



Beyond 2.4%: Research and Development Investment in Liverpool City Region

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Purpose

The purpose of this paper is to provide an overview to the LCR LEP Board of the Government's ambition to increase Research and Development spending from 1.7% to 2.4% of GDP, and outline how Liverpool City Region may seek to align its priorities to take advantage of this ambition.

Recommendation

For LEP Board to work with key public and private sector partners, as outlined below, in establishing a plan to attract greater funding for Research and Development in the region. It is anticipated that such a strategic plan would form part of existing key strategies, coordinated by the Liverpool City Region Combined Authority.

Basis of the Knowledge Economy

The basis of the "knowledge economy" is the translation of knowledge (often derived from research activities) into economic value by public and private actors. Research and Development (R&D) carried out by businesses accounts for 68% of all R&D expenditure, Higher Education accounts for 23%, and government sector (including funding councils), accounts for 6%¹.

The production of this knowledge can be usefully characterised into three classes ²:

<i>Firm Specific Knowledge Bases</i>	The knowledge which a firm uses to specialise and create competitive advantage.
<i>Industry Level Knowledge Bases</i>	The broad knowledge bases which are shared by most or all firms in an industry sector, or sub-sector.
<i>Generic (Largely Scientific) Level Knowledge Bases</i>	The knowledge bases that are relevant across many industries and public activities

Firm specific knowledge tends to be technical in its construction and organisation specific so as to secure competitive advantage (it includes data, techniques, know-how, trade secrets, inventions, software, ways-of-working, consumer insights, commercial partnerships, and materials). This knowledge is not openly shared. Industry level knowledge provides no specific organisational advantage but is core to the way an industry sector functions. Generic knowledge combines "textbook knowledge", and the state of the art knowledge captured in research publications. It

¹ <https://researchbriefings.files.parliament.uk/documents/SN04223/SN04223.pdf> p.3

² Adapted from:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/451265/bis-15-321-research-and-innovation-organisations-in-the-UK-innovation-functions-and-policy-issues.pdf p.24

is an openly shared and widely accessible composite of well-known and new theory, analysis and technique.

New R&D knowledge continues to be created by individual actors, but recently there has been a growing shift towards cross-disciplinary, multi-agency 'innovation ecosystems', which draw on the distinctive contributions of different organisation to develop and exploit new knowledge. These ecosystems are often anchored on knowledge assets with unique competencies and facilities. For example, the Materials Innovation Factory combines specialised space and expertise, with differentiated equipment, to solve the commercial and academic challenges involved in delivering innovative products, whilst driving demanding and complex research innovation in academic and industrial sectors³.

In areas like Liverpool City Region, the composite innovation ecosystem is supported by a cluster of world-leading academic expertise, high quality facilities, ambitious private partners, and a public sector supported infrastructure. The production of new scientific knowledge within this ecosystem can contribute directly at a firm level to secure competitive advantage. For universities, it fulfils our core mission of delivering cutting edge research which can change lives, and in turn supports the growth of our research profile. A key consideration is how to expand the impacts of these clusters and in turn grow the benefits it brings.

For the City Region there are agglomerate benefits which flow from effective research partnerships and innovation ecosystems.

1. The combination of high-quality facilities, commercial partners, and leading academics, has a crowding-in effect which draws further public and private investment to their locations⁴. This often takes the form of commercial partnerships which bolster existing industries.
2. It nurtures, attracts, and retains, a talented workforce within the Region who in turn contribute to growing productivity and GVA⁵.
3. Along with universities themselves, partnerships between public and private bodies provide the fertile ground from which new industries can spin out and become employers and economic contributors in their own right.⁶
4. Joint industry-university collaborative research such as UKRI or Horizon funded projects or Knowledge Transfer Partnerships have proven successful in supporting business to become more efficient, improve products and

³ <https://www.liverpool.ac.uk/materials-innovation-factory/>

⁴ <https://www.ukri.org/files/about/24percent/25april2019-generate-economic-growth-through-place-based-rd-policy/>

⁵ See The University of Sheffield Advanced Manufacturing Research Centre (AMRC) who have articulated some of this benefit: <https://www.amrc.co.uk/pages/about>

⁶ https://www.brookings.edu/wp-content/uploads/2019/12/Full-Report-Growth-Centers_PDF_BrookingsMetro-BassCenter-ITIF.pdf p.45-46

processes and access and develop new markets, thus growing their overall economic contribution.⁷

5. The civic responsibilities of universities in combination with partners have often been deployed to benefit local population. For example, the Liverpool Civic Data Cooperative will both improve care services and create jobs.⁸

This is not an exhaustive list, but is illustrative of the impact that the existing ecosystem of Research and Development in areas like the Liverpool City Region can have. Although the spill-over effects will often go beyond the Region (and indeed internationally recognised research is core to the University's mission), it is important to acknowledge that geographical proximity delivers distinct benefits.

Liverpool City Region

Liverpool City Region contains expertise of international prominence. As the Science and Innovation Audit (SIA) sets out⁹, this is primarily across three areas (the SIA further sets out the assets which are aligned to these expertise):

- Infection
- Materials Chemistry
- High Performance and Cognitive Computing

These areas will in turn be key in realising the ambitions of the Industrial Strategy.¹⁰

Equally, the Mayoral Growth Plan recognises that:

“more needs to be done to help strengthen and grow the local economy through working closely with our key economic partners including the Combined Authority, LEP, Liverpool Vision, local businesses and the city's universities and research-intensive organisations.¹¹”

The knowledge economy is therefore central to the ambitions of the City and the City Region. Achieving these ambitions with our knowledge assets is not without its challenges and, as the SIA notes, this includes increasing the levels of public and private investment into the Region¹².

⁷ <https://www.liverpool.ac.uk/research/collaborate/knowledge-transfer-partnerships/>

⁸ <https://www.liverpoolcityregion-ca.gov.uk/liverpool-city-region-combined-authority-announces-proposals-for-5-3m-funding-for-data-driven-health-improvements/>

⁹ <https://www.liverpoollep.org/wp-content/uploads/2017/09/LCR-SIA-Summary-FINAL-September-2017.pdf>

¹⁰ <https://www.liverpoolcityregion-ca.gov.uk/growing-our-economy/lis/>

¹¹ <https://liverpool.gov.uk/media/1356877/mayoral-growth-may-2018-a3-spreads.pdf>

¹² <https://www.liverpoollep.org/wp-content/uploads/2017/09/LCR-SIA-full-report-and-appendices-FINAL-September-2017.pdf> p.IV

These are also issues which the higher education sector is attuned to. In particular, there is too narrow a regional spread of R&D investment (while investment in translational research is underdeveloped)¹³.

Government Ambition

The Government has committed to supporting the growth of public and private R&D spend from 1.7% to 2.4% of GDP by 2027. This commitment was made prior to the Covid-19 pandemic but, as outlined above, it's clear that the growth of knowledge intensive sectors will be key to a sustainable and inclusive recovery.

Achieving this through a mixture of public and private investment equates to a spending increase from around £33bn in 16/17 to around £70bn in 2027/28¹⁴. In their March 2020 Budget the Government outlined some immediate steps to achieve this goal which included a plan to increase public R&D investment to £22bn by 2024-25 (from around £9bn currently). The long-term measures were due to be announced in the comprehensive spending review, which has since been delayed. However, some immediate plans were put forward in the budget¹⁵ (of course subject to any change owing to the ongoing Covid-19 pandemic.)

- £400m boost in 2020/21 for world-leading research, infrastructure, and equipment, with a focus on what they call 'basic research' and physical sciences
- £300m for experimental mathematical research as a means of attracting global talent
- £800m for ARPA (the high risk and high reward research agency)
- £80m over the next five years for specialist research institutions
- Double size of energy innovation programme
- £12m for National Institute for Health Research (in 2020/21)
- Increase rate of R&D expenditure credit from 12% to 13% to attract private investment
- £200m for British Business bank for new dedicated equity investment programme.

As the LEP has considered since 2011,¹⁶ and this Government has mooted since the election, there is a direction of travel toward place-based investment. The current Covid-19 pandemic makes it important that this commitment moves toward a tangible cash investment.¹⁷ If we take in combination both the

¹³ http://www.softmachines.org/wordpress/wp-content/uploads/2019/05/ResurgenceRegionsRALJv22_5_19.pdf p.2

¹⁴ <https://www.kcl.ac.uk/policy-institute/assets/the-road-to-2.4-per-cent.pdf> p.11

¹⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/871799/Budget_2020_Web_Accessible_Complete.pdf

¹⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/32080/11-1338-rebalancing-britain-liverpool-city-region.pdf

¹⁷ <https://www.liverpoolecho.co.uk/news/liverpool-news/liverpool-facing-bankruptcy-after-governments-18173747>

increase in R&D, and a place-based rebalancing agenda, there is a unique opportunity to attract investment to the Region with co-ordinated effort.

Of course, we should not limit our ambitions to reflecting a national target, and instead consider how we become a leading environment for R&D investment both nationally, and internationally. The proposal below highlights that a key consideration is setting out the size and scale of our ambition.

The Proposal

The significance of Liverpool City Region's Knowledge Assets and industry-knowledge based collaboration will become more pronounced as we seek to rebuild our local economy post Covid-19¹⁸. The growth of the R&D sector will help build resilience through enhancing, coordinating, and networking, the assets we have with appropriate mechanisms for support.

Equally, the Government agenda, which is lining up behind greater public R&D investment, provides us with the opportunity to consider how our knowledge assets can attract further investment to the region.

Therefore, the opportunity is to find the way of coordinating this activity into a **regional strategy** to attract, and leverage, further R&D investment, and in turn grow the agglomerate benefits this brings.

This strategy should build on the strengths already within the region and can therefore be considered across three areas:

Articulation: Collating the total activity of the LCR knowledge economy into an 'innovation prospectus' for the Region. This would highlight existing strengths, and articulate specific high-level strategic goals of the LCR-CA for inward investment and their own investment focus.

Resourcing: Building on the SIA to develop an ambition for the size of the knowledge economy within the Liverpool City Region, the desired dynamics of the innovation ecosystem, and a strategic roadmap to achieve this with specific steps and areas of strategic investment focus. Align LCR funding more strongly with this strategic roadmap, and proactively partner with those knowledge economy leaders who can orchestrate significant high-quality resource and assets against the roadmap.

Mechanisms: Designing the mechanisms at a regional level which can enhance our capacity for attracting public and private investment, including from UK central government. Examples might include grant and loan support such as Strength in Places funding, joint communication campaigns in key areas, and establishing better connections between the businesses and knowledge base.

The Combined Authority is already working on a whole programme of interventions to support the City Region's business ecosystem, with a focus on

¹⁸ <https://www.liverpool.ac.uk/media/livacuk/publicpolicyamppractice/covid-19/Heseltine,Institute,Policy,Briefing,002.pdf>

networks, talent, funding, support and infrastructure for knowledge intensive businesses. Covid-19 response is providing an opportunity to shape this as an immediate response to a clear, long-term priority. This initiative dovetails neatly with an innovation agenda.

It's anticipated that the LEP, and its Innovation Sub Board, will play a key role in promoting the development of this activity.