

Creating an Emerging Economy Evidence Base



GLASGOW
CITY REGION

Contents

1.	Introduction: The Need for a New Economic Evidence Base	3
2.	Better Understanding Our Knowledge Intensive Sectors	4
3.	New Techniques – Using Economic Complexity Analysis	5
4.	New Techniques and New Datasets – Economic Relatedness	7
5.	Turning Data into Insights – How we are Creating the Evidence Base of the Region’s Economic Clusters	9
6.	Next Steps	11

1. Introduction: The Need for a New Economic Evidence Base

With emerging specialisations from MedTech to Energy Management, the diversification and transformation of Glasgow City Region continues at pace. This is the result of the evolution and adaptation of entrepreneurs, firms, and academic institutions. This triple helix approach¹, cultivated in the Region's innovation districts, has led to a thriving innovation economy². But the evidence on the detail of that evolution was previously not as comprehensive as policy makers would like.

The Region's Economic Baseline³ and Regional Economic Strategy⁴ both identified local strengths in broad industries such as Financial and Insurance Services, Information and Communication, and Manufacturing. This came from the use of traditional Standard Industrial Classification (SIC) datasets⁵. But the SIC datasets come with a variety of challenges when trying to understand how the modern economy functions – not least in terms of emerging industries, such as Quantum, and cross sectoral technologies such as AI.

This is a major problem for anyone tasked with supporting the growth of local and regional economies – particularly in places such as Glasgow City Region with relatively low business base and a need to generate more higher skilled (and therefore better paid) jobs.

So, over the last couple of years, a key focus of the Region's Intelligence Hub⁶ has been creating a granular economic evidence base of the strengths, gaps and opportunities. One that reflects the Region's actual activity, one which its business leaders, entrepreneurs and innovators understand. This evidence base is being developed utilising the latest academic thinking and economic modelling. An evidence base which can clearly identify opportunities for businesses and employment growth across the Region.

This work is already being put into practice. It is these new insights, coupled with a comprehensive series of stakeholder engagement sessions led by the Glasgow City of Science and Innovation⁷, that are providing the evidence base to support the Region's emerging Innovation Action Plan.

This briefing note provides an introduction to the work, some of its emerging findings and outlines how it will be strengthened in the coming months and years. It will be followed by a series of evidence documents which provide detail on the methodologies used and their findings. It is intended that these can be used by local and Regional policymakers to confidently make decisions on how best to develop the economy. And hopefully it will be used as a tool for beginning a dialogue with our places engaging in similar analysis.

Glasgow City Region Intelligence Hub

1 <https://www.frontiersin.org/articles/10.3389/feduc.2023.1142502/full>

2 <https://www.glasgowcityregion.co.uk/accelerating-our-innovation-economy/>

3 <https://www.glasgowcityregion.co.uk/wp-content/uploads/2022/03/210309-GCR-Economic-Baseline-final.pdf>

4 <https://www.glasgowcityregion.co.uk/wp-content/uploads/2021/12/GCR-EconomicStrategy-Final.pdf>

5 <https://resources.companieshouse.gov.uk/sic/>

6 <https://glasgowcityregion.co.uk/intelligencehub/>

7 <https://glasgowcityofscienceandinnovation.com/>

2. Better Understanding Our Knowledge Intensive Sectors

The work started a couple of years ago with a focus on more fully understanding the everyday economy (Foundational economy⁸). Through the Regional Economic Strategy (RES) Action Plan⁹ a lot of work is ongoing as to how we can improve the quality of jobs and productivity of businesses within these sectors.

The next stage has been finding ways of gaining meaningful insights into our knowledge intensive sectors – particularly those within the emerging economy.

The work has been split into two parts:

- Using new and emerging techniques of understanding how the economy functions, and
- Interpreting new datasets to explore the economy.

This has developed through a team of economists, data scientists, researchers and GIS specialists willing and able to find new ways of understanding the Region's economy.

⁸ <https://www.glasgowcityregion.co.uk/wp-content/uploads/2021/07/Foundational-Economy-June-2021-1.pdf>

⁹ <https://www.glasgowcityregion.co.uk/wp-content/uploads/2022/08/GCR-RegionalEconomicStrategyActionPlan-23August2022.pdf>

3. New Techniques – Using Economic Complexity Analysis

One of the approaches developed was based on applying the analytical framework of Economic Complexity Analysis (ECA) created by Hidalgo and Hausmann (2009)¹⁰ at Harvard University.

The Hub has developed a methodology that builds upon the ECA to identify the strongest complex (knowledge-intensive) sectors of the economy and those that may represent growth opportunities. In testing the approach, the analysis was initially conducted for Glasgow City – as noted below:

Stage 1: Examine Glasgow’s concentrations

The first stage of the analysis identified the sectors in which Glasgow City has a higher concentration of employment than Great Britain (using Location Quotient analysis)¹¹.

Stage 2: Examine Glasgow’s strengths in complex sectors

The second stage of the analysis highlighted Glasgow City’s strengths in complex sectors. Complex sectors are defined as sectors that require a high level of technology and know-how e.g., chemicals and electronics. They are important for an economy as they tend to be highly productive and pay higher wages. Using this framework, we identified a list of 22 strengths for Glasgow City.

Stage 3: Identify Glasgow’s future growth opportunities in complex sectors

The third stage identified opportunities for growth in complex sectors in which Glasgow City does not have an employment concentration. This created a long list of opportunities which was further analysed considering a variety of factors including employment size and complexity.

Stage 4: Examine alignment of opportunities relative to current industrial strengths

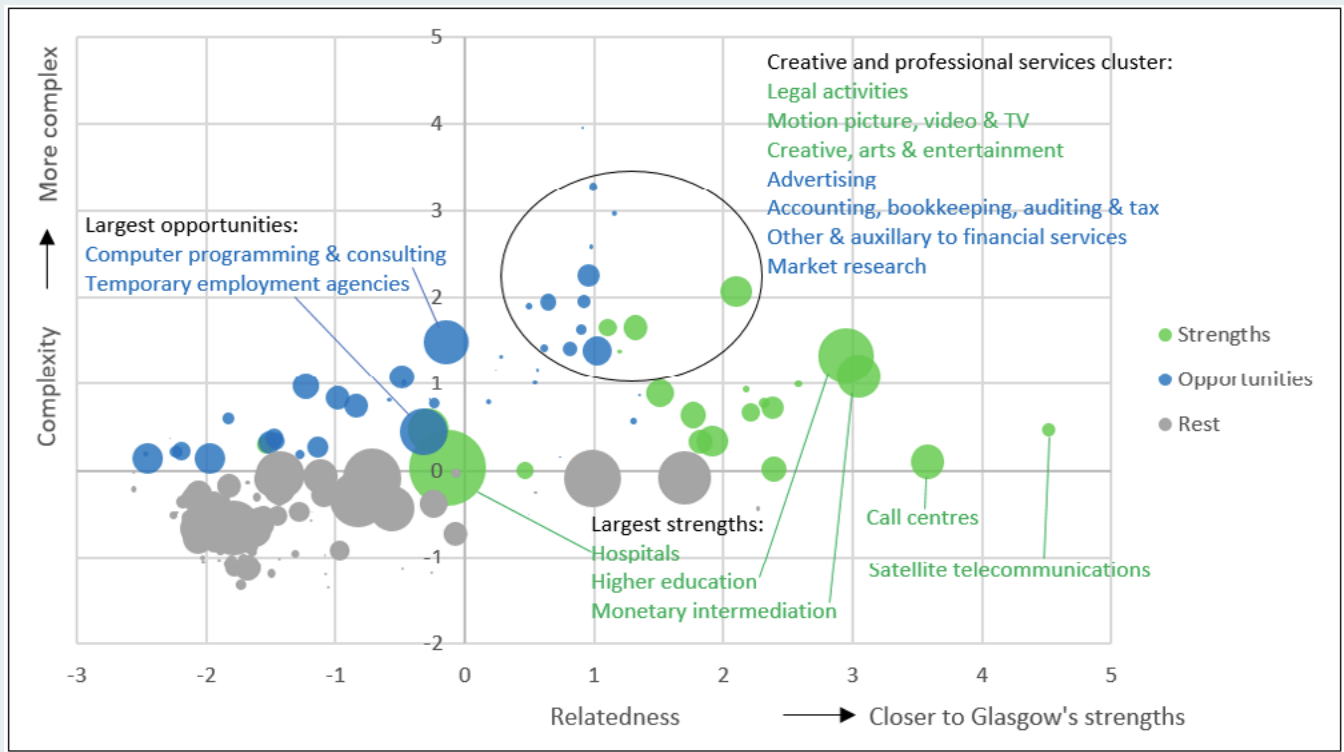
The final stage is a review of how well-aligned or proximate these sectors are to Glasgow City’s current industrial strengths. This considered a measure of relatedness between sectors and the industrial profiles of areas, which is technically defined as relative density.

An output of the work can be seen in Figure 1 below. It helps us to understand that there is a Creative and Professional Services cluster within Glasgow – and there are opportunities with sectors such as Advertising to build on existing strengths in Motion Picture, Video and TV.

¹⁰ Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the national academy of sciences*, 106(26), 10570-10575.

¹¹ LQ Definition

Figure 1: Sectors by Employment, PCI and relative density to Glasgow City



The approach has recently been reviewed and signed off by leading economists at both the Universities of Glasgow and Strathclyde to ensure that it is technically robust. Over the next couple of months, the Hub will produce a more detailed briefing on both the methodology and findings (at both Regional and local authority levels).

4. New Techniques and New Datasets – Economic Relatedness

The ECA analysis is already proving incredibly powerful. It has helped policy makers better understand trends and opportunities within the economy. But it has been developed using SIC codes and so, it does not capture emerging economy sectors such as FinTech and BioTech. Moreover, it does not reflect how investment and innovation is occurring in the Region. For instance, Precision Medicine firms¹² (not a SIC code) within the Region have received major investment in recent years – but they are multidisciplinary. As well as studying the link between genomes, disease, and medicine they are doing so using a wide range of techniques and resources such as account digital pathology, radiology, AI and machine learning, and enabling integrated diagnostics.

Research in technological and sectoral relatedness shows this movement towards tighter connections between sectors in the modern economy – something which SIC codes do not show.

Sectoral relatedness analysis can have significant effect on the way we understand supply chains and can help policymakers identify economic clusters, better target business support and help identify future skills needs.

So, the Hub has been using company data from Data City¹³, a platform which classifies companies based on what they say they do in their website using a language recognition algorithm. The platform processes the website text data for 1.6 million companies across the UK. They have created over 350 Real-Time Industrial Classifications (RTICs) to reflect the emerging economy, and so encompass the likes of FinTech, Precision Medicine and Photonics.

Stage 1: Using Real Time Classifications

RTIC classifications are not categorical and mutually exclusive, meaning that a company can be classified in more than one sector or industry vertical at the same time. For example, if a company develops Internet of Things (IoT) products that use Artificial Intelligence technology, this company will be classified both in the IoT and Artificial Intelligence RTICs. This is an indication that a company works in two fields at the same time and serves as a bridge between sectors.

Stage 2: Mapping supply chain links across RTICS

The data can be used to map supply chains for sectoral relatedness and identify how different sectors or nodes of activities are related to each other. This suggests potential for knowledge and technology transfer, social collaboration or supply chain activities

¹² <https://www.investglasgow.com/ecosystem/clusters/healthtech-precision-medicine>

¹³ <https://thedatacity.com/rtics/>

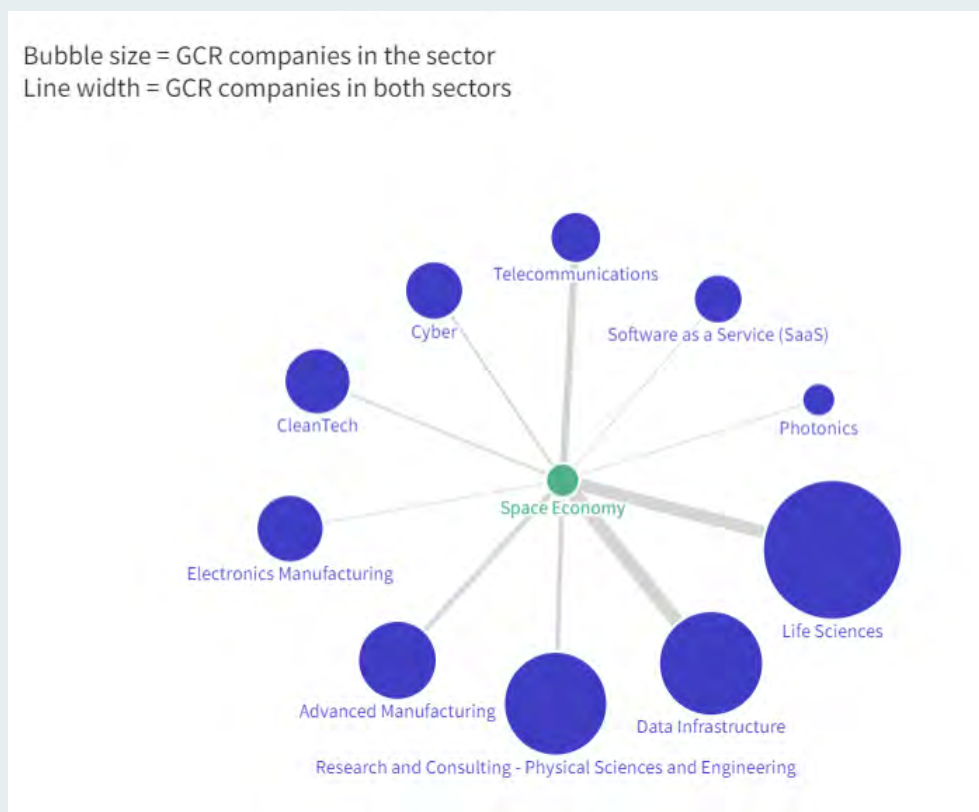
Stage 3: Visualising the links

Network maps can be created to represent different RTICs and the relationship between them. The size of the circle represents the total number of companies in this RTIC in Glasgow City Region. The width of the links represents total number of companies that have been classified in two RTICs or more at the same time.

Figure 2 represents the relationship between Glasgow City Region’s Space Economy and other sectors of the Region’s economy. As shown, it is evident that Space Economy has strong links with Life Sciences, Data Infrastructure and Telecommunications.

Again, a further briefing will be produced that outlines the methodology in more detail.

Figure 2: Space Economy Relatedness



5. Turning Data into Insights – How we are Creating the Evidence Base of the Region’s Economic Clusters

The Hub is using these tools and techniques to support partners across the Region who are developing the emerging Regional Innovation Action Plan. The Action Plan is being developed with Innovate UK and is due for launch at the end of the summer.

These datasets and techniques are being combined, with others such as the Glasgow Tech Ecosystem Platform¹⁴, Higher Education Statistics Authority data and analysis on the evolution of firms with sectors. By doing so, the Hub is ensuring that the Action Plan is informed by a thoroughly robust baseline of its existing and emerging cluster strengths. The key components of the baseline can be seen in Figure 3.

Figure 3: Cluster Baseline – Measurement and Components

<i>Key Components</i>	<i>Measurement Approaches</i>
Sectoral Strengths	<ul style="list-style-type: none"> • LQ Analysis • Network Analysis / Relatedness
Investment	<ul style="list-style-type: none"> • Funding into sectors – Innovate and institutional • Specialist investors / VCs
Skills	<ul style="list-style-type: none"> • Course and HESA LQs • HESA data – graduate retention
Institutions	<ul style="list-style-type: none"> • Institutions – research and spin offs • Innovation bodies / agencies
Enabling Infrastructure	<ul style="list-style-type: none"> • Incubators and accelerators • Tech/science parks & districts • Tech transfer infrastructure
National Policy	<ul style="list-style-type: none"> • Sectors supported by national policies and strategies

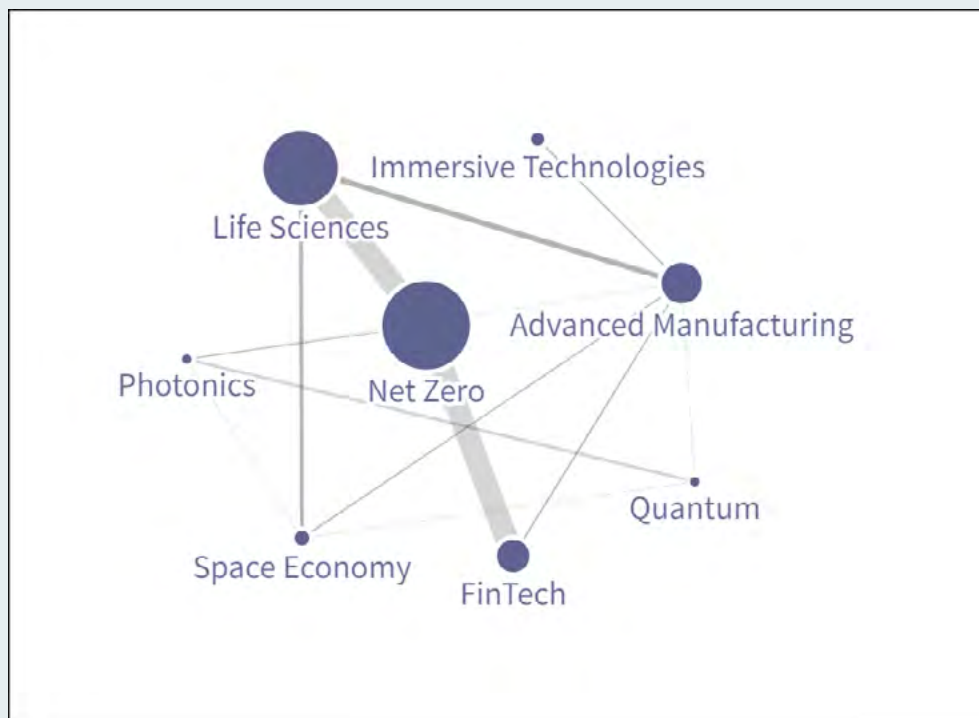
¹⁴ <https://glasgow.dealroom.co/intro>

Emerging Findings

The work will continue over the next month or so, but it is already yielding some insights which highlight the evolving strengths of the Region's economy.

The diversified and changing nature of the economy can be seen through analysis on the firm level strengths, growth, and investment.

- **Sector Concentrations:** recent analysis shows that Glasgow City Region is leading the way in a wide variety of emerging economy sectors. For instance, **in Energy Management and Internet of Things, the Region outperforms all of the other UK Core City Regions¹⁵ and the likes of Edinburgh and South East Scotland City Region in terms of concentration of firms.**
- **Growth of Firms:** the success of the Region's innovation eco-system can be seen through the rapid growth of firms in a wide variety of sectors. **Over the past five years, MedTech and Immersive Technology firms in the Region have grown by 43% and 54% respectively.**
- **Firm Level Investment:** this growth can be seen in investment within the Region. Investment in firms in the Space and Fintech sectors have attracted over £700m in funding in recent years.
- **Sector Relatedness:** a review of different firms has been conducted to map relationships between them. This might be in the form of collaboration/knowledge transfer or supply chains. The chart below highlights some of the connections between some of the Region's key sectors.



¹⁵ Due to their similar economic geographies and histories, the Region compares itself with Cardiff Capital Region, Greater Manchester, Liverpool City Region, North of Tyne, Sheffield City Region, West Midlands, West of England and West Yorkshire regions.

6. Next Steps

The work will continue as the baseline for the Innovation Action Plan is finalised. It will be updated periodically to inform any adjustments and updates as the Action Plan is delivered.

As well as the quantitative analysis, the evidence base will be strengthened by qualitative research through engagement with local businesses. As noted above, this is already taking place for the Innovation Action Plan via the Glasgow City of Science and Innovation. And similar types of engagement will become a regular component of the Regional team's work.

As well as understanding better the Region's economy, the analysis will also be applied at a local level to help local authority partners better understand the strengths with their areas.

Steps are being taken to engage beyond the Region with others who are conducting similar analysis. The aim is to share best practice with other national, regional and local organisations conducting similar analysis.

