’s written in the description” (INT10). This can result in “weaker IP” that is more easily circumvented in Europe. These jurisdictional differences can influence filing orders - “the fact you’ve already got it in America helps you get into Europe… if I’d gone to Europe first, it’d be a lower chance to get the patent” (INT10).

The Joint Ownership Dilemma – Why Firms Avoid Shared IP

Joint IP ownership is widely viewed as problematic. Firms prefer sole ownership with licensing to avoid the administrative and strategic complications. This preference reflects concern with maintaining control and clarity in collaborative ventures as previously discussed. One interviewee with experience of joint IP ownership remarked, “having that joint IP was a right nightmare… even though you get to halve all the costs, I would be very hesitant about doing any jointly owned IP in future” (INT12). As a result, firms carefully manage collaborative relationships with academics and structure partnerships to retain full ownership of resulting IP while allowing academic dissemination. For instance, one organisation sponsoring PhD research ensured that

the IP is owned by the company while allowing PhD students to publish academic papers.

The Disclosure Trade-Off

The timing of patent filings was reported as critical. Premature disclosure can compromise patentability while delayed filings risk losing first-mover advantage. Some innovators delay filing to avoid tipping off competitors - “you’re always trading off that balance of ‘do I patent this or not? If I patent it, I’ve got to tell people about it and how it works and if I’ve done that, then how easy is it for somebody to steal it, copy it?... patents can be useful, but they’re also a very good way of telling everybody what you’ve done” (INT15).

The Enforcement Gap and Power Plays

There is scepticism about the real-world enforceability of patents - particularly for smaller firms that lack the financial resources to litigate against larger, well-funded competitors - “if somebody with deeper pockets than you decide to just walk all over it, they can do” (INT19). This imbalance undermines the practical value of patents - “if I wanted to go up against Siemens… what chance have I got?... a patent actually doesn’t give you much in terms of protection… if you haven’t got the money to do that prosecution” (INT9).

Publish or Patent? The Academic IP Paradox

Academics face pressure to publish, often conflicting with IP timelines - “patent attorneys hold their heads in their hands when they’re dealing with academics, because we do want to publish” (INT4). This tension is rooted in the structure of academic careers - “it’s difficult to have a career in academia if you don’t publish” (INT20) one interviewee explained.

4.3 Commercialisation Pathways

- Commercialisation typically follows licensing or product-based routes, each with distinct trade-offs
- Funding gaps create a “valley of death” for early-stage innovation
- Academic incentives often misalign with commercial goals, limiting market-ready innovation
- Restrictive university IP policies can stifle entrepreneurial motivation and investor confidence
- Venture builders offer a promising alternative to traditional spin-out pathways in universities

From Lab to Market – Choosing the Right Commercialisation Path

Commercialising innovations typically follows one of two pathways: 1) licensing IP to pre-existing companies or 2) selling products directly (including by creating a new company). Each route offers distinct advantages and challenges, and the choice often depends on the nature of the technology, available resources, and long-term strategic goals.

Licensing IP is often seen as a lower-risk, faster route to market. It allows companies to access proven technologies without years of investment - “we have allowed companies to use our technology… they’re not paying for two or three years of development from scratch, building a team, making mistakes… they access the technology immediately” (INT7). This approach can accelerate innovation adoption and generate revenue through licensing fees. However, it may also limit the organisational and/or inventor control over how the technology is used and reduce potential long-term financial returns. On the other hand, selling products directly offers greater control and the potential for higher returns, but it requires significant time, capital, and entrepreneurial expertise.

At universities, spin-outs play a vital role in bridging the gap between academic research and commercial application. University spin-outs are independent companies created from the IP and/or research developed at a university. These companies are often better positioned than universities to undertake the extensive development work required to bring innovations to market - especially in capital-intensive sectors like pharmaceuticals as one interviewee described - “our business model would be to license IP from the

university into a spinout, get the necessary millions of funding to drive it to early-stage clinical trials, get that clinical proof of concept data, and then have that licensed or acquired by a potential corporate. They would then go and commercialise it by doing the phase two, phase three, and eventually phase four trials" (INT17). This staged approach allows innovators to de-risk the technology before handing it over to larger firms with more resources to complete the costly and complex later stages of development.

The Valley of Death

Access to funding is the most cited barrier to commercialisation. A critical funding gap exists between early-stage research and commercial viability - commonly referred to as the "valley of death" (INT4/INT5). The level of investment required to transition a concept to market readiness varies widely depending on the technology. For example, pharmaceuticals and biotechnology that have high R&D costs and long development timelines often face a much steep valley compared to industries with shorter development cycles and lower R&D intensity. The process of securing investment is also time-consuming and uncertain as one interviewee explains, "my first spin-out… we did the rounds with the business plan and pitch deck. You have to kiss an awful lot of frogs before you get somebody that will put their money into it" (INT4).

Commercialising Academic Research – Misaligned Incentives and Missed Opportunities

Academic structures often prioritise novelty, theoretical advancement and publications over market relevance - particularly of "blue-sky research that may be decades away from practical application". "My area of academia is quite significantly removed from commercial reality" (INT20), one interviewee noted. It was alleged that academics often lack market awareness - "I say to them, things like, okay, so what's the market size of your application? What new markets could open? What's the growth rate of this market? And they're just like, oh, I've no idea" (INT16). This disconnect can lead to impractical innovations being celebrated - "here's an amazing battery. It's the best battery in the world. It's made out of platinum… so it's never going to be commercialised because it's going to be 10,000 times the price of another battery. But I've got this amazing Nature paper now" (INT16).

The culture of specialisation and novelty discourages cross-disciplinary development and the integration of already existing technologies into commercially viable products, which is key to commercial success. Several interviewees expressed frustration with this culture - “you have to, as an academic, demonstrate that you're an expert, which effectively makes you really niche… it doesn't encourage a free thinker who moves across different fields”; “papers have to be novel, right? But development is really what gets you to commercialisation. But you don’t get that paper from development” (INT20).

University IP policies are another barrier to commercialisation, with some universities allegedly demanding “too high” (INT16) percentages of ownership. This can undermine sense of ownership and motivation to pursue commercial ventures - “if you’re one of three founders and [named University] takes half, and then the VC wants 20%, suddenly you’re in single digits. Where’s the incentive to actually do something?” (INT16). This contrasts to the experience the same interviewee had at another university - “the feeling of ownership was a lot bigger at [named University where they take 10%, or up to 50% if you use their TTO and funding. That felt much more reasonable. If I have 90% of something, I feel like I can go for it” (INT16). Level of ownership over IP is also important for investor confidence as another interviewee remarked, “investors want to think there’s someone with such a vested interest in the success of the company that they would throw their entire life into it… and they want that person to own most of the company. But academics don’t” (INT20).

Some interviewees pointed to more entrepreneurial academic structures internationally, particularly in the US, where universities are perceived as being more flexible and supportive of commercial ventures - “in America, they've got a better way… they just encourage these entrepreneurial interactions… if people make masses of money, they tend to just be associated with the university, which is a good thing” (INT20).

When university IP policies are overly rigid or extractive, it can stifle innovation and push entrepreneurial activity outside formal academic structures.

Technology Transfer Offices – Enablers or Inhibitors?

While TTOs are widely acknowledged as vital enablers of academic commercialisation, their effectiveness varies across institutions. One interviewee recalled a third-party TTO prioritising only high-revenue opportunities, overlooking smaller-scale innovations with

niche or emerging potential. Another common limitation is the lack of domain-specific expertise, particularly in complex fields like climate technology, which can hinder accurate valuation and support for promising innovations - “the people I’ve worked with in tech transfer have very limited experience of building businesses in certain areas… deep climate tech is one of them” (INT20).

Breaking the Mold - Venture Builders

Academics are exploring alternative pathways to bring their innovations to market. Venture builders offer an agile and commercially focused environment for translating academic research into viable businesses. As one interviewee explained, “we formed an arm’s length venture builder… nothing to do with [named university] we tried to conceive what would be the way of optimising academic acumen to build technology companies… how could we accelerate this journey from potentially something quite blue sky to something that can be a meaningful commercial output” (INT20). These entities provide technical support, business development expertise, and early-stage funding, significantly accelerating the journey from concept to commercialisation. Venture builders can also play a role in helping start-ups secure seed capital - “we help them to raise seed capital based on growth of that company… so selling off 15% for £2 million to keep them going for another couple of years” (INT20). This model represents a novel and increasingly influential approach to commercialising academic research, offering a flexible and responsive alternative to traditional university spin-out processes.

4.4 Government Support

- Bureaucratic complexity, fragmented systems, and slow decisions hinder access to government funding, especially for start-ups and SMEs
- There is a funding gap to support early-stage, high risk innovation
- Regional disparities weaken the UK’s innovation potential outside major hubs

Fuel for Innovation – Government Support and its Ripple Effects

The most frequently cited government support scheme was R&D tax credits, providing financial relief to businesses engaged in R&D. They support and help sustain ongoing innovation and strategic planning, making it a cornerstone of UK innovation policy.

Innovate UK grants were also highlighted. These grants offer funding and can serve as a powerful tool to attract private investment - "it makes it a lot easier to raise finance if you've secured a [government] grant" (INT10) claimed one interviewee and another explained, "those projects were like one to three million over a few years… you need to show that you can get the 30% to cover the extra… what that enabled us to do was use those as leverage to get further private investment… use that as an instrument to go out to investors and say hey, look, you know you give us a portion of that 30%, you're going to get 70% back free from the government" (INT10). Several Innovate UK-funded Programmes were also recognised. For example, ICURe was praised for supporting university researchers to turn their research with commercial potential into investment-ready spin-out companies and license agreements through funding and personalised support.

The UK government's investments in the transition to net zero in recent years was also acknowledged. For example, the Advanced Propulsion Centre (APC) was cited. Established in 2013 and based at the University of Warwick, APC manages a £1 billion investment fund jointly backed by the UK government and the Automotive Council. It supports UK-based R&D projects focused on zero-emission technologies. The APC's decade-long funding cycle was particularly valued for enabling medium- to long-term planning. Another valuable mechanism supporting R&D in the transition to net zero is the UK Green Channel, a service offered by the UK Intellectual Property Office to accelerate the processing of patent applications for environmentally beneficial inventions. This scheme provides early search reports, allowing businesses to make informed decisions about whether to pursue international patent filings - "it enables us to get a very quick answer about whether or not this is something we should be investing in… we're going to save the costs associated with that… avoid going down that very expensive dead end" (INT12).

At the regional level, government-backed business support organisations can offer early-stage market research services as part of their wider package of support to

businesses. These can help businesses assess the commercial viability of their ideas, often at no direct cost - “I worked with Business West to help me do the market research… you don't pay for it, but you get access to a qualified and experienced researcher” (INT13).

Several past initiatives were also acknowledged for their impact. For example, Innovation Vouchers, which offered modest grants of up to £5,000, were praised for helping small businesses and independent inventors bridge early-stage funding gaps. As one interviewee recalled, “the most beneficial thing to me was the research voucher scheme… that was how I managed to get my first prototype” (INT9). Similarly, former regional programmes like the Yorkshire Enterprise Fellowship Scheme - to increase entrepreneurial and commercial activity in Yorkshire and Humber universities - played a key role in seeding innovation - “they essentially had some regional money… to take things to the next level when they’re needed” (INT18) one academic inventor reflected.

Barriers to Access – Quantum, Bureaucracy, Fragmentation and Inequality

Despite the government funding support that exist, the quantum of funding available was described as inefficient in scale. Grants such as those from the Innovate UK Transformative Technologies Fund were described as too small to make a meaningful impact - “[the Government say] we’re putting £20 million into the Innovate UK Transformative technologies fund… but awards are 25 to 50k… it’s just not very much money in reality” (INT16). Comparisons were drawn with international competitors like China, where governments are investing considerably more money over the longer-term. The end of EU support schemes, such as Acceleration Through Innovation, has further reduced available funds.

Many innovators also face significant access barriers. A recurring concern is the bureaucratic complexity and time-consuming nature of application processes, which disproportionately affect smaller enterprises. This often deters engagement, particularly from start-ups that lack the capacity and resource to navigate funding systems. Slow turnaround times for funding decisions were also reported as detrimental to innovation momentum and university-industry partnerships - “I’m putting a grant in at the moment… and I won’t know about it until halfway through next year” (INT4). Another interviewee shared a similar frustration - “it took the funding agency 15 months to get back to us… we don’t even know if the letters of support [from our partners] are in their budget for

this year anymore" (INT16). The resource-intensive nature of applications discourages participation and limits the diversity of innovation supported. Some venture capitalists actively discourage the firms they work with from applying for grant applications, viewing them as a distraction from more flexible private funding.

Moreover, interviewees described the support landscape as "very disjointed" (INT2), with unclear guidance – "I'm not entirely sure what [government support] is in place at the moment" (INT2). In response, one interviewee expressed a desire for a centralised, user-friendly platform to streamline access to funding - "the government should have a page that says 'Are you an inventor?' and then lists all the stuff you could apply for" (INT9).

Smaller enterprises reported feeling disadvantaged by the resource-intensive nature of grant applications. Many perceived that larger, more established companies were better positioned to secure funding. As one interviewee shared, "we put a lot of effort in and then we've always sort of felt, oh, it's always the bigger companies that get rewarded" (INT14). The competitive nature of funding bids combined with the resource-intensive nature of applications disadvantages "small businesses that don't tend to have the overhead to do it" (INT14). This disparity not only discourages smaller firms from applying for funds but also limits the diversity of innovation supported through public funds.

Concerns were also raised about where available funds are allocated. Interviewees criticised wasteful spending and a lack of strategic focus - "a lot of money gets wasted" and "people apply for it without clear plans" (INT2). Similarly, criticism was targeted at government for "always thinking you have to put the seeds [funding] in universities but you don't… you need to pull it out of universities" (INT9) as well as academic researchers that "just want more money to do basic research… without considering what can be commercialised" (INT18). At the same time, interviewees stressed that government investment should be viewed not only in terms of immediate commercial returns but also as a means of cultivating a skilled innovation workforce and long-term national capability - "if a company employing ten skilled people folds, that money isn't lost—they'll go on to build the next company" (INT20). Gaps in cross-sector collaboration were also highlighted, with no obvious mechanisms to support licensing or application of innovations across industries - "we've got patents and products that could solve issues in aviation or rockets, but we don't have the time or knowledge to

enter those sectors. We'd happily license it, but there's no process to support that kind of cross-fertilisation… no one's serving that need" (INT10).

There was a call for more "high-risk, early-stage funding" to support technologies through the "valley of death" (INT4). Current systems often fail to provide the first investment needed to unlock further support - "they [the government] wouldn't make the first investment - they wanted somebody else to be the lead investor and then they do match funding [but] it's no good because it's always the first investor that's the hard one to get" (INT4). Without this, many high-potential innovations risk disappearing before they can reach the market.

Closing the Loop - Gaps in Support for Commercialisation

A major gap lies in the lack of structured support for monetising IP. As one interviewee remarked, "we have had a section of our portfolio that we have been looking to either sell or licence or monetise in some way and there has been no kind of government support for that" (INT12). Another issue lies in the lack of formalised IP practices in funded projects that can deter participation - "the contracts for collaborative projects usually kick the can down the road in terms of IP… it can put people off being in those projects" (INT19). A suggestion was made "every Innovate UK project should have a patent attorney available to them" (INT19). Another proposal was to make existing government patent services more accessible to project teams, enabling them to secure/ manage IP rights more effectively.

Levelling the Field – Intra- and Inter- National Disparities

A concern raised by several interviewees is the regional imbalance in the distribution of UK innovation funding. There is a perception that resources are disproportionately concentrated in London, Oxford, and Cambridge, leaving other regions under-supported and underrepresented in national innovation strategies - "especially in the north [of the UK], there's not bucket loads of money around" (INT4). While some regions benefit from dense ecosystems that include experienced business talent, large-scale laboratories, and established industry networks, other regions do not offer the same advantages. One interviewee noted, "Scotland's excellent at starting up companies. Not so great in scale-up. The ecosystem isn't quite as well built as many places down south in Oxford, Cambridge, and London" (INT17). The lack of larger companies, customer chains, and

collaborative opportunities makes it harder for startups in these regions to grow, therefore requiring more government intervention. Without targeted investment and infrastructure development in underserved regions, the UK risks missing out on the full potential of its national talent pool and regional innovation ecosystems.

Another issue identified is the relative scarcity of venture capital (VC) funding available to UK-based start-ups in comparison to international competitors - "if you just look at the amount of funds that people get, it often seems very small in Britain compared to particularly West Coast companies [in the US…] and I don't know whether that's tax breaks or more incentivisation or something" (INT1). The same interviewee noted, "funding from VCs is crucial to a lot of Biotechs and it does seem like you can get a bit in Britain, you can get more on the East Coast of America, you can get a lot more on the West Coast" (INT1). This disparity in funding availability was seen as a major constraint on the growth and global competitiveness of UK firms and points to a potential lack of UK fiscal incentives or policy frameworks that make other countries more attractive to investors.

5. Policy Reflections and Proposals

Based on the findings of the research, this section outlines the key policy reflections and proposals for strengthening the UK's innovation ecosystem that is rich in potential, but constrained by structural, cultural, and systemic barriers that limit its effectiveness and inclusivity. These barriers include:

- **Industry and academic innovators operate under different models of knowledge exchange and input**. This often hinders collaboration. Paywalls and restricted access to academic literature limit the flow of knowledge from universities to businesses. Despite shared interest in collaboration, differences in timelines, incentives, and IP concerns create friction. Industry typically seeks rapid, market-ready solutions, while academia often incentivises the pursuit of long-term, early-stage and novel research. These mismatches delay and often derail partnerships.

- **IP concerns are major barriers to open collaboration.** Ambiguity around ownership fosters secrecy. Shared IP ownership is widely viewed as problematic, prompting firms to structure deals to retain sole ownership.

- **Patent systems are often complex, costly, and opaque.** The language of patents is often intentionally obscure, hindering accessibility and understanding. Start-ups and smaller firms face hurdles in accessing legal expertise, conducting prior art searches, and maintaining patents - creating a two-tier IP system that favours well-resourced entities. The high cost of litigation limits the enforceability of the IP rights of smaller firms.

- **University incentives and IP policies restrict commercialisation.** Academic reward systems prioritise novelty and publication over market relevance, leading to under-commercialised research and missed opportunities. Rigid or extractive university IP policies, such as high institutional equity stakes discourage academic entrepreneurs and deter investors.

- **Navigating the government innovation support landscape is challenging.** A lack of an effective centralised information portal limits awareness and uptake of available schemes. Slow and resource-intensive application processes disproportionately burden start-ups, discouraging engagement and reducing the diversity of supported innovation.

- **Access to innovation funding is easier for larger, well-resourced organisations.** University-held, publicly funded equipment is often inaccessible to firms due to high usage fees - limiting the broader innovation system's return on public investment.

- **The UK lacks sufficient innovation funding, particularly high-risk, early-stage funding to bridge the "valley of death" between early-stage research and commercial viability.** Compared to international competitors - particularly the US - the UK is seen as less attractive for venture capital investment.

- **Innovation support is unevenly distributed across the UK.** Regions like Oxford, Cambridge, and London (the "Golden Triangle") benefit from dense innovation ecosystems, while others struggle due to limited access to capital and networks.

Innovation funding and infrastructure remain concentrated in the Golden Triangle, leaving other regions underfunded and underrepresented in national strategies.

In response to these barriers based on the findings of the research, we put forward several policy proposals as ideas and opportunities for strengthening the UK's innovation ecosystem. These measures - if taken forward - could help create a more dynamic, inclusive, and commercially impactful innovation landscape across the UK.

Strengthening knowledge exchange and collaboration between universities and industry could be supported through greater investment in intermediary organisations such as Catapults. To **enhance** their effectiveness, more needs to be done to improve open collaboration within these spaces. This could involve including partners in programme design, offering trust-building activities like joint pilots and IP support, and shifting incentives toward long-term, impact-driven partnerships. The UK must also rebuild international research ties disrupted by Brexit and its temporary exit from the Horizon EU research programme (2018-2021) by recommitting to multilateral frameworks and reinvesting in international R&D partnerships.[15]

There are several potential avenues for **improving IP awareness, access, and strategy** across the UK's innovation landscape. One option could be building on existing resources[16] with lessons from international comparators. This could draw inspiration from initiatives such as the Michelson Institute in the US, which has developed widely used, open-access IP education resources.[17] To support practical implementation, publicly funded IP services could be expanded to offer more greatly subsidised legal advice, prior art search assistance, and patent filing support - possibly along the lines of similar international initiatives.[18] Additionally, modernising the patent system through AI-powered tools for prior art searches and translation, alongside efforts to promote clearer and more accessible patent language, would help reduce complexity and improve usability. Government-funded innovation programmes, such as those run by Innovate UK, might also consider offering access to patent attorneys and tailored IP strategy support to help participants better protect and leverage their innovations.

[15] See Castellani, D., & Du, J. (2023). *Innovation without Borders: A Rapid Review of International R&D Collaboration between Firms*. Innovation Research Caucus Insight Paper 008, June 2023.
[16] See Seeking Intellectual Property Advice
[17] See Intellectual Property Education Resource Hub - Michelson IP
[18] See SME Fund - EUIPO

To **boost early-stage innovation through to commercialisation**, expanding the baseline level of funding should be considered, particularly for proof-of-concept and seed-stage ventures. Dedicated micro-grants and rapid-access funding for prototyping and feasibility studies may help de-risk innovation and attract private capital. Universities might also be encouraged to adopt more flexible IP policies and performance metrics that reward commercialisation and industry collaboration. Complementary training programmes could help build commercial awareness and entrepreneurial skills among researchers. In parallel, grant assessment processes would benefit from placing greater emphasis on the translational potential of projects, ensuring that funding supports innovations with clear pathways to market.

Enhancing accessibility and efficiency of government support should also be explored. For example, a centralised, user-friendly digital platform could be developed to consolidate information on available innovation support schemes, tailored by business type and stage. This might be complemented by advisory services to guide start-ups and SMEs through funding and IP processes. Simplifying grant application procedures and accelerating decision timelines could further reduce administrative burdens and better align with the pace of innovation. Mandating the shared use of publicly funded and maintained research equipment would help to expand the benefits of R&D investment.

Finally, **promoting regional innovation and equity** could involve a move towards rebalancing the distribution of innovation funding. Directing a greater share of investment to underserved regions, alongside the development of regional infrastructure such as incubators, accelerators, and university-industry collaboration hubs, would help unlock untapped potential. Incentives for private investors and corporates to engage with start-ups in these areas might also be considered.

6. Conclusions

This report has investigated some of the structural, institutional, and policy factors that shape the effectiveness of the UK's innovation ecosystem. While the UK remains a global leader in basic research, systemic barriers continue to impede the effective generation, protection, and commercialisation of new ideas. Drawing on in-depth qualitative evidence from impactful innovators and support bodies, we explore how knowledge is exchanged, IP is managed, innovations are commercialised, and government support is experienced in practice within the UK. Our research has identified key challenges including fragmented knowledge exchange between academia and industry, inaccessible IP systems, limited early-stage funding, weak university incentives for commercialisation, and uneven access to innovation support.

In response, we offer practical policy proposals to strengthen the UK's innovation ecosystem. Priority actions include expanding IP education and support services, increasing funding for proof-of-concept and seed-stage ventures, encouraging more flexible university IP policies that reward commercial impact, simplifying access to government support - particularly for start-ups and SMEs, and targeting more funding at underserved regions to unlock the UK's full innovation potential.

Moving forward, further action is needed to translate these research findings and broad set of policy proposals into impact. This includes engaging key stakeholders at national and regional levels to explore implementation pathways, pilot new approaches, and evaluate their outcomes. This could include the establishment of a high-level working group comprising academic experts and policymakers to guide this agenda.

Now you have read our report we would love to know if our research has provided you with new insights, improved your processes, or inspired innovative solutions.

Please let us know how our research is making a difference by completing our short feedback form via this QR code.

Thank you

The Innovation & Research Caucus

Annex 1

Interview Questions – Impactful Innovators

Introduction

- Please can you tell me a bit about yourself/ the company?
- What is your role?
- What does your work involve?

Patents

- How many patents do you have in your portfolio?
- Can you please describe in high-level terms your patents and the problem(s) they are trying to solve?

Knowledge Inputs

- What are your primary sources of knowledge and information that feed into your R&D processes? (aka how does new knowledge and information flow into your company?)
- Who do you typically collaborate with during your R&D activities? (e.g. industry associations, universities, suppliers, customers). National? International?
- What challenges or barriers have you faced in gaining access to knowledge and information to support your R&D processes?

Protection of Knowledge

- How do you protect the intellectual property and know-how generated through your R&D efforts?
- What is your process for patenting inventions? (inc. duration, associated costs, etc.)
- What other IP protection mechanisms do you utilise?
- What challenges or barriers have you faced in protecting your knowledge

Commercialisation

- How do you typically go about commercialising the outcomes of your R&D, such as patents or other knowledge assets?

- Do you export your products and technologies? If so, what are the key factors that enable your ability to do so? (licencing its use/production, franchising, exporting or producing in other countries)
- What are the main barriers or challenges you face in successfully commercialising your R&D and intellectual property?

Government Support

- Have you accessed any direct or indirect government support for your R&D activities, intellectual property protection, or commercialisation efforts?
- If so, what have been your experiences with these government programmes and interventions?
- How could government policy and support be improved to better facilitate the development, protection, and commercialisation of your innovations?

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