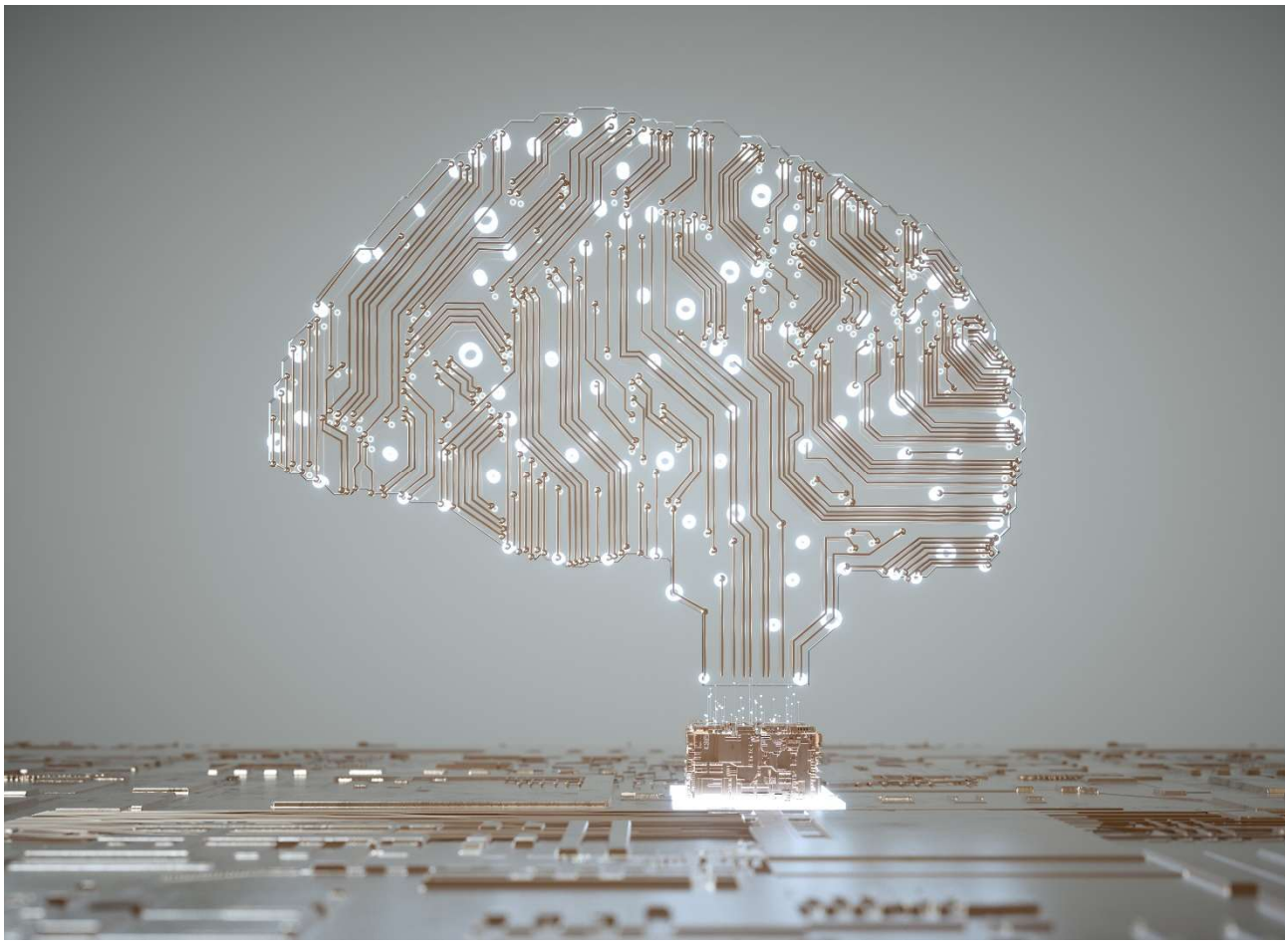
Executive Summary
September 2025

Greater Manchester Science & Innovation Audit – Refresh 2025



steer economic development

INNOVATION GREATER MANCHESTER

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Executive Summary

Context

Purpose

This Science and Innovation Audit (SIA), developed by Steer Economic Development and DMS Research and Consulting, presents refreshed analysis of Greater Manchester's (GM) science, technology and innovation (ST&I) strengths and assets. It identifies the key capabilities that can drive accelerated growth in GM and deliver on the Greater Manchester Combined Authority's (GMCA) ambitions for 'good growth' which increases access to opportunity, improves living standards, reduces poverty, and improves health and wellbeing. The 'refresh' builds on 2016's SIA for GM and Cheshire East.

Objectives of the 'refresh'

The objectives in commissioning the refresh were three-fold, namely to :

- Deliver an up-to-date assessment of the region's science, technology and innovation capabilities;
- Identify opportunities and challenges faced by the innovation ecosystem in Greater Manchester; and
- Take a wider approach than the original audit, particularly considering private sector strengths and inclusive innovation, which focuses on equitable benefits across all of society.

This 'refresh' SIA builds on 2016's original version, but uses a broader definition of innovation and its impacts. Whilst recognising that science and technology-based innovation remains fundamental to generating new ideas, products and services, this study takes a wider ecosystem view, more explicitly capturing innovation led by the private sector and innovation benefiting the public sector.

Crucially, the 'refresh ' considers the wider benefits of innovation, beyond driving economic growth only. It considers the societal impacts innovation can have on people and communities– both through creating growth, but also through ensuring that benefit is shared equitably across all of society.

Work Done

The study has deployed a mixed methods approach, combining:

- Analysis of socioeconomic data to understand progress since 2016;
- Extensive stakeholder engagement to sense check the study context, approach, and emerging findings; and
- Detailed analysis synthesising data from a range of sources on academic research and the business base to understand GM's strengths and opportunities.

Key Findings

Progress review

Economic and innovation indicators used to assess progress since 2016 show that:

- GM's economy has overall outperformed national averages on many key metrics of growth since 2016;
- This has fed through into higher levels of employment, higher earnings and reduced disparity in pay;
- Much of the growth has been concentrated in knowledge intensive service sectors, particularly digital industries, legal and accounting;
- GM has seen a marked increase in innovation funding via Innovate UK, but much of this is via one-off channels presenting risks to its sustainability;

- Overall research grant and contract funding for GM's universities has been broadly flat in nominal terms with UoM's position declining relative to other leading institutions;
- The number of graduates from and students at GM's higher education institutions has continued to increase more rapidly than the nation overall. There has been particularly strong growth in STEM subjects, providing a strong talent pipeline to support the City Region's ambitions for science and innovation led growth.

Overall, GM's performance on key economic and innovation indicators shows signs of strong progress over the past decade and there is evidence of alignment between GM's innovation policy priorities and areas of growth or existing strength.

Ecosystem Development

GM's innovation ecosystem has progressed significantly since 2016, with substantial new assets and a more structured, coherent and strategically aligned set of shared priorities. This trajectory reflects deliberate investment in hard and soft infrastructure, clearer alignment with national and regional priorities, and stronger collaborative working;

A new generation of physical assets, such as Salford's Energy House 2.0 and the emerging Atom Valley programme, demonstrates GM's growing ability to align infrastructure with policy goals, including Net Zero and inclusive growth; and

Despite this progress, challenges persist. These include a shortage of specialist grow-on space near universities and innovation clusters; underrepresentation of R&D-intensive private sector anchor firms; and a lack of long-term revenue certainty for translational assets and programmes.

Analysis of Academic Strengths

Assessment of GM's current science and innovation strengths was informed by analyses of:

- The Research Excellence Framework (REF) 2021;
- Research Funding 2016/17-2023/24;
- Scholarly works since January 2017; and
- Startups and spinouts since 2016.

In terms of externally-funded research grants and contracts obtained by GM's universities over the period 2016/17–2023/24, the best-funded areas have been Biosciences (£406 million), Clinical Medicine (£380 million), Physics (£219 million), Mineral, Metallurgy & Materials Engineering (£213 million), and Chemistry (£205 million).

Greater Manchester punches above its weight in its share of research funding for Mineral, Metallurgy & Materials Engineering (22.5 per cent of UK funding) and Chemistry (10.4 per cent) in particular.

However, funding for Clinical Medicine has, on average, shown a significant reduction since 2015/16. This has been a major driver in the overall reduction in GM universities' share of total research funding.

REF 2021 results were an encouraging endorsement of the excellence of research being undertaken at Greater Manchester's universities, particularly in the Life Sciences and Materials/Engineering areas;

For the highly-cited sub-set of STEM scholarly works, Materials and Life Science-related research areas dominate, although there is also a substantial representation for Digital research (AI, AI apps, immersive tech, cyber, blockchain, wireless networks and computing).

Analysis of Industry Strengths

Science and innovation strengths in GM's industry base were informed by detailed analysis of the business landscape in GM with a focus on innovation-active companies and their capabilities. The headlines are as follows:

- Analysis of industries with high location quotients and/or high growth since 2016 highlights the importance for GM of financial services, legal services, e-commerce, creative industries and digital in particular.
- The value creation in most of GM's strongest industries is *not* being driven by scientific advances in the areas in which GM's universities are especially strong: Life Sciences and Materials. But digital innovation is relevant to many, if not all, of these industries.
- Mapping a sample of innovation-active companies with GM operations reveals particularly substantive groupings for Digital, Financial, Legal & Insurance, Creative and Brand Retail. While Health & Life Sciences and Materials Chemistry & Engineering do feature as significant groupings, there would appear to be an opportunity to grow and/or attract more companies of scale in these areas, to build critical mass and help ensure that GM universities' particular academic strengths are leveraged more in fostering economic growth for the region.
- Analysis of Knowledge Transfer Partnerships in GM reveals strong growth in the proportion of projects involving AI: increased from 11 per cent for projects starting in 2017–19 to 19 per cent in 2023–25.

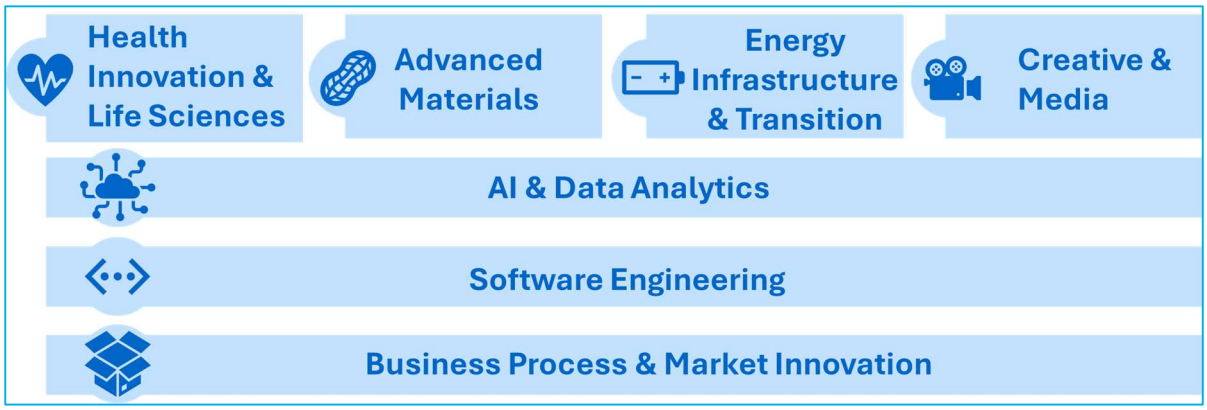
GM's Primary Capabilities

To identify primary 'capabilities' for GM, potential areas of strength were analysed against two criteria:

- **Criterion 1:** There is outstanding knowledge capability in GM universities & a realistic prospect of this being translated into superior economic growth (new or additional) in GM's private sector; **OR**
- **Criterion 2:** Existing strong sectors and/or high growth sectors in GM have strong demand for the knowledge capability area in view, irrespective of GM's universities' comparative advantage.

Applying these criteria, seven Primary Capabilities were identified for GM:

Figure i: Depiction of GM Primary Capabilities



These capabilities are summarised in the table below.

Table 1: Summaries of GM Primary Capabilities

Primary Capability	Rationale for inclusion
Health Innovation and Life Sciences	GM is home to exceptional research capability in Health Innovation and Life Sciences, making it a Primary Capability under Criterion 1. Despite a recent decline in clinical medicine funding, the sector continues to attract GM's two largest university research funding streams—Biosciences (£406m) and Clinical Medicine (£380m). The University of Manchester ranks in the top global percentile for research in areas including lung cancer, advanced radiotherapy, wound healing and treatment, and pharmacogenetics. Manchester Metropolitan University and the University of Salford also excel nationally in areas such as sports performance, musculoskeletal research, sports injuries and prevention, and the application of AI to diagnose COVID-19. Although the scale of private sector activity does not yet match the research base, GM has a growing life sciences business ecosystem with clear opportunities for expansion. The sector already plays a pivotal role in GM's economy: • Health is the largest employment sector, with jobs rising by 23.5% since 2016 to over 205,000, including nearly 100,000 in hospitals alone. • The GM Patient Care Record, covering 99.95% of patients, is a unique asset that improves care while enabling population-scale health research—an invaluable driver for innovation and investment. • Private sector strengths in diagnostics and therapies, personalised medicine, and clinical research reinforce GM's leadership potential. Health Innovation and Life Sciences is therefore both a cornerstone of GM's research excellence and a critical growth opportunity, with global significance for healthcare innovation and delivery.
Advanced Materials	GM is recognised globally as a leader in Advanced Materials research, with world-class expertise that justifies its inclusion as a Primary Capability based on Criterion 1. GM's research consistently ranks in the top percentile across key fields, including: • Graphene • Nanomaterials • Additive Manufacturing • 3D Printing This excellence is reflected in GM's ability to secure a substantial share of research funding in this space - 22.5% of the UK's Materials Engineering and 10.4% of Chemistry funding. The University of Manchester's materials research is also among the most highly cited worldwide, underlining GM's international reputation. While this academic strength has not yet translated into large-scale private sector growth, GM hosts a substantial cluster of advanced materials activity with a growing pipeline of startups and scaleups. To accelerate this potential, the Graphene, Advanced Materials and Manufacturing Alliance (GAMMA) is spearheading the creation of an Advanced Materials supercluster, supported by major development sites such as Atom Valley—part of GM's designated Investment Zone and one of its six Growth Locations. GM's diverse ecosystem spans home-grown innovators and multinationals, with applications across manufacturing, digital and electronics, and defence. Advanced Materials represent not only a research strength but also a critical driver of future industrial growth and global competitiveness for the City Region.

Energy Infrastructure and transition	GM has well established research strengths in Energy and Environmental Sciences, making this a Primary Capability under both Criterion 1 (research excellence) and Criterion 2 (industry strength and growth potential). Analysis of highly cited works and REF Impact Case Studies demonstrate GM's influence across multiple areas: • Electrical power systems — advances in managed connections, flexible demand response, and overhead line design. • Nuclear technologies — pioneering graphite research improving safety, security, and reliability in the UK nuclear industry. • Industrial decarbonisation — innovations to reduce the climate impacts of shipping and aviation, and replacing fossil-oil-based insulating liquids in power transformers. Research excellence extends further, with GM institutions also leading in areas such as urban heat island mitigation. Collaboration is central to this capability, exemplified by the Greater Manchester Electrochemical Hydrogen Cluster (GMEHC), which is accelerating the development and deployment of electrochemical (green) hydrogen technologies through partnerships between academia, industry, and government. GM's private sector strengths complement this research base, with innovative firms active in renewable energy generation, storage, and distribution, as well as engineering solutions to decarbonise industry. Together, these capabilities position GM as a leader in developing the technologies, systems, and industrial solutions needed to drive the transition to Net Zero.
Creative & Media	GM hosts one of Europe's most dynamic Creative and Media sectors, making this a Primary Capability under Criterion. At its centre is MediaCityUK, Europe's largest purpose-built digital hub and home to major anchors including the BBC and ITV. The sector spans from freelancers to multinationals in areas such as TV and broadcasting, music, digital content, immersive technologies, and performing arts. Key strengths include: • High growth since 2016, with TV and broadcasting among the fastest-growing industries and employing over 8,000 people. • A strong talent pipeline, with GM universities producing 4,000 graduates annually in media, design, and creative subjects, and nearly 350 music graduates from the RNCM in 2024. • Academic excellence, with Manchester Metropolitan University a leader in Virtual Reality, Salford driving immersive tech innovation through its Creative Tech Labs, and the University of Manchester ranked top 3 nationally in Drama, Dance, Performing Arts, and Screen Studies (REF 2021). Creative and Media in GM combines a globally recognised industry cluster, world-class facilities, and strong academic underpinnings, making it one of the UK's premier locations for cultural and creative innovation

AI & Data Analytics	GM has broad and growing strengths in AI and Data Analytics, meeting both Criterion 1 (research excellence) and Criterion 2 (industry strength). Research leadership is reflected in highly cited AI clusters across GM universities, an increasing number AI-focused Knowledge Transfer Partnerships (KTPs), and recognised capabilities in cybersecurity, wireless networks, and applied AI. University of Manchester and Manchester Metropolitan University are both highly ranked in cybersecurity research, while GM is a central node in the North West Cyber Corridor, linking to the National Cyber Security Centre and GCHQ. The private sector is equally strong, encompassing: • Global firms including Arm, whose GM base develops system hardware, developer tools, and automotive GPUs, underpinned by its global AI partnership with OpenAI. • A multitude of global tech firms such as Amazon, BT, and Thales have a major presence in GM. • A diverse mix of startups and specialist firms is driving the application of AI across industries from healthcare to finance. With strengths spanning research, infrastructure, and business adoption, GM is a national and international leader in AI, cybersecurity, and data-driven innovation.
Software Engineering	Software engineering is a core enabler of innovation across GM, making this a Primary Capability under Criterion 2. It underpins growth in multiple sectors, from e-commerce and finance to digital services and the public sector. Key indicators of strength include: • The information and communications sector was one of GM's fastest-growing between 2016 and 2023, driven by computer consultancy (+110%), programming (+67%), and IT services (+71%). • GM universities supply a robust talent pipeline with around 3,000 computing graduates, 1,000 in mathematics, and 3,500 in engineering and technology. • Employers highlight the importance of a broad skills base, beyond pure computer science, in driving digital adoption and innovation. Software-related innovation is driving transformation across industries, reinforcing GM's position as a leading hub for digital technology and software-driven growth.
Business Process & Market Innovation	This priority recognises that a key route to innovation-driven inclusive growth is through the adoption of new business models, processes, and technologies to disrupt sectors' existing ways of doing business (Criterion 2). GM is driving innovation in multiple industries in this way, including: • Retail and e-commerce – where new digital platforms and services are disrupting consumer markets. • Leisure – with technology reshaping consumer experiences. • Financial and Professional Services – driving efficiency and value through new tools and platforms. • Legal and Accounting – modernising services through digital adoption. While much of this innovation is business-led, GM universities—particularly their business schools—play a vital role in supporting growth. UoM ranks top 3 nationally for research power in Business and Management Studies. This capability reflects GM's entrepreneurial strength, applied innovation, and sector-spanning impact, positioning the city region as a leader in market disruption and the adoption of new business models.

Recommendations

Informed by the study, nine recommendations are made:

Recommendation 1: *From Audit to Plan for Action*

The 2016 SIA laid the evidential foundation for Greater Manchester's innovation and cluster strategies over the following decade. This 'refreshed' SIA should similarly serve as the basis for future focus across the GM ecosystem. To achieve this, the study's findings and identified Primary Capabilities should be widely disseminated and embedded, providing an objective framework for prioritisation by partners. As new innovation strategies and sector/cluster plans emerge, they should be guided by this evidence base and contribute to its ongoing refinement—ensuring GM's understanding of its innovation ecosystem remains accurate and up to date.

Recommendation 2: *Live/regular monitoring of the ecosystem*

This study has developed a method for identifying and understanding innovation-active firms in GM. Building on this, consideration should be given to establishing a more regular and coordinated approach to gathering intelligence on these sorts of firms. Organisations such as the Growth Company, universities, MIDAS, GMCA, and Pro-Manchester hold valuable insights here. A shared dataset of innovation-active firms could support annual reporting (e.g. to the Innovation Greater Manchester Board) and enable targeted deep dives into specific themes, emerging new capabilities, or policy areas. While this would require resources, the benefits of a more dynamic and inclusive understanding of innovation-led growth are significant.

Recommendation 3: *A Broader Strategic View of 'Innovation'*

This 'refresh' has identified the role that innovation can play in achieving objectives for GMCA and partners around both economic growth *and* equitable and sustainable societal outcomes, providing an increased focus on inclusive innovation. Whilst this link is increasingly recognised, it is important to continue to strengthen this so that GMCA and partners (i) have a shared and unified view of the need for balance between growth per se and the need to equitably distribute the gains across all of society, and (ii) think beyond natural science and technology based innovation strengths to an approach that incorporates perspectives from social sciences and public health.

Recommendation 4*: Developing, Attracting and Retaining Skills*

Across all the Primary Capabilities, there is a consistent need to develop and retain high-level skills, and build the pathways that support them. This includes both technical expertise and broader entrepreneurial competencies. GM's universities and Further Education institutions play a critical role in preparing an employment-ready workforce. These partners should continue to align the skills pipeline with areas of growth and opportunity—helping retain talent in GM and attracting high-value inward investment.

Recommendation 5: *Agility in responding to Opportunity*

The Primary Capabilities identified in this refresh include both sector-specific and cross-cutting opportunities, many of which have evolved since the 2016 SIA. GM's partners must remain agile, ready to identify and act on emerging innovation opportunities. Importantly, much innovation occurs outside the formal public policy and academic spheres – market-driven innovation is equally vital. While not all firms require engagement with the formal support ecosystem, many could benefit from it. Implementing Recommendations 2 (monitoring) and 9 (visibility) will help GMCA and partners identify these opportunities and raise awareness of available support.

Recommendation 6: *Functional Innovation Geographies*

Innovation is increasingly open and globally connected, making it less geographically bounded. While GM's innovation partners are place-centred, they must also be outward-looking—actively seeking knowledge, expertise, and opportunities wherever they exist and bringing them back to the City Region. This 'outside-in' approach should become a defining feature of how GM builds its innovation ecosystem.

Recommendation 7: *Targeting Interventions at Need and Opportunity*

Some capabilities will require more intensive support to align research strengths with commercial opportunities. For example, GM's world-class research in Advanced Materials and Health Innovation is not yet matched by a critical mass of industry activity in the City Region. Coordinated action across public, private, and academic sectors is needed to better translate research excellence into commercial impact.

Recommendation 8: *Knowledge Transfer and Diffusion*

Substantial expertise in the primary capabilities is held in institutions at all scales. However, this study identified a clear appetite from large anchors in the private and academic sectors to collaborate more closely with SMEs in the City Region. Priority should be given to developing mechanisms which support the transfer of knowledge from large entities with national and global reach to local firms with the ability to adapt and grow.

Recommendation 9: *Increasing Ecosystem Visibility*

There is a clear appetite among GM's public and private partners to raise the profile of the City Region's innovation ecosystem—locally, nationally, and internationally. A formal launch event for this refreshed SIA could serve as a starting point, followed by a programme of networking events, innovation festivals, and other activities. These would promote GM's innovation offer, and enable learning from other leading regions.