Scotland's Productivity Challenge: Exploring the issues – 2025

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Abstract

This paper updates the key data shaping the productivity performance for Scotland. The presentation is organised around the broad research themes of The Productivity Institute and draws comparisons with other UK regions and internationally. The refreshed paper updates its findings within the context of the six capitals framework, including a new look at environmental aspects falling under 'natural' capital. Section 3 presents the broad productivity and intraregional trends. Sections 4, 5 and 6 collect evidence on productivity drivers and presents the policy landscape. The last section outlines some of the key issues for Scotland as they emerge from the analysis.

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1 Overview: The six capitals framework and Scotland's Productivity Landscape

Productivity is the single most significant driver of economic growth, living standards and societal wellbeing. It represents the efficiency with which inputs like labour and capital are converted into outputs, such as goods and services. Productivity underpins higher living standards; public services funding; innovation and competitiveness; regional resilience; and achieving net zero goals. For Scotland, improving productivity is not just an economic imperative but a pathway to achieving broader social and policy goals, including job creation, reducing inequality, and advancing sustainability. Scotland's productivity performance between 2019 and 2024 has been shaped by significant global and domestic events, notably the impact of the COVID-19 pandemic, Brexit, the ongoing cost of living and climate crises, and Russia's invasion of Ukraine. These factors, combined with Scotland's long-standing challenges around business growth, skills gaps, and regional productivity disparities, have created both hurdles and opportunities. Nevertheless, Scotland's productivity has continued to outperform other regions of the UK between 2008-2023, recording an average annual labour productivity growth of 1.0%, compared with an average annual growth of 0.4% for the UK as a whole, and 0.8% for the EU.[1] As such, this paper updates the key figures from the 2021 insights paper, and expands the notion of productivity using the six capitals framework. These six capitals – Financial, Public/Infrastructural, Intellectual, Human, Social, and Natural – serve as critical pillars of understanding Scotland's productivity:

1. Financial Capital: The availability of financial resources, investment levels, and access to credit remain crucial to enhancing productivity. While investment in sectors like finance and technology has been strong, underinvestment in areas such as Research and Development (R&D) and digital infrastructure continues to limit broader productivity gains.
2. Public / Infrastructural Capital: Scotland's infrastructure, including transportation networks, energy systems, and housing, plays a critical role in productivity. Recent investments in green infrastructure, digital networks, and housing have been crucial in addressing Scotland's long-standing productivity challenges, particularly in rural areas.
3. Intellectual Capital: Scotland's higher education sector remains a key driver of productivity, particularly through its contributions to research and innovation. However, innovation - as measured by the number of new products and business processes - has lagged the UK average, underscoring the need for better integration between universities and the business sector.
4. Human Capital: Scotland boasts one of the most educated workforces in the OECD, with high levels of tertiary education and skills. However, significant regional disparities exist, with areas like Glasgow continuing to report high levels of working-age individuals

[1] Scottish Government, Labour Productivity Statistics 2023: https://data.gov.scot/labour-productivity-2023/

with no formal qualifications. Skills shortages, particularly in digital and technical fields, have been exacerbated by the pandemic, and labour market disruptions continue to affect productivity.

5. Social Capital: Scotland's emphasis on Fair Work practices and inclusive growth, particularly through programs like the Fair Work Convention, have highlighted the importance of strong leadership, employee engagement, and workplace innovation. However, further improvements in management practices across businesses are needed to capitalize on these initiatives.
6. Natural Capital: Scotland's abundant natural resources, particularly in renewable energy (wind, hydro, and tidal power) can position Scotland as a leader in the transition to a green economy. Investments in Natural Capital not only help meet climate goals but also boost productivity by creating new jobs in green industries and reducing reliance on traditional fossil fuels.

Reflecting upon Scotland's productivity performance is a story of puzzles and apparent contradictions, with strength in some areas but below average performance elsewhere.

For example, Scotland has success in high productivity sectors such as energy and finance. With its renowned group of world-leading Universities it also has one of the most educated workforces in the OECD. It is near the top of countries in Europe for the proportion of working age population (25 to 64) with a tertiary education.

At the same time, Scotland continues to have a higher percentage of adults without any qualification (8.2%), in comparison to England (6.2%) as of 2023. It does fare better than Wales (8.6%) and Northern Ireland (12.3%) However, Glasgow remains in the bottom 10 U.K cities for the highest percentage of its working age population with no qualifications (11.9% - 5th worst) [2].

Like other parts of the UK, whilst employment growth has been strong in recent years, most of this growth since 2009 has been in the (relatively) low value-added service sector.

The business ecosystem in Scotland lacks a critical mass of large scale-ups. This impacts a range of outcomes, including export performance – with around 100 companies accounting for 60% of Scottish international exports. These issues have been exacerbated by the impacts of Brexit and the COVID-19 pandemic, with the estimated value of Scotland's international exports remaining 11.5% lower than before the pandemic[3]. A significant challenge is the persistently low rate of business start-ups, which lags the rest of the UK by 150 companies per 10,000 residents. Like the rest of the UK, the majority of Scotland's business base is clustered at low levels of productivity. Highly productive firms are concentrated in the knowledge intensive service industries, but they account for a small number of employment and employers

[2] ONS, No qualifications (Education and skills): https://explore-local-statistics.beta.ons.gov.uk/indicators/aged-16-to-64-years-with-no-qualifications-great-britain

[3] Scottish Government, Exports statistics Scotland 2021: https://www.gov.scot/publications/exports-statistics-scotland-2021/

report various skills gaps that hold back their growth potential.

Another area for improvement is in investment. Levels of private investment in the Scottish economy are typically lower than in the best performing countries. In areas such as Research and Development (R&D), expenditure has been chronically low in comparison with the OECD and below the UK average. Again, there are puzzles here. Scottish Universities contribution to R&D is among the best in the OECD, but this has yet to translate into a step-change in innovation in the Scottish economy. Indeed, in the most recent 2023 UK Innovation survey, Scotland lags the UK in key metrics of innovation (from new products and processes to workplace innovations) [4]. If anything, performance has deteriorated over the last decade.

One driver of innovation is the adoption of digital technologies. Research identifies a strong link between the digital technology and firm productivity. Evidence indicates a low degree of digital penetration in the Scottish business sector. Businesses report gaps in employee digital skills – crucial for the ecosystem to engage fully and reap the benefits from digital transformations. Strong leadership and management practices are strongly correlated with firm productivity and are a key enabler of technology adoption and IT engagement. More broadly, there is a growing recognition that quality of management and employee engagement are crucial for Fair Work and Workplace Innovation – key priorities of the Scottish Government.

Beyond this national picture, large variations have emerged at a regional level within Scotland.

Looking at output per hour (city of Edinburgh) is £49 compared to £28.6 in the worst performing region (Na h-Eileanan Siar). Edinburgh built out its advantage over 20 years compared to all other regions, including cities as Aberdeen (at £38.3) and Glasgow (£36). To put these differences into perspective, a hypothetical rise in productivity of lagging Scottish regions to the national average (£38.5), would yield an additional £539.18 for every person in Scotland[5][6].

From a productivity perspective, the Scottish economy can be best understood as having four quite distinct regional dimensions which shape outcomes: i) the North-East,

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[4] UK Government, UKIS 2023: Report. 6.2, Spatial distribution of innovative businesses.

[5] Method: $\sum nECONTACTn * HOURS\ WORKED * \sum n(AVG - GVAn)/TOTPOP$

Where:

- $\sum nECONTACTn$: The sum of economically active population across underperforming regions
- $HOURS\ WORKED$: Total hours worked by the economically active population
- $\sum n(AVG - GVAn)$: The sum of the differences between the average GVA and the GVA of each underperforming region
- $TOTPOP$: Total population of Scotland

[6] Data for calculation: ONS, Annual regional labour productivity: https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/datasets/annualregionallabourproductivity

including Aberdeen, with the dominance of its high value oil-and-gas sector, ii) Edinburgh and surrounding areas (Eastern Scotland) with its strong finance, public sector and professional services sector; iii) Glasgow and the Central Belt (Western Central Scotland) with a mix of sectors and areas recovering from post-industrial decline, iv) the rural and island areas (Highlands and Island and Southern Scotland).

These differences in productivity levels reflect, in part, the nature of growth in cities, the industrial make-up of each region and geography. It is puzzling that Glasgow, a big city itself,suffers from chronic low productivity in comparison to Edinburgh. Output per hour continues to be higher (36.1%) in Edinburgh compared to Glasgow. A reasonable hypothesis that may explain the disparities in intraregional productivities is the dynamism of certain local economies (Edinburgh and Aberdeen) in comparison to other parts of the country. Evidence suggests that Edinburgh and Aberdeen perform better on metrics such as R&D within businesses, business start-up rates, qualified workforce employed, and exporting activity compared to most other cities and regions.

Improving Scotland's productivity performance has been a policy objective of successive governments in both London and Edinburgh. Under devolution, responsibility for improving productivity is shared across different tiers of government. In recent years, there have been criticisms that the policy landscape to support the economy, and improvements in productivity, is cluttered. There have been numerous "strategies" and "action plans" but arguably less focus upon delivery, implementation and evaluation of "what works".

Key macroeconomic, industrial, innovation and fiscal levers are controlled by the UK Government. This includes key drivers of productivity such as business tax policies, policies to support internationalisation, access to finance and regulatory lever. Specific policy initiatives, such as the Industrial Strategy and Levelling-Up agenda, will see resources specifically targeted at key sectors and regions within Scotland with the aim of helping to boost productivity.

In contrast, the Scottish Government controls more of the microeconomic levers to support productivity. This includes the education and skills system, support for business start-ups and broader economic development, infrastructure, and small business growth. Delivery of policy in these areas is often devolved to arms-length agencies, such as Scottish Enterprise, Highlands and Islands Enterprise and Skills Development Scotland. The 2015 Scottish Government Economic Strategy sets out an ambition to reach the top quartile of OECD countries on productivity as part of its ambitions around inclusive growth and a focus upon a wellbeing economy. Local government too as a role to play, particularly around planning and through City and Regional Growth Deal.

Figure 1. Scotland at a Glance, 2023.

2 Introduction

Productivity in the UK has stagnated since the onset of the financial crisis of 2007-2008 and has since become a serious drag on the UK economy, impacting economic growth and living standards for more than a decade. Addressing the UK productivity challenge is a matter of national priority, especially in the current context where fresh challenges have been brought about by the COVID-19 pandemic, the intensification of global competition and the rebalancing of the economy following Brexit and international & geopolitical shocks. Responding to the productivity challenge and recognising the importance of the regional disparities of productivity across the UK, the Productivity Institute was established to advance our understanding of productivity stagnation and propose national and regional solutions to restart productivity growth across regions and nations. Eight Productivity Forums (PFs) are tasked to develop the productivity agenda and deliver bespoke solutions in the UK regions.

Productivity impacts everyone in Scotland. It affects pay and benefits providing citizens more money to spend, the creation of new jobs, business growth and profits, the quality of public services, pensions and health service. The agenda of Scotland's RPF is to continue to identify the productivity gaps, analyse the causes, and collaborate with the business and policy communities to develop and deliver targeted interventions to boost productivity. Steps have been taken towards this, with a new memorandum of understanding signed with Prosper in 2024, and the building of closer working relations with private sector partners at Scottish Enterprise, the Women's Business Centre and more.

Unlocking the productivity potential will allow Scotland to create a stronger more resilient economy in Scotland, especially for those currently so badly affected by the impacts of COVID-19 and the ongoing cost of living crisis. Scotland has an ambition to build back a prosperous economy by adopting a progressive approach as framed by the Sustainable Development Goals. Harnessing the power of diversity to transform existing thinking, open exciting possibilities and establish an environment where radical, step-change innovation thrives. Scotland has a highly skilled workforce to provide the talent and leadership required to achieve this ambition and secure Scotland's economic future.

This paper updates the key data shaping the productivity performance for Scotland. The presentation is organised around the broad research themes of The Productivity Institute and draws comparisons with other UK regions and internationally. The refreshed paper updates its findings within the context of the six capitals framework, including a new look at environmental aspects falling under 'natural' capital. Section 3 presents the broad productivity and intraregional trends. Sections 4, 5 and 6 collect evidence on productivity drivers and presents the policy landscape. The last section outlines some of the key issues for Scotland as they emerge from the analysis.

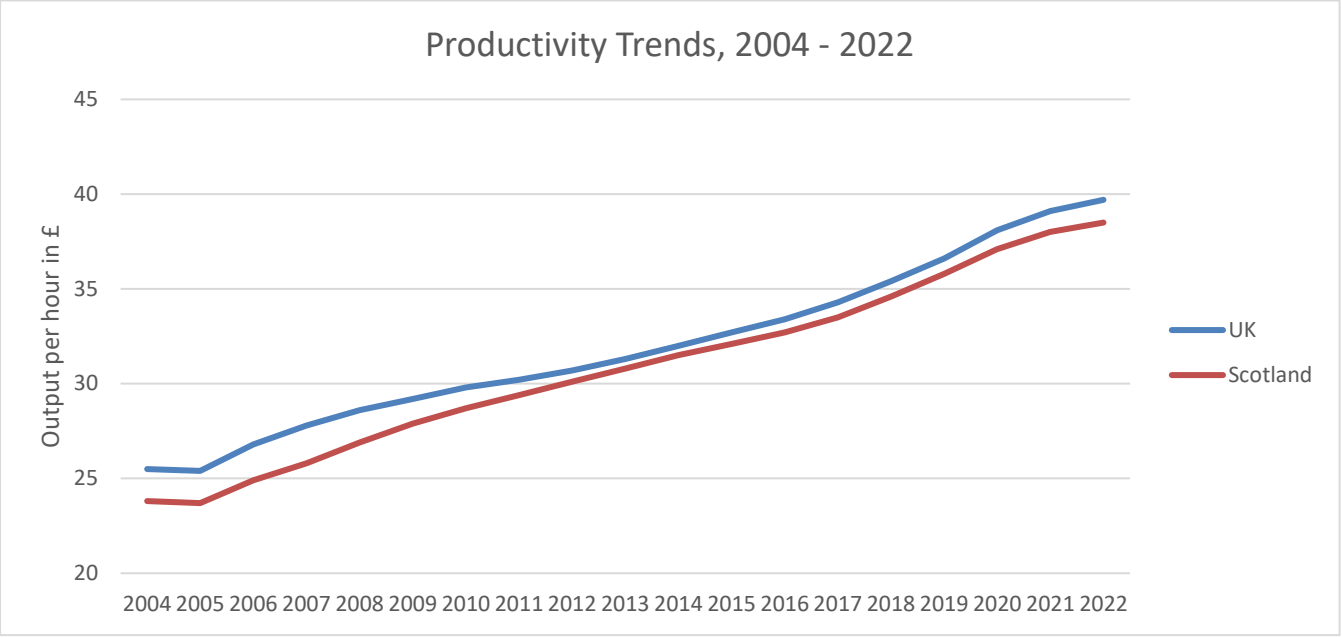
3 Productivity Trends

3.1 Scotland's Productivity Picture

Scotland has, over the last two decades, significantly closed the gap in productivity levels with the UK average (Figure 2). Real output per hour in Scotland as per available data from the ONS in 2022 was £38.5 in comparison to £39.7 in the UK. Scotland had outperformed all regions of the UK in the 2004-2019 period, recording an average growth of real output per hour of 1.52% per annum. Despite this solid performance, Scotland's productivity, like many other UK regions, remains below the UK average, and sits 3rd of the UK's twelve regions for productivity performance as of 2022. (Figure 3) reflects this, highlighting Scotland's continuing performance close to the UK=100 index. This is far below London, as the UK's most productive region, but higher than lower-performing regions like Northern Ireland.

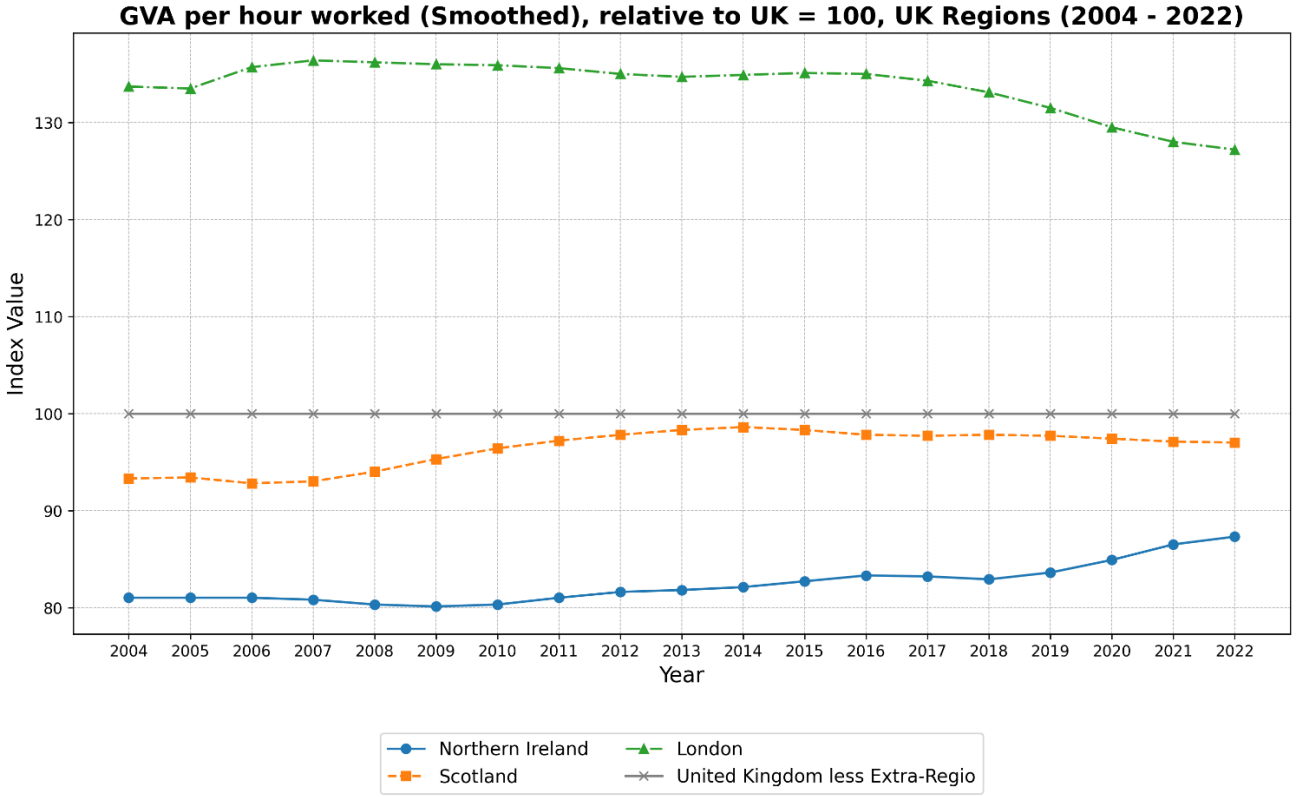
This progress has been halted, during the last decade, where productivity growth in Scotland, mirroring the rest of the UK, has been very weak, registering a 1.0% annual increase in the 2008 to 2023 period. Scotland's on-going ambition, formally stated in 2007 by the Scottish Government, is to be in the top quartile of OECD countries for productivity. However, Scotland's OECD ranking in productivity has barely moved since 2000 and sits below the median OECD productivity (Figure 4). To reach this ambitious goal requires an increase in Scotland's productivity by over 30% – a growth performance that has never been achieved by an advanced economy (except for Ireland).

Figure 2. Productivity trends, 2004 - 2022



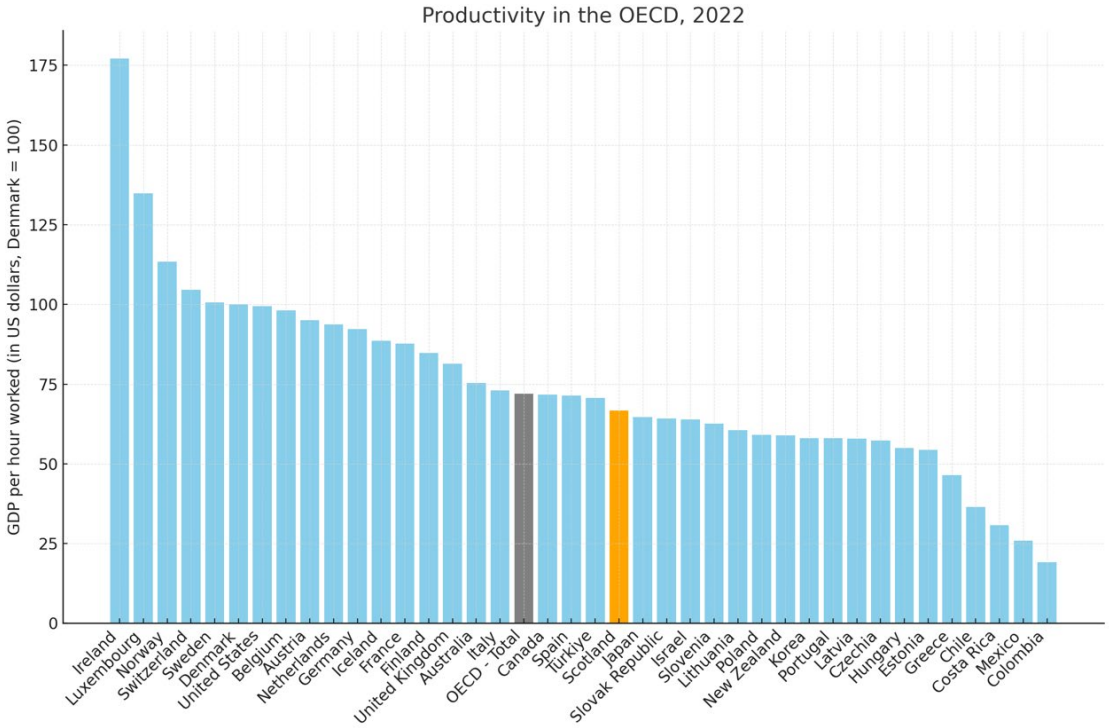
Source: ONS, Scottish Government

Figure 3. GVA per hour worked (smoothed), relative to UK =100, UK regions



Source: ONS

Figure 4. Productivity in the OECD & Scotland compared, 2022



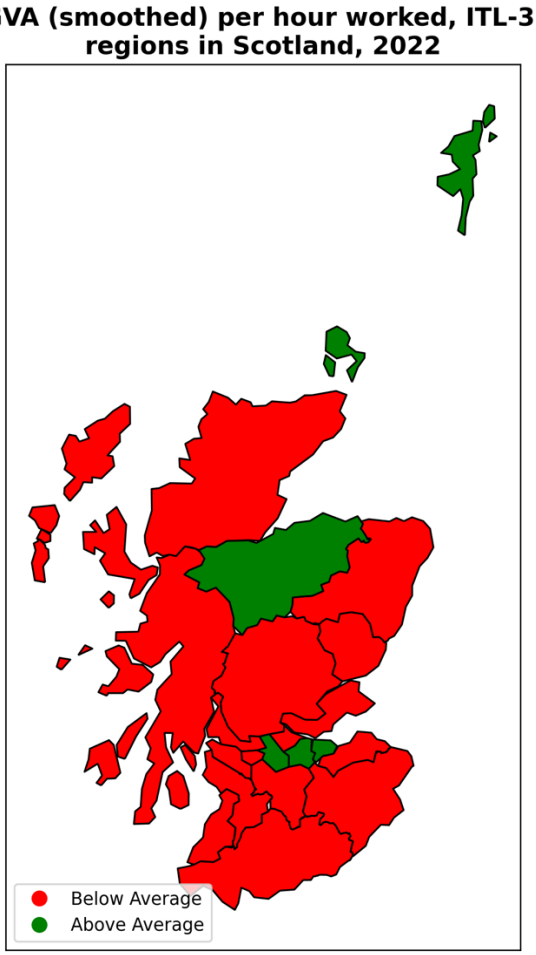
Source: ONS

Figure 5. GVA (smoothed) per hour worked, ITL-3 regions in Scotland, 2022.

2022 GVA per hourworked	ITL-3 region	Above or below Scotland ITL-3 2022Average
49.0	City of Edinburgh	Above
46.2	Orkney Islands	Above
41.6	West Lothian	Above
40.7	North Lanarkshire	Above
39.9	Shetland Islands	Above
38.6	Inverness and Nairn, Moray, Badenoch and Strathspey	Above
38.5	Scotland ITL-3 Average	
38.4	Caithness and Sutherland, and Ross and Cromarty	Below
38.3	Aberdeen City and Aberdeenshire	
37.8	Perth and Kinross, and Stirling	Below
37.7	Lochaber, Skye and Lochalsh, Arran and Cumbrae, and Argyle and Bute	Below
37.6	Clackmannanshire and Fife	Below
36.8	Falkirk	Below
36.2	South Lanarkshire	Below
36.0	Glasgow City	Below
35.9	Dumfries and Galloway	Below
35.7	East Dunbartonshite, West Dunbartonshire, and Helensburgh and Lomond	Below
35.6	East Ayreshire and North Ayreshire mainland	Below
34.7	Angus and Dundee City	Below
34.7	Inverclyde, East Renfrewshire, and Renfrewshire	Below
34.4	East Lothian and Midlothian	Below
33.2	South Ayreshire	Below
33.0	Scottish Borders	Below
28.6	Na h-Eileanan Siar	Below

Source: ONS & TPI Dashboard: Scotland

Figure 6. GVA (smoothed) per hour worked, ITL-3 regions in Scotland, 2022



3.2 Regional Disparities

Disparities in the productivity levels of Scottish regions are significant (Figures 5 & 6). Output per hour in Edinburgh is £49 compared to £28.6 in Na h-Eileanan Siar. This reflects, in part, the nature of growth in cities, which benefit from a concentration of economic activity. Only six regions in Scotland were above the Scotland ITL-3 regional average in 2023, down from eight in 2019. In the period 2004 to 2022, 11 out of 23 regions experienced faster (total) productivity growth than Scotland as a whole. The dispersion in output per hour within Scotland's regions is relatively high amongst the devolved nations and UK regions. Comparing productivity levels, the City of Edinburgh has systematically featured in the top three performing regions. While Perth and Kinross and Stirling have entered the top three since 2013, Aberdeen has dropped out since 2018. The Scottish borders feature consistently in the bottom three regions since 2004. These regional disparities have a counterpart in the performance of productivity in the business sector. Analysis by the Office for National Statistics (ONS) describe average regional productivity as stemming from two sources, 1) firm productivities

within industries–firm productivity effect, and 2)industry mix effect[7]. The exception is Northeastern Scotland which shows a higher level of productivity relative to the Great Britain average, due to the high concentration of productive firms in the large oil and gas sector in Aberdeen.

A reasonable hypothesis that may help explain the wide disparities in intraregional productivities evidenced in Figure 5 is the dynamism of the local economies around the cities of Edinburgh and Aberdeen in comparison to the South and West-Central regions. Evidence from the City regions suggest that the former perform better on metrics such as R&D within businesses, business start-up rates, qualified workforce employed, and exporting activity compared to most other cities and regions[8]. Whilst the oil and gas sector has pulled up Scottish productivity performance in the past, emerging trends in green energy–as well as the recent decline in oil prices–paint a more nuanced picture going forward with challenges and opportunities. Evidence from the ONS suggests that the region and sector has been shedding jobs since 2014.

4 Intellectual, Human and Social Capitals

4.1 Productivity drivers in Scotland

Scotland, like the rest of the UK, rapidly created jobs, reducing its unemployment rate from 8.8% in 2010 to 3.5% in Q4 of 2019. Robust employment growth in the period 2009 to 2019 mostly materialised in Scotland's (relatively) low value-added service sector. However, unemployment has increased from 2019, reaching 4.4% in Q2 of 2024 - an increase of 0.9%[9]. This rise can be attributed to several factors, including the continuing economic impacts of the COVID-19 pandemic, which severely disrupted key service sectors which drove the initial employment growth such as tourism, retail, and hospitality, and negatively impacting the number of people who are economically inactive due to ill-health. Additionally, the ongoing cost-of-living crisis and global supply chain challenges have put added pressure on businesses and consumers. Recent inflationary pressures, coupled with rising interest rates, have also created a challenging environment for both employers and job seekers, contributing to a sluggish post-pandemic labour market recovery in Scotland.

Between 2019 and 2022, several industrial sectors performed better in terms of productivity growth compared to the UK average. But jobs creation has largely skewed

[7] Non-financial business sector. The Firm Productivity Index shows the average level of productivity in a region (relative to the national average) and is designed to demonstrate the effect of the firm level productivities on the region's estimated average aggregate productivity. The Industry Composition Index shows the average level of productivity in a region (relativeto national average), assuming the productivity of each industry in that region equals nationwide average productivity for that industry; this is designed to demonstrate the effect of the industry composition on the region's estimated average aggregate productivity.

[8] Data available from the Scottish Government: https://www.gov.scot/publications/city-regions-summary/.

[9] Statista, D. Clark (Aug 2024). 'Unemployment rate in Scotland 1992-2024': https://www.statista.com/statistics/367727/unemployment-rate-scotland/

away from most productive sectors (Figure 7) and has mostly continued to be concentrated in low value-added sectors. Only four out of the high performing sectors have experienced robust jobs growth during the same period: *Information and communication, Professional, scientific and technical services, Administrative and support service activities, and Real Estate Activities.* Interestingly, *Health and Social work* has slipped out of the top four highest performing sectors, reflecting a continued lack of investment in the NHS and in public service provision. Further, two extreme examples highlight the mismatch between jobs growth and productivity growth: *Manufacturing* is a highly productive sector but loses the most jobs, whilst *Real estate* experiences robust jobs growth at the backdrop of negative productivity growth.

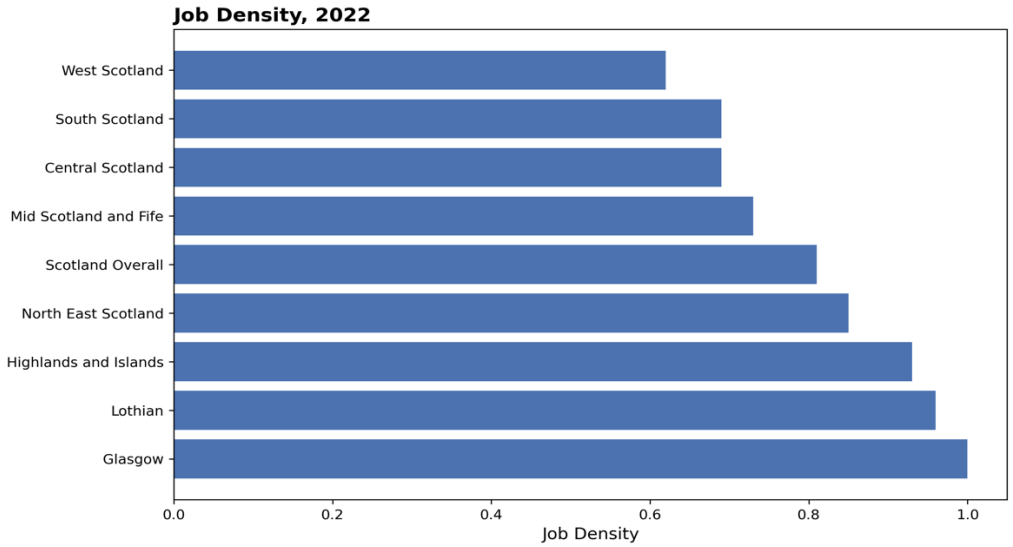
Despite the overall low unemployment rate, job opportunities are unevenly distributed across regions. The number of jobs as a proportion of economically active 16-64 population varies significantly between regions (Figure 8), with the West and South Scotland being the worst performing regions.

Figure 7. Annual employment growth and annual productivity growth by sector, 2019-2022.

The colour key shows the strength of the growth in employment and productivity by industry. Green shows the sectors experiencing the strongest growth over the period, while red shows those experiencing the weakest growth. The more vibrant the colour (in terms of red and green), the stronger the growth.

Source:ONS,, Scottish Government

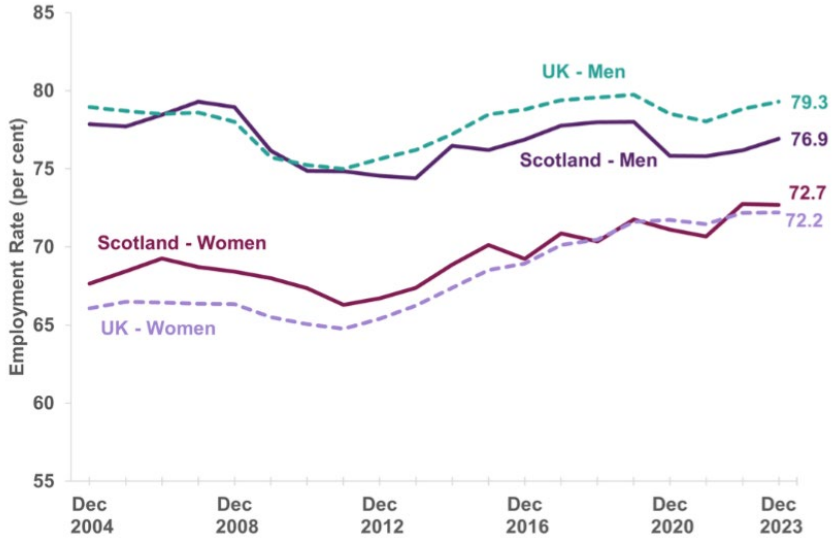
*Figure 8. Jobs density, 2022. (**Job density) = Number of jobs as a proportion of economically active 16-64-year-olds).***



Source: ONS, Scottish Government

The overall rise in unemployment outlines interesting differences across different groups and cohorts in terms of labour market outcomes. Whilst the gender employment gap (difference between the employment rates for men and women) had decreased from 6.3 percentage points in 2019 to 4.2 percentage points in 2023, a much greater proportion of women are in part time jobs (41.2%) compared to men (12.4%). Further, employment for men in Scotland as of December 2023 was 2.4% lower than the employment rate for men in the UK, while the employment rate for women was 0.5 percentage points higher than the UK rate, as outlined in Figure 9. This has several possible explanations, from a closing skills gap between men and women in Scotland, to economic inactivity being concentrated in men. Future research should follow this trend closely to gain a clearer insight into why this is happening.

Figure 9. Employment rates by sex, Scotland and the UK (2004 to 2023)



Source: Annual Population Survey, Jan-Dec datasets, ONS

The employment rate for the disabled population was 52.7% in 2023, up from 49.0% in 2019, but still significantly lower than the employment rate for those not classed as disabled (83.0%). The employment rate for the minority ethnic population aged 16 to 64 rose to 62.0% in 2023 from 59.3% in 2019, significantly lower than the white population employment rate of 75.8%.

As of June 2024, the youth unemployment rate (10.0%) in Scotland is comparable to the UK rate (11.0%), and slightly up from 9.7% in 2019[10]. Moreover, those in the 16-24 group are predominantly concentrated in Retail, Wholesale, Motor Trades, and Food and Accommodation services. The severity of the COVID-19 shock that has hit most

[10] Scottish Government, Labour Market Statistics for 16 to 24 year olds: Scotland and the United Kingdom – July 2023 to June 2024: https://www.gov.scot/publications/labour-market-statistics-for-16-to-24-year-olds-scotland-and-the-united-kingdom-july-2023-to-june-2024/pages/unemployment/

businesses in those sectors suggests a potentially significant continuing decline in employment opportunities for young people.

The UK has one of the most educated workforces in the OECD, with Scotland performing extremely well compared with other U.K regions. As of 2022, it performs 2nd best of the 12 UK ITL1 regions, with 54.2% of its working age population having qualification at NVQ4+ level ("high skill"), compared with 42.4% on average across the other 11 regions. Indeed, only London at 58.9% scores higher in this metric than Scotland. However, there is significant regional variation, with Edinburgh having by far the highest "high skill" percentage with 73.2%, whereas areas like North Lanarkshire continue to lag the U.K average at 38.2%[11][12]

Around one in three adults (1.5 million) in Scotland in 2022 were graduates (SCQF Level 9+), representing an increase of 334,200 (28.67%) since 2011[13]. Nevertheless, regional disparities are significant; for example, in North Lanarkshire this share is only 23%. At the same time, Scotland has a higher percentage of adult population without any (9.6%) qualification, in comparison to the UK (7.9%), even though this share has been steadily declining since 2004. Glasgow is in the bottom 10 UK cities with the highest percentage of working age population with no qualifications (11.9%). Differences in the proportion of qualifications seem to have a counterpart in the productivity performance of council areas. On average, council areas with a high proportion of residents with low or no qualifications tend to perform worse in terms of economic output and productivity.

4.2 Institutions, governance, and strategic ambitions: Scotland's Productivity Landscape under Devolution

Under devolution, Scotland's productivity policies are split between the Scottish and UK governments, creating a complex system, particularly after expanded fiscal powers in 2016. Key productivity levers like macroeconomic policy, business taxes, and internationalisation are still managed by the UK government in Westminster, while the Scottish government oversees microeconomic tools such as education, skills, infrastructure, and small business support from Holyrood. Scottish agencies like Scottish Enterprise and Skills Development Scotland, along with local councils, implement many of these policies.

The overlapping responsibilities often require coordination between Edinburgh and London, with mixed success. While collaboration in Higher Education is effective, other initiatives like Freeports have faced challenges. The Scottish budget also remains largely independent on the UK's block grant. The upcoming UK Shared Prosperity Fund may further complicate this landscape, allowing the UK government to spend directly in devolved areas like infrastructure. It also remains to be seen how the new Labour government's initiatives will affect Scotland's devolved productivity landscape. Figure 10 demonstrates the differences between the reserved

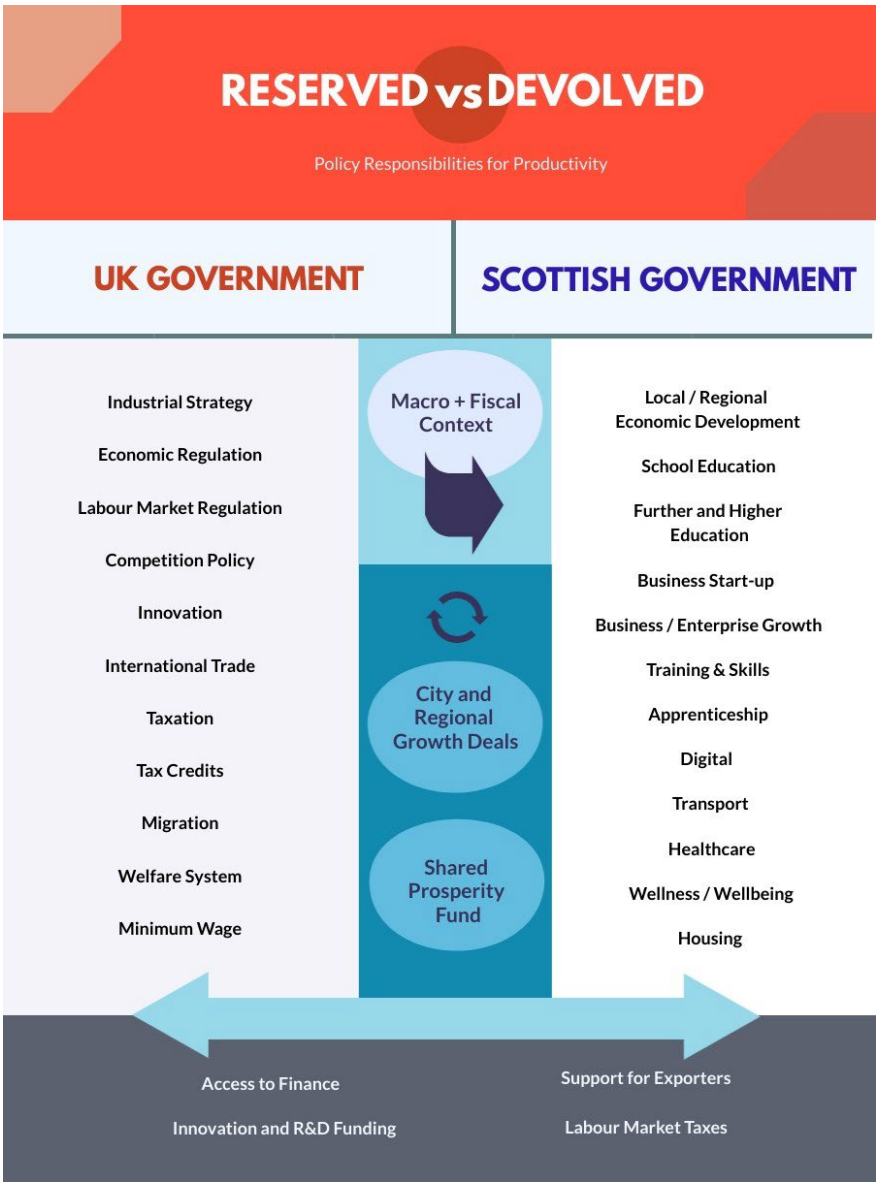
[11] https://ec.europa.eu/eurostat/databrowser/view/edat_lfse_04/default/table?lang=en.

[12] The Productivity Institute, Scorecards 2024 release.

[13] National Records of Scotland, Census Data 2022.

and devolved governments' fiscal responsibilities.

Figure 10. Reserved and devolved policies for productivity



Nevertheless, both governments aim to boost productivity alongside addressing inequalities and climate goals, as outlined in the UK's *Plan for Growth* and Scotland's *Economic Strategy*. However, criticism has emerged over the abundance of strategies versus actual implementation, with over 50 economic strategy documents currently active. The Enterprise and Skills Strategic Board (ESSB) and the Council for Economic Transformation were established to streamline efforts, yet evaluation of policy impacts – like the Small Business Bonus – is limited.

One area of effective collaboration has been the City Region and Regional Growth Deals, funded by both governments and local partners, covering all of Scotland. These deals aim to spur regional growth, though their long-term impacts remain to be seen.

4.3 Scottish Government Business Policies

The Scottish Government's business policies (2021-2023) reflected a targeted approach to enhancing productivity in a devolved context. By supporting SMEs, fostering innovation, and improving access to finance, these policies aim to address some of Scotland's key productivity challenges. Through initiatives like the Business Gateway, which provides guidance on growth and finance, and the Scottish Growth Scheme, which offers tailored financial support, the government has sought to empower SMEs – essential drivers of local economic growth. This focus aligns with the devolved responsibilities of the Scottish Government, particularly in supporting microeconomic productivity levers.

Innovation and entrepreneurship are also core to Scotland's productivity agenda, as demonstrated by increased R&D funding and initiatives like Scotland CAN DO, which aim to promote a culture of enterprise. A University of Glasgow study in partnership with Women's Enterprise Scotland investigating crowdfunding as an alternative financing source for female-led SMEs, finds crowdfunding to be a viable alternative to 'traditional' financing routes, with both financial and *non*-financial benefits, including greater skills development, confidence and the creation of an entrepreneurial community. Supporting similar initiatives could complement the UK Government's macroeconomic and fiscal policies, with the aim of creating a more competitive business environment. However, effective productivity improvements require funding and policy overlap, such as the regulatory landscape and regional development initiatives like City Region Deals.

The Scottish Government's focus on reducing regulatory burdens and promoting industry-led standards aims to further support productivity by improving the ease of doing business in Scotland. By focusing on high-growth sectors, such as digital technologies and sustainable energy – the Scottish Government can address structural and regional productivity gaps and lay foundations for a more resilient and adaptable economy equipped to deal with future challenges, including the transition to net zero. In sum, the Scottish Government's recent business policies and overall landscape under devolution reflect their overall commitment to a wealthier, fairer, and more productive Scotland, though success will rely on alignment and effective cooperation of devolved and reserved actors.

4.4 Key Interventions for Innovation, Skills, and Digital Transformations

To achieve impactful "quick wins", along with longer-term resilience and readiness in innovation, skills development, and digital adoption, three interconnected priorities emerge: developing Scotland's technological adoptions across public & private sectors; enhancing digital capabilities; and cultivating a culture of enterprise and entrepreneurship. The challenges and opportunities lie in addressing the ongoing digital skills mismatch and ensuring that businesses – especially the SMEs that make up 99% of Scotland's business base, have both the resources and the vision to scale through digital transformation.

4.4.1 Adoption of Digital Technologies

The findings in this refreshed insights paper highlights that while many SMEs exhibit high ambitions for digital adoption, their progress is hindered by limited IT budgets, in-house expertise, and strategic clarity. The Scottish Government's SME Digital Grant funding initiative (DigitalBoost Development Grant) revealed significant latent potential among SMEs when equipped with financial support and pledged £100m in digital support programmes up to 2026, with £38.5m of this budget spent by year end 2023[14]. Continued investment is needed to support this potential, and a broader roll-out of technology adoption incentives, coupled with tailored advisory support, could accelerate uptake across Scotland, promoting digitalisation among even traditionally low-tech and people focused businesses to enable them to scale sustainably.

4.4.2 Digital Skills Development

Despite Scotland's generally well-educated workforce and UK-leading higher education investment, companies report persistent gaps in digital skills. Addressing this requires targeted interventions, with suggested interventions including workforce retraining and upskilling programmes; partnerships with educational institutions; and initiatives like those recommended in the *2020 Logan Report* to grow Scotland's tech talent pipeline; including coding schools, internships, and vocational pathways into the digital economy[15].

4.4.3 Supporting the Tech Sector and Driving Innovation

The tech sector remains a vital engine for Scotland's economic growth and innovation ecosystem. Strengthening the sector requires targeted efforts on creating interconnected ecosystems that facilitate collaboration among start-ups, established enterprises, and academic institutions. Scotland's seven innovation hubs (The Data Lab; BE-ST; CENSIS; SAIC; IBioIC; PMS-IC; DHI) can serve as central nodes to connect these stakeholders, encouraging knowledge exchange. Additionally, Scotland's diverse population and unique geography presents an untapped opportunity to fuel creativity, leveraging varied perspectives enhances innovation outcomes and broadens the reach of enterprise initiatives discussed above.

Scotland's businesses must also continue to develop clear and actionable innovation strategies that align with long-term growth objectives. To this end, it is essential to articulate the measurable economic and societal benefits of innovation through a triple bottom line and ESG-focused lens to build confidence and investment among key stakeholders. Promoting these strategies through well-documented case studies and

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[14] Scottish Government (13 March 2024), *Digital support funding: FOI release* https://www.gov.scot/publications/foi-202300382065/

[15] Mark Logan and Scottish Government (2020) *Scottish Technology Ecosystem Review.* https://www.gov.scot/binaries/content/documents/govscot/publications/independent-report/2020/08/scottish-technology-ecosystem-review/documents/scottish-technology-ecosystem-review/scottish-technology-ecosystem-review/govscot%3Adocument/scottish-technology-ecosystem-review.pdf

evidence-based analyses will highlight success stories and provide a blueprint for other businesses to follow.

5 Public, Infrastructural and Financial Capitals

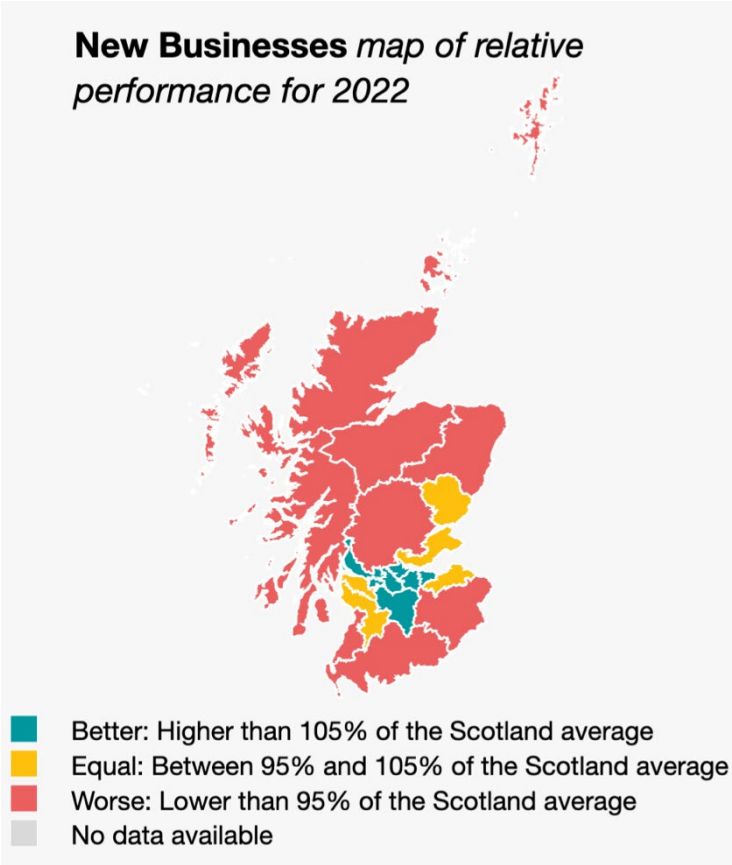
5.1 Organisational capital and the business base

As of end of year 2022, Scotland's business stock comprised of 340,760 private sector businesses operating in Scotland. This is a decrease of 4.43% from 364,310 in 2019, (20,150 businesses). These businesses provide 1.2 million private sector jobs. The SME sector has grown, accounting for 99.3% of businesses, up from 98% in 2019. However, this remains considerably smaller in comparison to the rest of the UK. In 2020, the gap amounted to 150 companies per 10,000 population and the gap has been persistent, indicating a lack of entrepreneurial skills, opportunities, and ambition. The gap can be traced to Scotland's lower rates of business startups than the UK. For 2018, business births per 10,000 adult population in Scotland was 45.6 compared to 70.7 in the rest of the UK. The comparative business stocks per 10,000 resident adults have also fallen since 2019, from 394 in 2019 to 380 in 2022[16].Since 2012, the growth rate of business creation in Scotland at 2.1% has lagged the respective UK growth rate (at 4.5%).

Intra-regional disparities in business start-up rates are significant, with Edinburgh and the East regions experiencing considerably higher start up rates in comparison to Glasgow City, West and South regions. Figure 10 displays a heat map of average new businesses as a percentage of total active firms at a regional level. This data shows that most regions in the west and south regions (in red) have experienced a considerably smaller number of net business creation in comparison to Central Belt regions such as Edinburgh and Glasgow (Blue shades). There are a spread of regions in the Outer Central Belt and the highlands that have experienced moderate net business creation (yellow shades).

[16] Scottish Government, Businesses in Scotland: 2023: https://www.gov.scot/publications/businesses-in-scotland-2023/documents/

Figure 11. Net Business Creation in Scotland – New Businesses map of relative performance for 2022.



Source: TPI Dashboard: Scotland

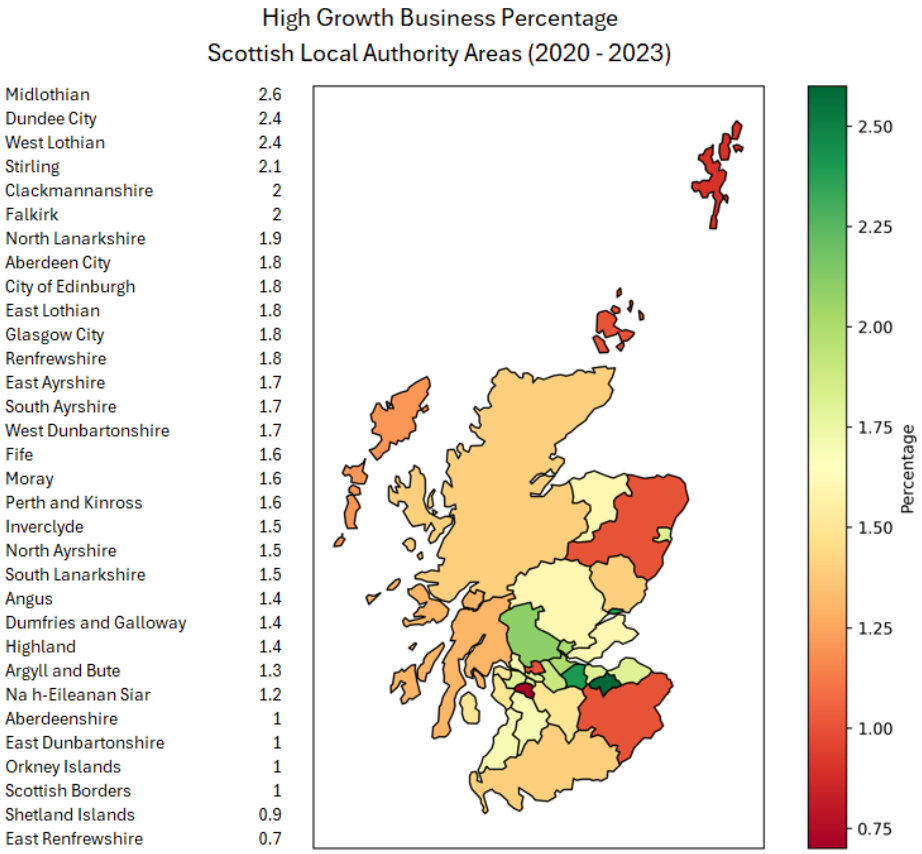
Further insights come by looking at firm level productivity trends using the annual business survey from the ONS. The distribution of productivities shape is remarkably similar in all regions except London and the Southeast. Figure 11 illustrates thelack of a critical mass of high growth businesses in Scotland in a regional heat map.There is only a handful of council areas (in green shades) that exhibit a proportion of high growth businesses greater than two percent. One explanation for the long tail of poor performing firms is that due to low adoption this group has failed to keep pace with technologies that are being used by the frontier firms. Scotland has a number of world leading companies at the cutting edge of innovation, but it remains to be seen how the benefits of innovation will spill to the wider business base.

The top 20% of firm productivity distributions is generally over-represented by knowledge-intensive services; in Scotland this feature is more pronounced in comparison to other UK regions. In Scotland, most of the firms in the knowledge-intensive services sectors that make up the top 20% of the distribution are micro (1 to 9 employees). The bottom 20% of firm productivity distributions is dominated by less knowledge-intensive industries (Figure 12)[17].

[17] The ONS classifies services into knowledge-intensive (KIS) and less knowledge-intensive (LKIS) based on the proportion of tertiary-educated workers at the NACE two-digit level. KIS sectors include high-tech fields (e.g., telecommunications, information services), market services (e.g., architecture,

Similarly, in terms of GDP/Hour Worked, Scotland remains below the UK average and has remained between Turkey and Japan (see Fig.4) in its OECD ranking, as it was in 2019.

Figure 12. The Percentage of High Growth Business. Median for 2020-2023 (Scotland).



Source: Scottish Government

5.2 Business investment, innovation, digital and R&D

Business investment in physical and intangible capital (machinery and equipment, buildings, ICT, R&D) is a key enabler of productivity and growth. The availability and quality of capital per worker (*capital deepening*) is a determinant of labour productivity. For example, investment in ICT capital allows firms access new technologies that raise productivity. Business investment has been chronically low in Scotland and as of 2018, at very near the bottom of the OECD Table (figure 13) and below the UK average. As a percent of GDP, Scottish real business investment has had an overall declining trend since the late 1990s. Despite some recovery spikes in the mid 2000s and early 2010s, business investment as a percentage of GDP remains lower than it was 20 years ago (figure 14). A 2017 report from the Fraser of Allander Institute estimated that for Scotland to match the UK average, every Scottish business with more than

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engineering, legal, and accounting), while LKIS sectors cover accommodation, food services, and retail trade. Other sectors include construction, real estate, and non-manufacturing production.

50 employees will need to invest an additional £55,000 per annum[18]. However, an upcoming paper from the Productivity Institute's Scottish Forum now puts this closer to £113,000 per annum[19]. This again highlights the chronic underinvestment that has plagued Scottish productivity since the late 1990s that continues to be prevalent.

Figure 14. Business investment in Scotland as a % of GDP over time (approx. 1950-2022)

Source: Scottish Forum, TPI – Business Investment in Scotland (working title), upcoming paper 2025.

The international competitiveness of the business sector can be measured by its export record. Exporting allows businesses to tap new sources of growth, create new jobs, and boost productivity. Firms which export have systematically higher levels of productivity than domestically oriented firms, on average by around a third. Scotland has increased its exports since 2005 in absolute value, but not as a share of GDP. The export base remains narrow, despite a growth from 11,000 businesses that are exporters in 2019 to 14,800 in 2021[20]. This reflects the continued absence of large scale-ups. And of those that export, 100 businesses account for 60% of exports. A further 400 businesses account for 20% of exports.

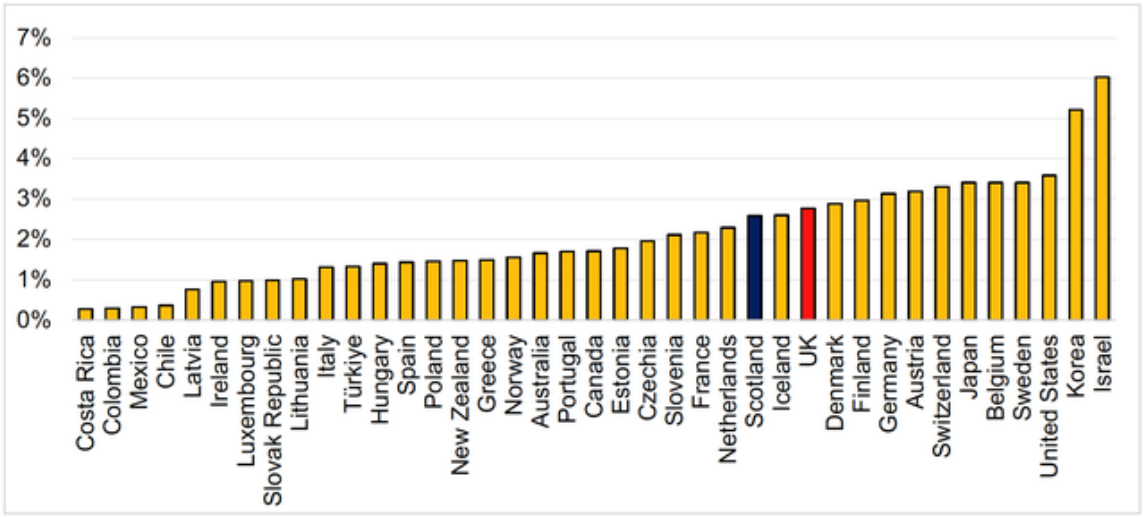
[18] Business investment performance in Scotland, Fraser of Allander Institute Economic Commentary, 2017.

[19] The Productivity Institute, Scottish Forum – Business Investment in Scotland (working title). Upcoming paper (2025)

[20] Gov UK, Dept. for Business and Trade (2023) Press Release: https://www.gov.uk/government/news/hundreds-of-scottish-businesses-set-to-benefit-as-uk-government-invests-in-new-roles-to-boost-exporting

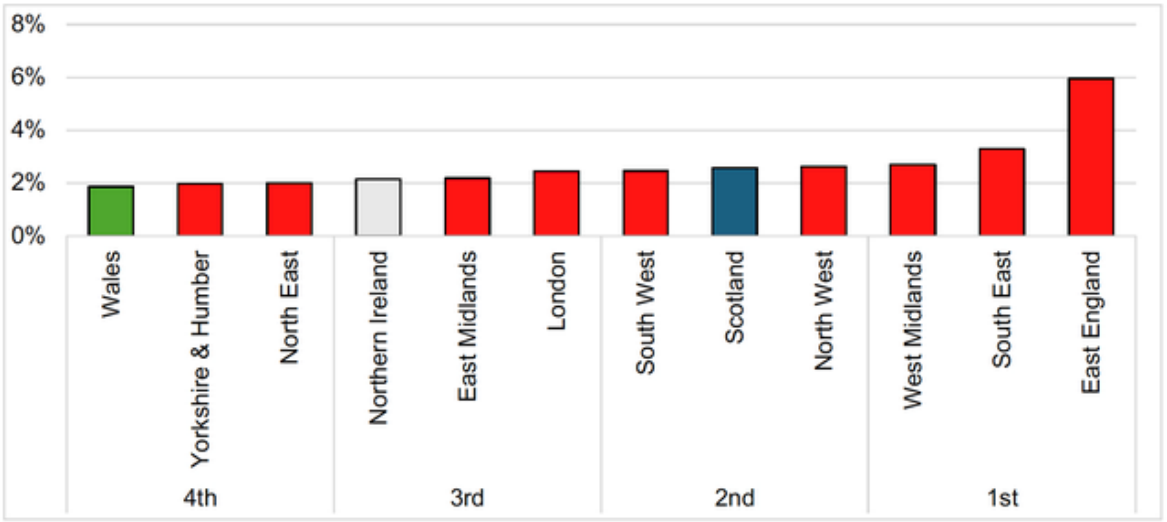
Scotland's gross expenditure on **Research and Development** (GERD)—a key enabler of productivity growth–was 1.65% of GDP in 2018.That has improved slightly to 2.58% in 2022 (Figure 16). GERD per head of population ranks fifth in the UK, below the UK average and in the third quartile of OECD. Comparatively, Scotland is in the second quartile for GERD in OECD countries, with the UK 12th, as shown in Figure 15.

Figure 15. GERD as a % of GDP – OECD 2022.



Source: Office for National Statistics, 2022.

Figure 16. GERD as a % of GDP, UK regions, 2022



Source: Scottish Government, National Innovation Strategy: Scorecard (2024 Update)[21]

On other hand, Scotland has a strong historical performance investing in R&D for

[21] Scottish Government, National Innovation Strategy: Scorecard (2024 Update): https://www.gov.scot/publications/national-innovation-strategy-scorecard-2024-update/pages/2/

higher education institutions, continuing to outperform all other UK regions, and ranks seventh in the OECD (2022) –with R&D spent by higher education institutions (HERD). The Higher education sector remains very effective in leveraging public sector funding, through high impact research, knowledge exchange, partnerships, FDI, spin-offs, etc. Scottish Universities are internationally renowned and have an influential role in shaping and driving the agenda of research and innovation, working closely with businesses to form new collaborations and maximise their impact on the economy. The challenge remains on how, given a level of HERD spending Scotland can generate more BERD spending and translate the world class research into commercial opportunities[22].

Public R&D has declined over the longer term by 24.9% between 2007 and 2018. Potentially, more public investment in targeted areas that have big societal impact (energy, environment, and climate) will be beneficial. The newly established Scottish National Investment Bank can crowd-in private investment and support innovation.

Innovation can take many forms, from design of new products and processes to workplace innovations, such as management practices. In the most recent UK Innovation survey 2023, Scotland lags the UK in all metrics of Innovation. The proportion of innovation active firms in Scotland is 32.2% compared to 37.6% for the UK. This share has been declining since 2012[23]. As documented in the 2021 insights paper, digital investment remains a powerful boost for productivity.

Businesses across the spectrum of digital maturity, including digital pioneers, report significant gaps in terms of digital skills, with just 34% of businesses developing their existing employees' digital skills[24]. A significant proportion of employers (58%) reported skills issues in terms of the necessary employability or work readiness skills and of those reporting a skills gap, 68% report it has an impact on business performance; 35% of businesses report staff are under- utilised; and 69% of employers identified the need for up-skilling in the next twelve months[25]. The COVID-19 pandemic has intensified these gaps, as businesses have had to swiftly adapt to the new ways of working. The two most recent surveys by Digital Economy show that these changes and skills gaps have remained persistent as the rate of digitalisation has advanced. Figure 17 shows that just 21% of businesses stated their existing staff were fully equipped in terms of skills to meet the business' digital technology needs, a decrease from 26% in 2017 and 37% in 2014.

Strong leadership and management practices have been shown to be strongly correlated to

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[22] The Muscatelli report: driving innovation in Scotland—a national mission (2019). https://www.gla.ac.uk/media/Media_700300_smxx.pdf

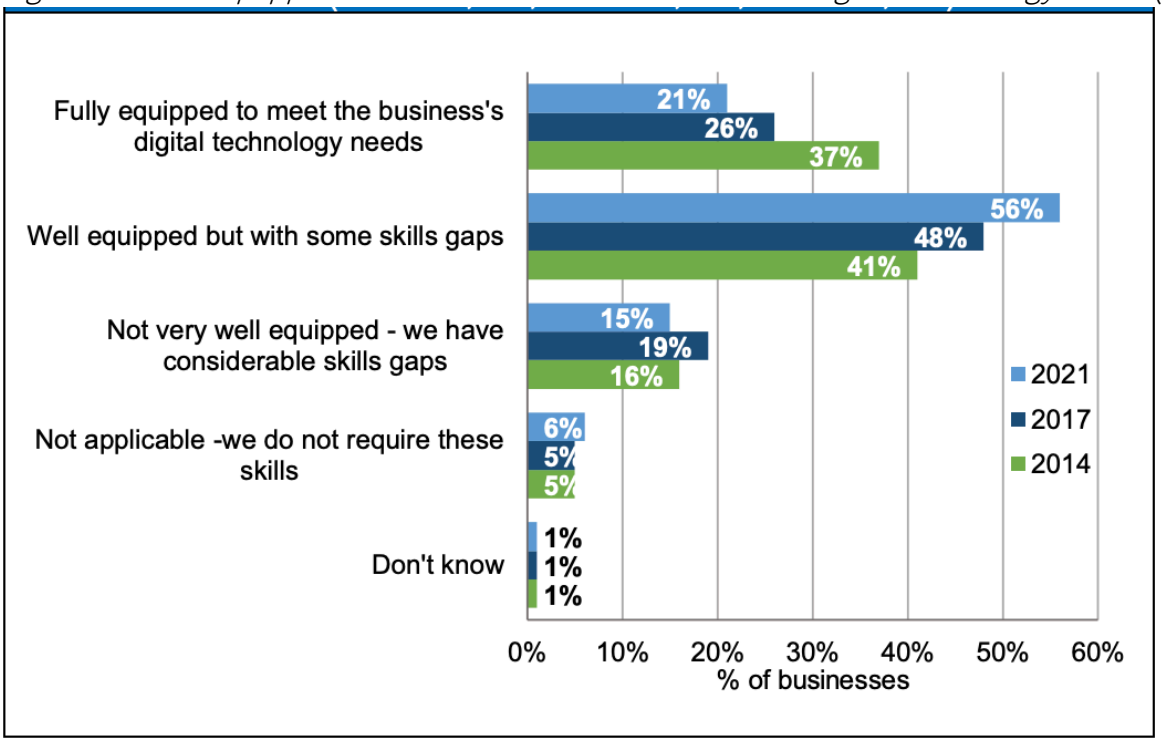
[23] Improving quality products and services, followed by improving outdated products and processes were the main drivers of innovation.

[24] See Scottish Government (2021) *Digital Economy Business Survey 2021*. https://www.gov.scot/publications/digital-economy-business-survey-2021.

[25] The Scottish Council for Voluntary Organisations estimates that **nearly one in five adults in Scotland** do not have theskills to make full use of digital technology at home or at work. https://scvo.org.uk/p/36175/2020/03/19/no-one-left- behind-digital-scotland-covid-19.

firm-level productivity, with even small improvements in management practices being associated with up to a 5% increase in the growth rate of a business's productivity[26]. A recent OECD report identifies management capabilities as a key enabler of technology adoption and IT engagement[27]. The Enterprise and Skills review on innovation suggests SMEs do not fully understand the benefits of workplace innovations or can navigate the support programmes offered by Scottish Enterprise. Simple solutions, such as behavioural nudges and a strong peer group for SME businesses can be leveraged to begin a journey of innovation.

Figure 17. How Equipped staff are in terms of skills to meet digital technology needs (%).



Source: Digital Economy Business Survey 2021 (p.29).

5.3 Responsible AI

The development and application of Responsible AI (RAI) represent a crucial intersection of ethics, technological development, and economic (and social) productivity. Insights from the Scotland Forum's roundtable event on 29/10/2024 emphasise that while AI holds immense potential to enhance productivity – particularly in streamlining workflows, automating processes, and enabling data-driven decision making – it also raises significant challenges that must be addressed *responsibly.*

[26] Bryson et al (2018), The impact of management practices on SME performance. NIESR discussion paper, no. 488.

[27] The report is available at: http://www.oecd.org/cfe/leed/UK-BDS-Synthesis-Report-Final.pdf.

5.3.1 Defining Responsible AI

RAI refers to the creation and deployment of AI systems that are safe, trustworthy, and aligned with ethical, societal, and legal principles. Key attributes of RAI include fairness, transparency, accountability, control, privacy, and sustainability. For example, Prof. Simone Stumpf (University of Glasgow) highlights those irresponsible applications, such as Amazon's no-defunct hiring AI, illustrate the risks of bias and unethical decision-making when training data reflects pre-existing inequalities. These failures underline the importance of oversight and compliance with evolving policy and regulatory standards.

5.3.2 Impact on Productivity and Employment

AI has the potential to be a transformative tool for the Scottish economy by increasing efficiency across sectors, from education to advanced manufacturing. However, the pace of change is uneven, with Prof. Dominic Chalmers (University of Glasgow) highlighting that significant productivity gains are often concentrated in lower-skilled roles. For instance, generative AI tools have dramatically improved output in call centres, reducing training times and boosting customer service efficiency. Yet, the disruptive potential of AI – particularly in labour-replacing functions – poses risks to certain industries and local supply chains, including the highly productive creative and knowledge-intensive sectors.

The roundtable panel noted that the adoption of AI often follows a "J-curve" pattern: initial inefficiencies as businesses adapt are followed by steep productivity gains. However, without strategic investment in skills and infrastructure, Scotland risks losing competitive ground. This is particularly acute for SMEs, which form the backbone of Scotland's economy, but often lack the resources and/or knowledge to effectively adopt AI and AI-based technologies. Embedding AI into small business ecosystems requires greater government support, education, and accessible AI solutions.

5.3.3 A Framework for Responsible AI

The roundtable event highlighted Scotland's unique potential to harness RAI development, leveraging its strong existing talent-base and highly educated population and HERD and its regional partnerships. Collaboration between academia, industry, and government is essential to establishing Scotland as a hub for ethical and innovative AI. Areas such as "Explainable AI" (ensuring users understand decision-making processes) and "Interactive AI" (designing systems to integrate seamlessly with human expertise) were identified as priorities. Additionally, the roundtable emphasised the importance of proactive governance, with Prof. Stumpf noting that Responsible AI must consider sustainability – not only in terms of environmental impact but also in fostering inclusive economic growth.

5.3.4 Balancing Opportunity and Risk

As Scotland aspires to become a leader in AI innovation, its approach must balance economic opportunity with responsible practices. For example, the automation of low-margin tasks, like customer services offer clear productivity benefits, but must be accompanied by upskilling initiatives to mitigate job displacement risks. Similarly, public sector leadership will be critical in aligning AI adoption with societal goals, including reducing inequalities and boosting inclusive growth.

Overall, RAI provides an opportunity for Scotland to lead in productivity-enhancing technologies while setting the standard for ethical practices. However, realising this potential will require targeted investment, robust regulation, and the creation of a culture of collaboration and trust among businesses, policymakers and communities that doesn't yet exist.

6 Scotland's Productivity, Natural Capital and the Transition to Net Zero

The concept of *Natural Capital* – the stock of natural assets, including soil, air, water, and biodiversity – should be central to Scotland's efforts to boost its productivity while transitioning to net zero. As outlined in the triple bottom line framework, recognising the environment as a fundamental driver of sustainable economic growth, businesses and policymakers should increasingly align their strategies to balance economic development with environmental stewardship. Key progress can be observed in metrics such as Scotland's reduced carbon footprint and household waste, and the evolving role of businesses in developing responsible, low-carbon practices.

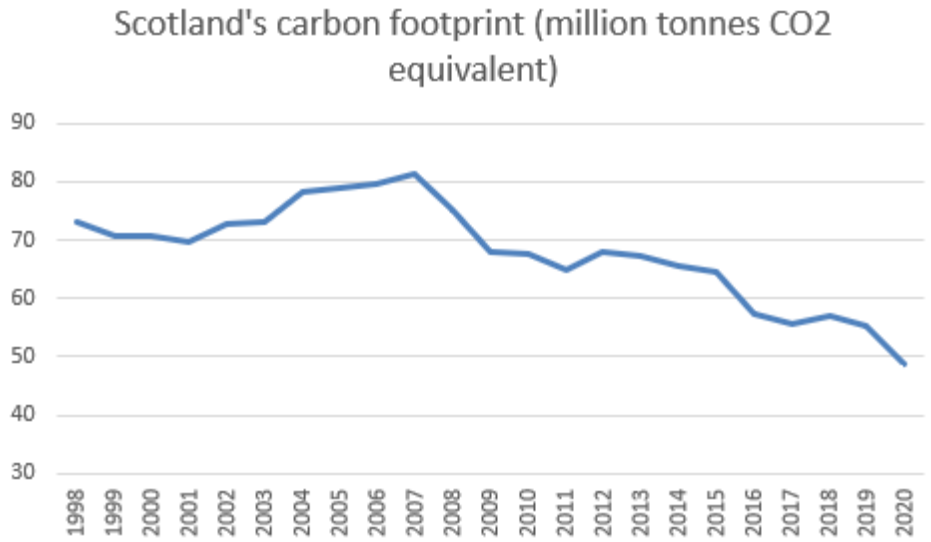
6.1 Progress in Carbon Footprint and Waste Reduction

The past 15-20 years has seen Scotland make significant strides in reducing its carbon footprint and household waste generation, showcasing the measurable economic and environmental benefits of protecting its natural capital.

As shown in Figure 18, Scotland's carbon footprint fell from around 77 million tonnes of C02 equivalent in 2007 to just under 45 million tonnes in 2020 – a 41% decrease. This progress reflects the limited success of Scotland's transition toward clean energy, particularly through the expansion of renewable electricity. Figure 19 shows 113% of Scotland's gross electricity consumption generated from renewable sources in 2022 – up 26% compared to 2021. In a nutshell, this means that renewables have provided more than enough electricity to meet Scotland's needs as of 2022. However, despite this increase, Scotland's *energy productivity* requires acceleration to reach its 2030 target of a 30% increase from the 2015 baseline[28]. As Figure 20 shows, although GVA fell between 2015 and 2022, final energy consumption also reduced, so 2022's final energy productivity increased by 10.6% from 2015 to £1.194m GVA per Gigawatt Hour (GWh) in 2022. Extrapolating this projection, Scotland's energy productivity requires greater GVA per GWh from 2024-2026 to reach its 30% target by 2030, which requires continued investment in renewable infrastructure – particularly in Scotland's well-developed wind and hydroelectric power generation.

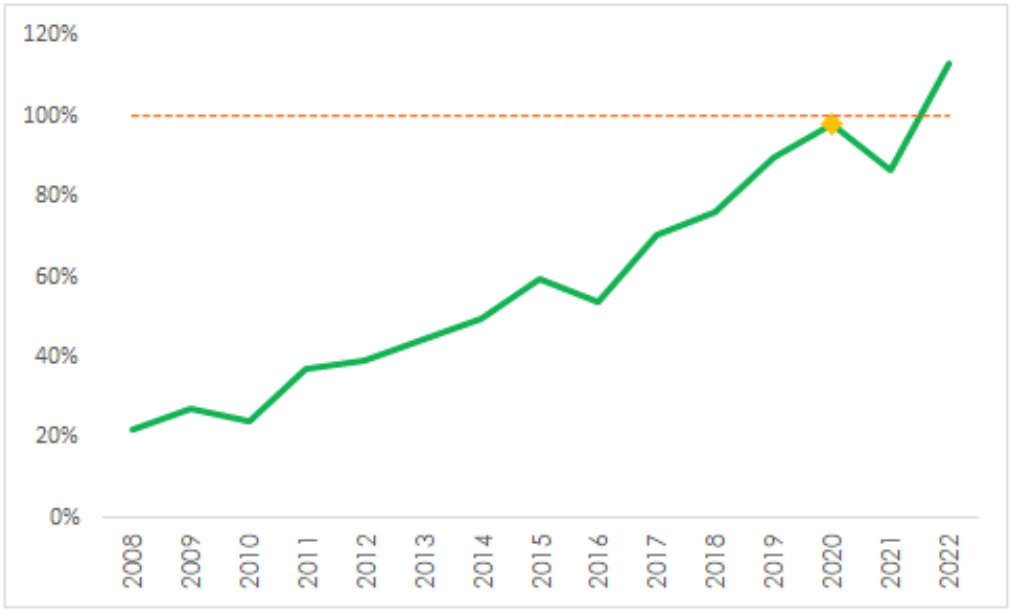
[28] *Energy productivity* here refers to Scotland's GVA from each gigawatt hour of energy consumed. Higher energy productivity means "squeezing" more out of every unit of energy consumed.

Figure 18. Scotland's CO2 Output, millions of tonnes per year, 1998-2022)



Source: ONS

Figure 19. Scotland's Renewable Electricity Target (2008-2022)



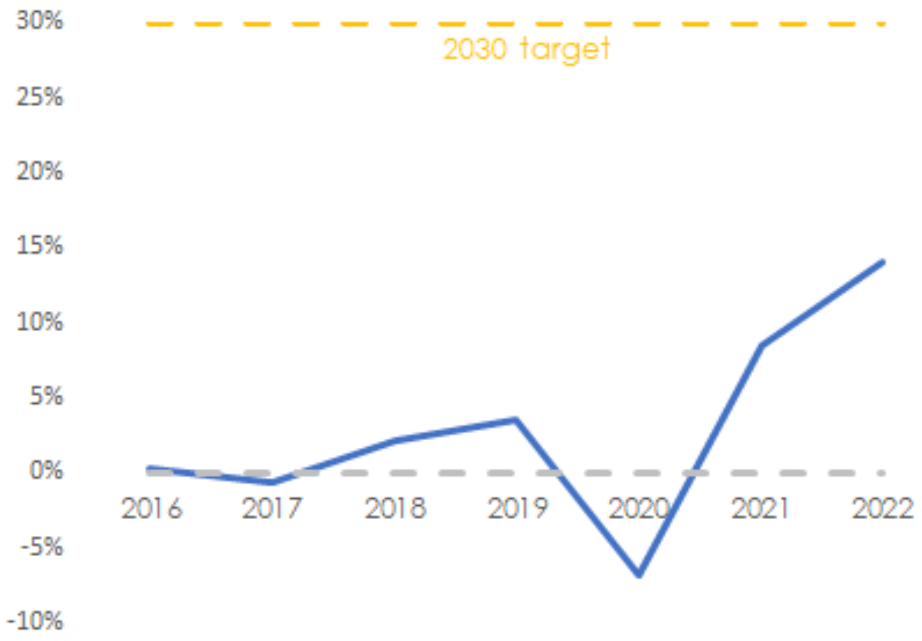
Source: Scottish Government[29]

[29] Scottish Government (25 January 2024) *Energy Statistics for Scotland – Q3 2023 Part 2* https://www.gov.scot/publications/energy-statistics-for-scotland-q3-2023-part-2/pages/renewable-electricity-target/

Challenges also remain – particularly in the transport sector, which accounted for 36% of Scotland's greenhouse gas emissions[30]. As such, continued reduction will depend on coordinated efforts, including continued investment in low-emission transport infrastructure, support for electric vehicle adoption, and policies that promote behavioural change in consumption patterns.

As outlined in Figure 21, from 2011 to 2022, household waste generation fell from 2.6 million tonnes to 2.3 million tonnes, a 12% reduction. This trend highlights the council-level impact of Scotland's Zero Waste Plan and supporting initiatives such as the Deposit Return Scheme and the development of local recycling infrastructure. However, more work is needed to reach 2030 net zero waste targets, driven by a slight uptick in waste between 2018 and 2021 due to the COVID-19 pandemic, underscores the need for sustained public engagement and education. Nevertheless, the 2022 recovery signals the effectiveness of target policy and awareness campaigns in implementing successful circular economy principles.

Figure 20. Scotland's Energy Productivity Target Progress Compared with 2030 Target.

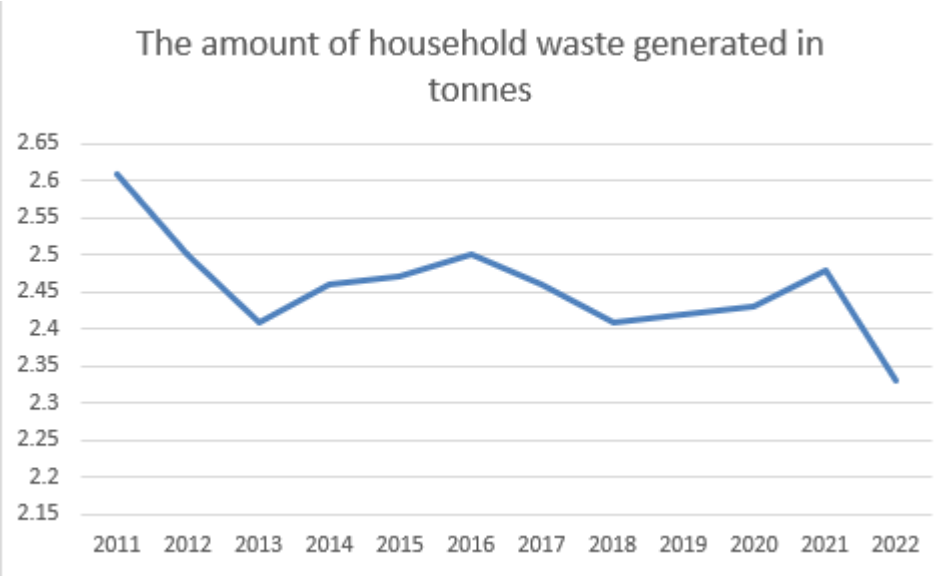


Source: Scottish Government, Energy Statistics Hub[31]

[30] Transport Scotland. *Scottish Transport Statistics 2021, Transport Environment. https://www.transport.gov.scot/media/51297/chapter-13-environment-scottish-transport-statistics-2021.pdf*

[31] Scottish Government *Energy Statistics for Scotland.*

Figure 21. Scotland's household waste generated (tonnes) per year, 2011-2022.



Source: ONS

6.2 Business Journeys to Net Zero and Natural Capital

Scotland's businesses are central to Scotland's net zero ambitions and play a vital role in preserving and enhancing *natural capital*. This section will cover the key insights from a roundtable event held by the Scottish Forum on 14th November 2024, highlighting the importance of balancing environmental objectives with financial viability and operational realities in a triple bottom line approach.

6.2.1 Sectoral Adaptation and Practical Solutions

Businesses are making progress by adopting tailored, financially viable solutions that address both productivity and environmental outcomes. For instance, one attendee from We Hae Meat adopted a combined heat and power (CHP) system on their farm, resulting in a 90% self-sufficient electricity boost, significantly reducing energy costs. Such solutions not only demonstrate the economic benefits of sustainability but also enhance local *natural capital*, reducing reliance on fossil fuels and lowering emissions.

However, barriers persist, particularly for SMEs, which face resource and knowledge gaps in adopting green technologies. One attendee, form Balfour Beatty highlighted grid connectivity delays and the reliance on diesel generators in remote areas as major hurdles for the construction sector, exacerbated by Scotland's large rural area. Addressing these issues through infrastructure investment and supportive policies, coordinated at a local council level will be crucial to unlocking further productivity gains while maintaining ecological integrity.

6.2.2 Innovation and Scaling Challenges

Scotland's innovation ecosystem offers opportunities to accelerate the transition to net zero. Start-ups and research partnerships are pioneering technologies that optimise resource efficiency and reducing emissions. However, scaling these innovations remains challenging due

to regulatory delays and inconsistent funding. Bridging this gap will require confidence and continuity in policy, alongside increased collaboration between large corporations, multinationals and SMEs to create sustainable supply chains.

6.2.3 Place-Based and Community Solutions

The roundtable also emphasised that the benefits of net zero initiatives must be felt locally to secure broad support. David Flynn (University of Glasgow) highlighted the untapped potential of local energy markets to reduce fuel poverty and redistribute surplus energy. Place-based approached, which focus on the specific needs of rural and urban communities, can help preserve *natural capital* while delivering social and economic benefits.

6.3 Natural Capital as a Foundation for Productivity

Scotland's progress in carbon reduction, waste management, and business-led net zero initiatives reflects a growing recognition of *natural capital* as a foundation for long-term productivity. By valuing natural assets, Scotland can unlock sustainable economic growth while addressing structural productivity challenges. Key priorities include:

1. Investing in Clean Technologies: Enhancing renewable infrastructure, energy storage solutions, and low-emission transport systems to drive emissions reductions
2. Supporting SMEs: Making up 99% of Scotland's business base, SMEs are pivotal to promoting natural capital for productivity. As such, policy should focus on providing financial incentives, skills development, and regulatory clarity to enable SMEs to adopt green solutions.
3. Promoting Circular Economy Principles: Expanding waste reduction initiatives, such as reuse schemes and eco-design to build successful, purposeful businesses in Scotland, with purposeful businesses such as Re and Ooni exemplifying the commercial and environmental viability of embedding these principles to drive business success.
4. Empowering Communities: Developing local energy markets and place-based solutions to ensure inclusive and equitable benefits from the net zero transition.

Overall, Scotland's efforts to reduce its carbon footprint and household waste, alongside business-led innovations in net zero practices, demonstrate the importance of integrating *natural capital* into productivity strategies. By valuing and investing in its natural assets, Scotland can position itself as a leader in sustainable economic growth, delivering benefits for businesses, communities, and the environment.

7 Key issues and research priorities

Scotland's business ecosystem lacks a critical mass of large-scale scale-ups, with most businesses being micro or SMEs (except in Finance, Insurance, and Oil & Gas), which make up <99% of Scotland's business base. Challenges include leadership and skills gaps, lack of diversity in leadership and workplaces, and limited access to talent. Behavioural barriers, such as complacency, fear of change, and lack of strategic ambition – often hinder businesses from adopting necessary organisational changes for growth. SMEs also need clear guidance on their growth journeys, including actionable roadmaps addressing "how", "when" and "where".

7.1 Leadership, Diversity, and Productivity

Management quality significantly influences productivity, with poor practices contributing to Scotland's lag international competitors and stagnation compared to OECD countries. Evidence suggests links between "good work" practices (e.g., work-life balance and fair pay) and productivity are positive, but complex and influenced by business size, sector, and work conditions. Post-COVID remote work trends also require examination to assess long-term impacts on productivity, as highlighted by initiatives such as the ESRC's PROPEL Hub

Diversity is essential to drive innovation and productivity. Women now represent 58% of newly self-employed individuals, yet many faces declining incomes, limited training, and inadequate social protection, with self-employment often driven by necessity. As examined by the Scottish Forum, University of Glasgow and Women's Business Institute's project exploring crowdfunding as an alternative access to finance for female-led SMEs, gender-specific entrepreneurship could unlock a £250bn opportunity and foster innovation through a more gender-balanced ecosystem. Similarly, minority ethnic entrepreneurs contribute significantly to the economy but face persistent barriers, including lack of access to mentors, networks, and funding. Policies promoting intersectional approaches are critical to leveraging the full potential of Scotland's diverse workforce, especially as its population ages and skills gaps become more prevalent. Improved data collection is also essential to address pressure points and support meaningful entrepreneurship.

7.2 Disparities and Closing Regional Gaps

Scotland's economy reflects significant disparities across its regions:

1. North-East: Dominated by Oil & Gas (Aberdeen)
2. Edinburgh: A finance hub resembling a mini-London, with startlingly high GVA/Hr.
3. Glasgow and the West: Struggling to recover from post-industrial decline
4. Rural Areas, Highlands and Islands: Facing infrastructure, connectivity and population challenges

A particular case is Glasgow's lagging productivity. Glasgow's productivity consistently lags areas like Aberdeen and Edinburgh, even in similar sectors. Higher economic inactivity rates – particularly post-COVID go some way to explaining this. Glasgow remains in the bottom 5 ITL3

Scottish regions for economic inactivity, with just 53.7% of people aged 16+ being economically active, compared with 62% in areas like West Lothian. Lessons can be drawn from other post-industrial cities like Liverpool and Manchester to address these disparities.

7.3 Policies and Implementation Challenges

The gap between policy ideas and successful implementation often undermines productivity improvements. Devolution offers an opportunity to focus on actionable policies by promoting collaboration between public, private, and third sectors, alongside academia. Rigorous evaluation and long-term planning are critical to ensure policies deliver measurable outcomes.

8 Conclusion

In conclusion, Scotland's productivity performance from 2019 to 2024 reflects both the impacts of significant global events and the evolution of key domestic factors. The updated findings in the refreshed insights in this paper, framed within the six capitals approach – Financial, Manufactures, Intellectual, Human, Social and Natural – show how these different forms of capital have shaped Scotland's productivity over the past five years, and how they can continue to do so in the future.

Scotland has made notable progress in areas like higher education, renewable energy and its journey toward Net-Zero (inform by section on Natural Capital) (part of its Natural Capital), while its performance in Financial and Intellectual Capital(s) has been mixed. Financial capital, though somewhat bolstered by improvements in sectors like finance and technology, remains constrained by underinvestment in areas such as research and development (R&D) and digital infrastructure. Meanwhile, Intellectual Capital, driven by Scotland's leading universities, exhibits the highest HERD (R&D invested by higher education institutions) in the UK. However, this has not yet translated into widespread innovation across the economy, with lagging adoption of new products and processes in many sectors.

The updated findings in this paper highlight improvements in its *manufactured and natural capitals*, especially though investments in green infrastructure as Scotland moves along its journey toward net zero which are essential for growth in rural areas. However, regional disparities continue to undermine overall productivity, particularly between high-performing areas like Edinburgh and the underperforming Glasgow and rural areas. Human Capital, though strong in terms of education levels, is still characterized by skills shortages, especially in digital and technical fields, with regional gaps that further exacerbate these differences, and reflected by a slight increase in unemployment rates since 2019.

Social Capital has continued to evolve through Scotland's emphasis on Fair Work practices and the potential of new access to capital for female-led SMEs, but there is still room for improvement in management practices and leadership, which are crucial for driving firm-level productivity and embracing new technologies.

The addition of Natural Capital to the framework in this refreshed paper underscores Scotland's growing focus on sustainability and the growth of a green economy.

Ultimately, while Scotland's productivity has outpaced other parts of the UK between 2019 and

2024, particularly in terms of its Intellectual, Human and Natural Capitals, overall growth has remained slow, and its OECD rankings remain stagnant. Addressing the challenges highlighted by the six capitals framework – particularly the gaps in investment, innovation, and regional disparities – will be essential for Scotland to unlock its full productivity potential and achieve inclusive, sustainable economic growth in the years ahead.

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