Liverpool City Region All-Party Parliamentary Group

Research Paper No.5

How can Liverpool City Region harness its digital and innovation assets to improve prosperity?

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1. Introduction

The UK has a productivity problem. Since the Global Financial Crisis, productivity – defined as how much is produced per unit of input, such as labour and capital – has lagged behind most of our Western European neighbours, and far behind the USA. This matters because productivity growth represents the most sustainable, long-term way to grow the economy and improve living conditions.

Weak productivity is a particular problem outside London and the South East. In common with other major city regions in the North and Midlands, the gap in productivity between Liverpool City Region (LCR) and the UK average has grown over the last 20 years. A major reason for this weak productivity is low levels of investment from both the public and private sector. According to the ONS, capital investment per worker actually fell in the UK in the decade following the Global Financial Crisis.

To prevent a further decline in productivity, growth and living standards, the UK will need to encourage investment in research, innovation and development activity that will result in new technologies and processes which boost productivity. The UK has strong foundations on which to build to achieve this goal, with a cutting-edge university sector and excellent innovation institutions such as Innovate UK and Catapult centres. Place-based innovation policy and initiatives are reflected across various government department plans, including the Levelling Up White Paper. Liverpool City Region (LCR) is well placed to support a renewed focus on innovation as central to UK growth and productivity, with particular strengths in infection prevention and control, materials chemistry, digital solutions and net zero industries.

From a global perspective, the importance of innovation assets is increasingly central to industrial policy in many countries. The USA has led the way on investing in research and development and developing new technologies since 2020 via the Inflation Reduction Act, which explicitly targets investment in transitioning from fossil fuels to green energy and industries. Crucially, central government funding is being pumped into places long considered 'left behind' by deindustrialisation, bringing manufacturing jobs back to cities such as Detroit and Pittsburgh. Described by economist Dani Rodrik as 'productivism', many national governments are also reconsidering their role in shaping where investment happens, how this investment can encourage innovation, and how this innovation contributes to productivity growth.

2. Liverpool City Region's innovation assets

While national policy will be important in developing and harnessing the UK's innovation assets, local policy also has a crucial role to play. Liverpool City Region Combined Authority (LCRCA) has identified a range of innovation assets through its Plan for Prosperity and Innovation Prospectus to reflect the city region's long history as a centre for innovation. It was home, for example, to significant innovations at the heart of IVF technology, and the Liverpool School of Tropical Medicine was the first institution of its kind in the world when established in 1898. Today, LCRCA aims to invest 5% of regional GVA in research and development – nearly double the national target.

According to the Innovation Prospectus, LCR has innovation strengths in three specialist sectors. These strengths are shared across the private and public sectors, with collaborative partnerships between the city region's universities, businesses and local leaders.

- **Infection prevention and control**: LCR has the UK's largest concentration of research, development and innovation into infectious diseases. Together with neighbouring Cheshire and Warrington, the sector is worth £2bn a year. Research led by the Liverpool School of Tropical Medicine and University of Liverpool is central to delivering research on infectious diseases. For example, the National Biofilms Innovation Centre, a collaboration between the University of Liverpool, 59 other research institutions and over 250 companies, is developing new technologies to tackle the impact of microbial activity and antimicrobial resistance.

- **Materials chemistry**: The University of Liverpool is ranked 3rd in the UK for impact in materials chemistry, with much of this research undertaken in collaboration with major employers based in LCR, such as Unilever. Partnerships also exist with multinationals such as Ineos, Johnson-Matthey and BASF. The Materials Innovation Factory, which opened in 2017, develops cutting edge technology and expertise in materials chemistry.

- **AI solutions and emerging technologies**: LCR has several assets in this strategically important and growing sector. The STFC Hartree Centre at Sci-Tech Daresbury is home to the world' most powerful supercomputer dedicated to using AI to address real world challenges. Established in 2012, the Hartree Centre supports businesses and other organisations to utilise supercomputing and AI. The University of Liverpool's Computer Science and Informatics division is ranked 5th in the UK for world-leading research outputs. LCR's health sector is leading the way in using new digital technology to improve patient care, with Alder Hey children's hospital home to a 1,000 square metre space dedicated to AI implementation.

In addition to these existing strengths, recent policy developments at a national level provide further opportunities for LCR to build on its innovation assets. These include:

- **LCR Freeport**: Established in 2022, the LCR Freeport is one of eight in England. Along with improving trade and creating jobs, promoting innovation is one of the main objectives of the UK's freeport policy. The LCR Freeport management team, working with LCRCA, are targeting investor and employers aligned to broader LCR economic and social objectives, with a particular emphasis on net zero and low carbon industries. Employers located at 16 sites across the city region benefit from a range of customs and tax benefits.

- **LCR Investment Zone**: In addition to the freeport, LCR will also be home to an Investment Zone. The zone will be focused particularly on developing the city region's

already strong life sciences and pharmaceutical sectors, and will centre on sites in the Knowledge Quarter, Sci-Tech Daresbury, Maghull Health Park and other key health and life science assets. The zone will focus on developing clusters of private and public sector assets with an emphasis on research and innovation. A new partnership between the University of Liverpool, Liverpool John Moores University and Edge Hill University has also been launched as part of the Horizons programme, funded by the UK Shared Prosperity Fund.

- **Net Zero:** LCR is well placed – geographically and in its sectoral strengths – to benefit from the UK's transition to net zero over the coming years. The LCR Investment Strategy, launched earlier this year, identifies how funding will focus on growth sectors such as advanced manufacturing, with a particular focus on achieving the city-region's goal of reaching net zero carbon emissions by 2040.

In order to harness its innovation and digital assets effectively, LCR will also need to focus on improving productivity in the foundational economy in which two thirds of employees work. Improving working conditions, skill levels and routes to progression in sectors such as healthcare, education and retail must go alongside investment in the high-value sectors highlighted above. This approach is important to support sustainable growth and boost left-behind places.

Figure 1: Liverpool City Region's innovation assets, from the LCR Innovation Prospectus

3. Innovation for public good

Innovation is about more than creating new products, growing businesses, or growing the economy. It is also about developing solutions to society's most pressing challenges. This kind of 'innovation for the public good' can be particularly critical in moments of rapid change and uncertainty, but relies upon a 'triple helix' of effective collaboration between researchers, businesses, and policymakers in order to adequately identify and prioritise challenges, and develop actionable solutions.

In the United States, the MetroLab Network was established in 2015 to build these kinds of bridges between research and innovation stakeholders in order to improve outcomes. In particular, the Network aims to promote collaboration between local government and universities in order to improve public services, public health, and climate resilience across a range of American cities through evidence-based policymaking as well as the design of novel technological solutions to pressing local challenges.

A core component of the MetroLab Network's activity is the Civic Innovation Challenge, a multi-million dollar 'research and action' initiative focused on leveraging research partnerships with local governments and community groups to solve long-standing local challenges. Projects include:

- **Crowdfunding Sensor Data for Flooding** (Great Lakes Region, Michigan): partners from Michigan Technological University, University of Washington, and Western Upper Peninsula Planning and Development Region have developed tools and information that emergency managers can use with limited resources to understand the flood risk in rural coastal counties.

- **Neighbourhood Mobility Hub** (Austin, Texas): partners from The University of Texas, Austin and Austin Transportation Department have implemented SmartHub, a neighbourhood-focused multimodal mobility hub to address a transit desert and location-based transit access issues. With SmartHub, residents will have access to several models of transportation in one location, such as (e-)bikes, e-scooters, ride hailing, electric vehicle charging stations, and public transit.

- **Digitally Mapping New York City's Underground** (New York): partners from New York University, NYC Geospatial Information Systems and Mapping Organization, Open Geospatial Consortium, and Ginkgo have developed a subsurface infrastructure data model and map for natural disaster risk identification and mitigation measures. Underground infrastructure systems are critical to New York City, and these systems are vulnerable to natural disasters and accidental failures. However, subsurface data is not publicly accessible in an interoperable format at present.

In addition, MetroLab's **'GenAI for Local Governments'** project will consider how Generative AI technologies can help to improve city services, as well as the appropriate processes and policies that are required to ensure a just, equitable, and accurate use of this technology.

Through the Heseltine Institute, the University of Liverpool is one of two affiliate members of the MetroLab Network in the UK, creating a distinctive opportunity to learn from and collaborate with city and university partners in the United States.

Indeed, the city region's universities are already providing a similar focal point for civic innovation through leveraging their science and innovation assets to support the wellbeing and prosperity of communities across LCR. For example, the University of Liverpool's new strategic framework, Liverpool 2031, outlines how it will build on existing assets such as the Materials Innovation Factory, the Digital Innovation Facility and the Pandemic Institute to

attract jobs and investment, support business growth, and assist the transition to Net Zero. This includes ambitious plans for a **Materials Innovation Supercluster**, a **health and life sciences innovation campus**, as well as supporting the development of the Liverpool City Region **Investment Zone**. The University is also committed to helping local businesses to innovate and become more sustainable, including through the use of digital technologies, in order to support LCR in reaching its **Net Zero** targets.

As an enabling technology there is scope to use AI as a tool to extract data from large digital datasets and through modelling and mapping assist LCR policymakers to simulate policy choices and visualisation of intended and unintended consequences. For example, **Meta-Liverpool** is a visual-interface map offering a city scale ecosystem of real-time rendered virtual *communities*, *services* and *tools* that can be accessed synchronously and persistently, by a defined and potentially unlimited number of users with an individual sense of presence and with continuity of data.

4. Conclusion and questions

The recent report from the [UK Urban Futures Commission](#) emphasised the extent to which strong, sustainable rates of innovation will be critical towards regenerating the UK's core cities. Innovation, the report argues, is at the root of economic growth, helps drive up productivity and prosperity, and is essential to successfully tackling social and environmental crises. Cities have long been the wellspring of innovation, thanks to their density, diversity and dynamism. However, slow rates of growth, a succession of global economic shocks, and a long-term failure to invest are preventing the UK's cities – including LCR – from realising their full potential.

This briefing paper has outlined the particular assets and opportunities that could enable LCR to harness innovation as a key driver of productivity, prosperity, and progress. International best practice, particularly from the United States, highlights the extent to which this will require concerted investment, coordination, and a clear sense of prioritisation and purpose.

The following questions provide a basis for further discussions about the types of policy and interventions required to promote innovation in LCR:

- What does LCR need from the next government to develop key innovation opportunities further? What is the scale of investment required, how can this be unlocked, and how can this be directed to support local priorities?

- How can parliamentarians support the realisation of LCR's nationally and internationally significant innovation opportunities? Is new legislation required to unlock key opportunities? How can LCR's profile as a site of innovation potential be raised?

- How can local stakeholders collaborate and coordinate innovation activities to better address pressing policy challenges? What are the key opportunities for civic innovation in LCR that could help to deliver significant public good?

About the Heseltine Institute for Public Policy, Practice and Place

The Heseltine Institute is an interdisciplinary public policy research institute which brings together academic expertise from across the University of Liverpool with policy-makers and practitioners to support the development of sustainable and inclusive cities and city regions. The Institute has a particular focus on former industrial cities in the process of regeneration, such as the Liverpool City Region. Through high impact research and thought leadership, knowledge exchange, capacity building, and evidence based public policy, the Institute seeks to address key societal challenges and opportunities pertaining to three overarching themes: 21st Century Cities, Inclusive and Clean Growth, and Public Service Reform.

For more information visit https://www.liverpool.ac.uk/heseltine-institute/

This paper has been prepared by:

Dr Tom Arnold, Research Associate, Heseltine Institute
Dr James Hickson, Research Associate, Heseltine Institute