Draft baseline review socio-economic context and SWOT analysis for ERDF 2014-2020

Office of the Chief Economic Adviser
October 2013

1 Summary

Structural Funds form an important part of the Scottish Government's response to the economic downturn. With 2007-13 programmes over-committed, it is important to both get the new programmes started as soon as possible; and to ensure that they have the right focus to both address the current economic issues and to build towards Europe 2020 – the underlying objective for all European funding for the next period.

The European Commission identified in its position paper a number of aspects which the UK should be using EU Funds to address. However, the UK is one of the larger and most populous member states, and Scotland faces challenges which are both common across the UK; and distinct and shaped by geography and history, for example migration patterns and historical concentrations of particular industries.

This paper uses official published statistics to set out an economic context, Scotland's current performance against each of the thematic objectives relevant to the European Regional Development Fund (ERDF), and sets out reasons for areas where Scotland's performance diverges form the EU 2020 targets. Where relevant, the analysis is broken down further by NUTS region or by other inter-sectional indicators such as gender. This baseline information in turn drives the analysis of the type of intervention or area of activity where the Regional Development Fund could be focused in order to have the biggest impact in Scotland, included in each section as policy recommendations.

In this context, it is important to note that Structural Funds, although a valuable contribution to economic and social development, represent a relative modest amount of funding to change such significant policy areas as business competitiveness or commercialisation rates of R&D&I. Wherever possible, the recommendations made in this paper therefore take into account the wider domestic (Scottish and UK) funding picture to pinpoint where the European Regional Development Fund would add greatest value.

The paper is a collaborative piece of work between policy and analytical teams in the Scottish Government, and has been prepared without prejudice to Partnership discussions with stakeholders who are likely to benefit from Structural Funds as a result of some of these recommendations. It should be read alongside the baseline analysis for the European Social Fund.

1.1 Summary of data related to Thematic Objective 1: strengthening research, technological development and innovation

- Although Scotland's expenditure on Gross Expenditure on Research and Development (GERD) has risen since 2006, Scotland is a mid-ranking performer within the UK and lags behind a number of key comparator countries such as Denmark, Sweden and Finland, who are considered to be innovation leaders.
- Business expenditure on Research and Development (BERD) – a key driver of productivity and economic performance within economies – is weak. Not only does Scotland's BERD performance remain historically lower than its comparators, its concentrated within the manufacturing sector and dominated by large and foreign-owned firms, suggesting very limited investment in R&D by indigenous SME's

- In contrast, spending on Higher Education Research and Development (HERD) in Scotland remains world class with Scotland coming top within the UK's regions and nations and third amongst those OECD countries for which the most recent data was available.
- Despite Scotland's knowledge exchange index – which tracks exchange of knowledge between universities to the wider economy – rising slightly in recent years, the gap between Scottish performance on HERD and BERD suggests that more support is needed to encourage business-to-academia linkages, commercialisation of research produced by Scotland's world class higher education sector and encourage business investment.
- Recent evidence suggests that the proportion of Scottish firms that are innovators may be stalling and that Scotland continues to lag behind the UK.
- Costs of innovation – in particular the availability and costs of finance and the direct cost of innovation – are the most cited barriers to undertaking innovative activity especially amongst those firms already innovating. This suggests that not only do firms learn about the barriers to innovation as a result of their attempts to innovate but also that support is still required once firms have taken this step.
- A clear link between innovation and internalisation exists. Those firms that do innovate are much more likely to be exporters than non-innovators. Innovation will therefore be a critical fore-runner to competitiveness and growth through better exploiting international markets.

1.2 Summary of data related to Thematic Objective 2: Enhancing access to and use and quality of ICT

- Although broadband is not an area for investment recommended by the Commission for the UK, a significant part of the UK without adequate broadband coverage and quality is within Scotland, in difficult to reach rural geographies. Scotland currently has poor fixed NGA infrastructure, particularly in rural and remote areas. Indeed, many of Scotland's rural areas suffer slow basic broadband speeds; slowing down productivity within these areas. When compared with other regions of the EU, Scotland's rural areas once again lag behind.
- "Superfast" or next generation access (NGA) broadband is expected to deliver significant economic benefits over the next 15 years including increased economic output, job creation, reduced social exclusion and increased community cohesion. These benefits are of importance to the whole of the Scottish economy - but will most crucially have a significant impact in Scotland's rural areas.
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- Use of digital connectivity by Scotland's population and business could be improved, but could be addressed through supporting business competitiveness, workforce skills and/or social (digital) exclusion and employability.
- Whilst a significant proportion of Scotland's adults are using the internet, a significant minority choose to not do so. Use of digital public services lags by Scottish citizens lags behind that of much of the EU including countries such as Denmark, Norway and Sweden, where the vast majority of the population utilise eGovernment services.

- Evidence suggests that whilst nearly all SMEs in Scotland have broadband access and that many of these businesses use the internet to run their businesses (for example, to pay bills or complete tax returns), this has not been translated into the exploitation of digital connectivity to realise economic potential. An area where Scotland lags behind other EU nations, such as Norway.
- Independent research suggests that, based on historical evidence, that the continued adoption and exploitation of ICT could generate an additional £2.8 billion of GVA to the Scottish economy over the next 5 to 7 years. Those firms that have already made the shift to exploiting digital technologies have reported a number of benefits including increased sales, cost and time savings and attracting more customers.

1.3 Summary of data related to Thematic Objective 3: Enhancing the competitiveness of SMEs

- Scotland has a lower business stock than the UK as a whole; an historical trend that still continues.
- Scotland's business stock has experienced an increase in 2012, marking a turning point following a declining trend since 2008. This increase has been driven by substantial growth in unregistered businesses. Whilst this may be indicative of a rise in entrepreneurship in Scotland, its more likely to be reflective of the impact of poor economic conditions on work choices, with more people choosing to become self-employed.
- The Scottish economy is dominated by small and micro businesses, particularly in rural areas; whilst large firms provide over half of Scotland jobs and a larger share of Scotland's turnover.
- Evidence from a range of sources on new firm formation suggests that Scotland has performed reasonably well during the recessionary period. However, Scotland has historically had a lower business birth rate per adult population than all other regions in the UK. This continues to be the case despite recent improvements.
- The latest available analysis of Scotland's innovation-based entrepreneurship ecosystem which suggested that Scotland is relatively weak in Opportunity Perception, Start-up Skills, Networking, and Aspirations. However, several programmes to raise aspirations and skill levels in networking and selling appear to have been successful.
- Evidence from a range of sources suggests that Scottish SMEs either lack or have downgraded their growth ambitions.
- Access to finance is one of the key barriers to starting a business for both entrepreneurs and non-entrepreneurs alike. However other barriers – such as skills, innovation, support from others and cultural factors - are also important to address.
- Traditionally evidence on access to finance by SMEs has focused on lending by banks. However, more recently, attention has turned to alternative financial instruments, such as business angels and the Scottish Investment Bank, and how SMEs might utilised these sources of funding. If such instruments are to be used more extensively, further evidence of their success and of the need for them should be collected.

- Despite the significant economic and firm-level benefits to exporting, only a small proportion of Scottish SMEs are exporters. The likelihood of exporting increases with the size of business with the self-employed and micro business least likely to be exporters. This suggests the structure of the Scottish economy may have an impact.
- Similarly, innovative firms are more likely to be exporters. Evidence shows that this is an area where Scotland lags behind.
- Scotland already provides support – through SDI – for exporters. Evaluation evidence suggests that whilst this support has improved firms' perceptions of their ability to export, this support has helped those firms who already had exporting plans rather than through making non-international firms become international.
- Access to finance is once again mentioned as a barrier to internationalisation. Other barriers include: not having a suitable product or service to export and sufficient information and capabilities.
- High growth firms are receiving increasing policy importance. Whilst they make up a relatively small proportion of the business stock in the economy, they account for a disproportionately larger proportion of job creation and are felt to be the key future economic growth.
- Whilst high growth firms make up only a small portion of Scotland's firms, Scotland has a similar prevalence to Wales and lags behind only Greater London and the South East in the UK.
- The majority of Scotland's high growth firms are concentrated in Scotland's most populated and prosperous areas, such as Aberdeen, Edinburgh and Glasgow.

1.4 Summary of data related to Thematic Objective 4: Supporting the shift towards a low-carbon economy in all sectors

- Evidence shows that Scotland has a growing renewables sector. Over the last decade, installed renewable electricity capacity in Scotland has risen substantially. This is particularly the case for wind power.
- Electricity generated from renewable resources delivered higher equivalent proportion of Scottish gross consumption than the corresponding proportion for the EU as a whole However, a small number of European countries have a higher proportion of electricity consumption from renewables than Scotland.
- Of the UK nations and regions, Scotland has by far the greatest electricity generation from renewables per unit of economic activity (as measured by gross value added).
- Scotland has significant growth opportunities in offshore wind, wave and tidal technologies. This is expected to lead to associated opportunities in supply chain, manufacture and installation/maintenance for these and other low-carbon technologies.
- Evidence shows that renewable heat output approximately doubled in the period from 2008/09 to 2010.
- Total final energy consumption in Scotland fell between 2005 and 2010.
- Scotland is making progress towards reducing emissions - emissions of greenhouse gases have also been declining and are now almost a quarter below 1990 levels.

1.5 Summary of data related to Thematic Objective 6: Protecting the environment and promoting resource efficiency

- Landfill waste has fallen significantly over the last decade. A significant proportion waste is now being recycled or composted. Over the period from 2000/01 to 2010/11, the proportion of local authority collected municipal waste recycled or composted rose from 4.5 per cent to 38.2 per cent.
- The market for recycled materials remains relatively embryonic. This may provide an opportunity for SME development as well as increased resource efficiency.
- Scotland's air quality has improved since 1990 in terms of the quantity of seven key pollutants monitored by the Scottish Government.
- Between 1992 and 2011, the proportion of river length that was classed as slightly polluted, polluted or severely polluted in Scotland rose from 6.8% in 1992, to 7.4% in 1998, before falling to 2.8% in 2011.
- Whilst a large proportion of SMEs have taken at least some steps to reduce their environmental impact, two thirds have reported that they would not do more than they do currently to reduce their environmental impact.

1.6 Summary of data related to Thematic Objective 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures

- The most recent data shows that in 2011, 11.2 per cent of driver journeys were delayed due to congestion. This was down by around 3 percentage points from the 2007 level.
- Evidence suggests that whilst Scotland performs well in relation to sustainable transport promotion, more could be done to encourage greater uptake amongst the population.
- The proportion of adults in Scotland usually travelling to work by public transport or active transport (such as walking or cycling) has remained broadly stable over the past decade – at around 30 per cent.
- Cars, vans and lorries accounted for the vast majority of miles travelled, within Great Britain, per year per Scottish resident according to the most recently available data.
- The number of ScotRail passenger journeys (that is, journeys within Scotland) increased by 41 per cent between 2003 and 2011.

1.7 Note on NUTS regions in Scotland

There are four NUTS 2 regions and 23 NUTS 3 regions in Scotland. The NUTS regions in are only partially aligned to the 32 local authority areas. The NUTS 2 regions and corresponding local authorities are:

North Eastern Scotland: Aberdeenshire and Aberdeen City

Eastern Scotland: Angus, Clackmannanshire, Dundee City, City of Edinburgh, East Lothian, Falkirk, Fife, Midlothian, Perth and Kinross, Scottish Borders, Stirling and West Lothian

South Western Scotland: Part of Argyll & Bute, Dumfries and Galloway, East Ayrshire, East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, most of North Ayrshire, North Lanarkshire, Renfrewshire, South Ayrshire, South Lanarkshire and West Dunbartonshire

Highlands and Islands: Most of Argyll & Bute, Eilean Siar, Highland, Moray, part of North Ayrshire, Orkney Islands, Shetland Islands

1.8 Summary Policy Context for Social Fund Interventions

Overall, business culture in the UK is geared towards growth through company sales, mergers and acquisitions rather than 'patient capital' and indigenous growth. This is reflected in the dominance of SMEs, the corresponding importance of major companies and employers in different geographies; and the very modest mid-sized business base. It is also reflected in the poor performance in business R&D, where longer-term investment might help small businesses flourish and grow.

Scotland's two Enterprise Agencies operate support programmes for high growth companies through account managers. This offers intensive support for growth, but numbers are relatively limited and there is little evidence of an 'exit strategy' form this type of support – a point at which companies no longer need the support, and would therefore free up a space for a new growth company to be supported. Basic and start up business advice, and local economic development support, is offered through Business gateway by the local authorities. This does not connect to the high-growth support; and does not specifically target small to medium growth patterns.

The ERDF might usefully focus on ensuring that companies in key sectors and locations with long-term growth potential are identified early and supported through innovation, investment and growth cycles to reach their potential, regardless of which agency is best able to help. Such use of the funds would also support the 'Team Scotland' approach to business and innovation support, recognising that businesses need a single access point and referral network to get help with e.g. exporting, skills and digitalisation, rather than having to get the help from multiple sources.

Scotland's Digital Strategy focuses on four key elements – an improvement to the network (step change) by 2015, a world class network by 2020, usage and skills. Although the network is not identified as a priority at UK level, several areas of Scotland remain either entirely without coverage; or with very slow speeds. This impedes both social inclusion and participation, access to services, and business competitiveness in those areas, and roll-out in these specific areas therefore remains a policy focus for the Scottish Government.

Scotland has a recognised commitment to and opportunity in the low carbon economy, building on expertise in engineering and energy sectors, and with an ambition to radically decarbonise e.g. transport, business, and energy production and consumption. There are also significant ambitions to develop a 'circular economy' where waste products are re-used in other products and processes.

As with the Social Fund, one of the most significant factors shaping Scotland's success or failure in reaching low-carbon relevant Europe 2020 targets will be understanding the policy responses required in different areas of Scotland. Different regions have different asset bases and strengths, and even within this major area of opportunity, it will be important to identify where those relative strengths lie if Scotland is to make the most of them; for example exploiting areas with strong engineering and manufacturing history, making the

most of the current skills set in the oil and gas sectors, and recognising the needs and opportunities in remote rural areas for deployment and maintenance. The notion of 'Smart Specialisation' should not only apply to research and innovation, but also to economic development in general.

It will also be critical that opportunities in economic development are supported by skills and workforce development by the Social Fund. There has been a tendency to focus both national and EU funds at employability and basic skills levels, but it is increasingly recognised in policy that if Scotland is to build a more competitive and outward-looking economy, it must also build its human capital. The Social Fund interventions should therefore match to those same Smart Specialisation principles.

1.8.1 Previous Use of Structural Funds and Institutional Landscape

The lessons learned report compiled for the 2007-13 programme highlights that small and fragmented interventions are not achieving the results desired; and are unlikely to make a measurable contribution to Europe 2020. The intended programme design for both ESF and ERDF is therefore based on lead partners taking responsibility for significant programmes of work to deliver outcomes; with smaller organisations involved through procurement or transparent project selection as delivery agents.

This has been trialled to a great extent through the 2007/13 programmes and the Strategic Delivery Body arrangement with Scottish Enterprise and Highlands and Islands Enterprise, and to some extent the University of the highlands and Islands, which have delivered high-quality innovation outputs in particular. As an ambition in relation to ESI Funds is to start the programmes early so that funding can help return Scotland to recovery and growth. This and the extensive development work carried out over the past few years to local authority, enterprise agency and national agency responsibilities suggests that Scotland should build on existing skills rather than trying to replicate them.

SE, HIE and SDS have recently carried out significant 'alignment' work to streamline the innovation offering to businesses, working with the Scottish Funding Council as the funder of further and higher education. Building on this alignment work and the services designed through it would allow greater reach and an increased focus on commercialisation/business innovation; as well as extending support for centres of excellence and innovation capacity in key smart specialisation sectors and geographical clusters. It will also ensure alignment with Horizon 2020 advice and support offered by these organisations; and the link to SFC should ensure that skills development matches both business and innovation support for key national and regional sectors.

The Enterprise Agencies are also involved in business development and competitiveness, alongside local authorities, Visit Scotland and existing business. Directing ERDF through these agencies, but altering how they work together and ensuring that they bring in new companies rather than focus on existing client bases, may offer the best opportunity to both delivery the programmes early and instigate long-term reforms in how growth businesses are identified and supported. A specific focus might be on growing medium-size businesses, and on identifying and developing the next generation of high growth companies in Scotland.

The low carbon delivery landscape is already quite cluttered, with a multitude of funds and investors interested, but not enough projects ready for investment. Rather than compete, ERDF could identify a specific role around developing projects for others to invest in – changing the shape and scale of investment risk by supporting the first development stages and helping projects across a range of low carbon platforms to take off for a relatively

modest amount of funding. This is likely to require a new delivery channel, but this could be based on procuring specialist advice in addition to a small co-ordination centre.

Resource efficiency advice is already delivered through Zero Waste Scotland, but more could be done to strengthen the reach of this; and to help turn advice into tangible investment help to bring about real efficiency.

Access to finance has been trialled extensively in Scotland, through the Scottish investment Bank and the local authority loan funds. Thought should be given as to whether to continue to capitalise these arrangements, extend the scope of rpoducts, establish new delivery models or a combination of all three to service the need for access to finance for business development, innovation, low carbon development and potentially other areas.

1.8.2 Summary Policy recommendations

- Scotland needs to make more of its SME base to provide long-term stable growth and employment, and should therefore support SME's through growth and innovation cycles with an aim of identifying the next generation of growth businesses; and growing the medium-sized business base. This needs to include a wide range of interventions, from skills and leadership to digital exploitation to access to finance and direct innovation support.
- Innovation has been very focused on universities and cutting edge research – more needs to be done to assist commercialisation in all sectors, with a particular focus on key sectors identified in the Government Economic Strategy (which also acts as the smart specialisation strategy)Both competitiveness and innovation will need to be supported by access to finance options, as this remains a weakness in the current economic climate. The focus of access to finance should remain flexible enough to adapt to changes in market failure over the programme life-cycle.
- To ensure that all of Scotland can benefit from business and service opportunities offered, it may be necessary to support the roll-out of broadband in remote areas. If so, ERDF interventions should be tightly focused on those areas where there is clear market failure and where current interventions do not deliver the necessary infrastructure.
- Low carbon and resource efficiency related growth is a major opportunity for Scotland, but one with many interested investors with more money than is available through these funds, and with fewer regulatory restrictions. It may be sensible to focus instead on helping a pipeline of projects to market than trying to compete with it
- Whilst the scale of funds do not offer the potential for large investments in transport, there could be scope for activity which incentivises modal shift in passenger transport by making it safer and more convenient

2 Thematic Objective 1: Strengthening research, technological development and innovation

A key thematic objective of the 2014-2020 ERDF Programmes is to strengthen research, technological development and innovation.

This section provides an evidence base on how Scotland currently performs in research and innovation activity by considering indicators on:

- research and development undertaken by businesses in Scotland including expenditure on this activity
- innovation in Scotland including evidence of the barriers to innovation

This section reviews the available evidence to establish the need for ERDF intervention by outlining Scotland's performance in both UK and EU contexts and, where possible, regional variations in performance within Scotland.

2.1 Research

Innovation and commercialisation will be key drivers in Scotland's transition towards a low carbon economy, and in delivering faster sustainable economic growth. Innovation is crucial for businesses to maintain profitability and competitiveness, and to provide high value products and services in a competitive, globalised knowledge-based economy. Research and development (R&D) activity is a key component of innovation and also demonstrates the strength of the economy in terms of having the required expertise, skills and knowledge-exchange environment that enables businesses to gain a competitive edge.

The Scottish Government remains strongly committed to the European Union's "Innovation Union" ambitions, and recognises that innovation is crucial for businesses to maintain productivity and competitiveness, and to provide high value products and services in a competitive, globalised knowledge based economy.

As highlighted in the Government Economic Strategy[1], the Scottish Government is focused on innovation in its widest sense - covering the development of new processes, products, services and business models to take advantage of global and market opportunities, often through incremental change.

2.1.1 Gross expenditure on R&D

With the aim of encouraging greater participation in innovation and R&D activities. Europe 2020 has set headline target of "raising the combined public and private levels in research and development to three per cent of GDP"[2].

The Scottish Government has a National Performance indicator to measure spending on research and development in Scotland recognising the importance of this towards achieving two of our National Outcomes - making Scotland the most attractive place to do business in Europe[3] and ensuring Scotland is renowned for its research and innovation[4]. As Figure 1

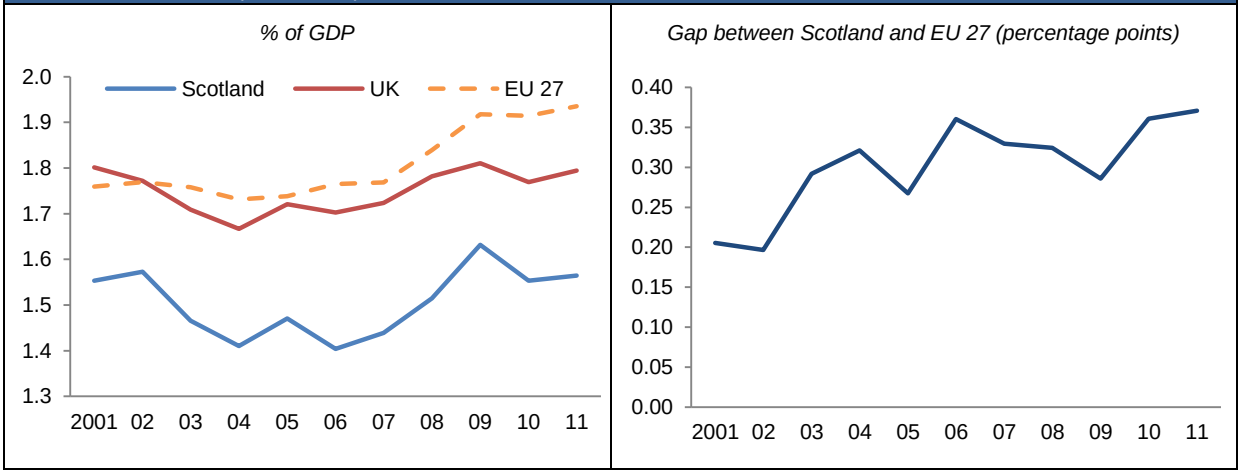
[1] http://www.scotland.gov.uk/Publications/2011/09/13091128/0
[2] http://www.scotland.gov.uk/Publications/2013/04/9331
[3] http://www.scotland.gov.uk/About/Performance/scotPerforms/outcome/business

shows progress towards achievement of this indicator is measured by Scotland's Gross Expenditure on Research and Development (GERD) as a percentage of GDP compared to the UK and EU averages. GERD includes the R&D expenditure of businesses, government, higher education, and the private non-profit sector[5].

- In 2011, Scotland's Gross Expenditure on Research and Development as a percentage of GDP was 1.56 per cent. For the EU27, the comparable figure was 1.94 per cent; a gap of 0.37 per cent[6].
- GERD as a percentage as GDP in Scotland has increased since 2006.
- The gap in total research and development spending between Scotland and the EU has ranged from 0.20 to 0.37 percentage points in the last ten years. The latest change shows a slight increase in the gap from 0.36 percentage points in 2010 to 0.37 percentage points in 2011.
- Spending on research and development in Scotland has increased between 2006 and 2011, from 1.40 per cent of GDP in 2006 to 1.56 per cent of GDP in 2011.

Figure 1: Gross Domestic Expenditure on R&D (as % of GDP)

Source: Scottish Government, ONS, OECD.
Note: Does not include private non-profit sector.

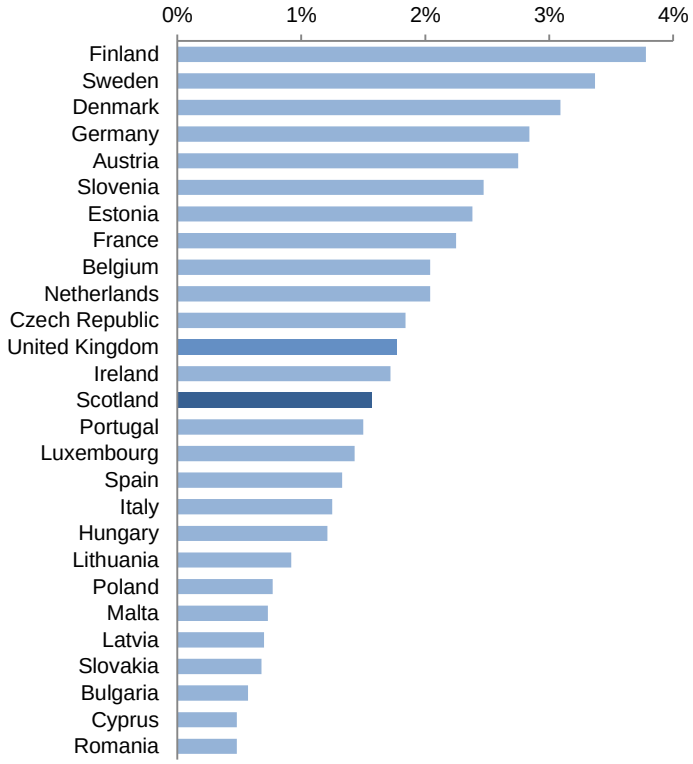


As Figure 2 shows, in 2011 Scotland's GERD as a percentage of GDP was mid-ranking in comparison with EU member states and slightly behind the performance of the UK as a whole Whilst the Scottish Government National Performance indicator is focused on the performance of the EU 27 nations, the performance of Scotland in relation to other small EU nations is also of interest.

[4] http://www.scotland.gov.uk/About/Performance/scotPerforms/outcome/research
[5] Note: This analysis does not include the contribution of the private non-profit sector, as this data was not available prior to 2011.
[6] Note:: The gap is calculated using unrounded data.

Figure 2: Gross Expenditure on R&D, % of GDP, EU member states and Scotland, 2011

Source: Eurostat (for member states), Scottish Government (for Scotland).
Note: Data for Greece is not available for 2011.
Note: Data includes the private non-profit sector



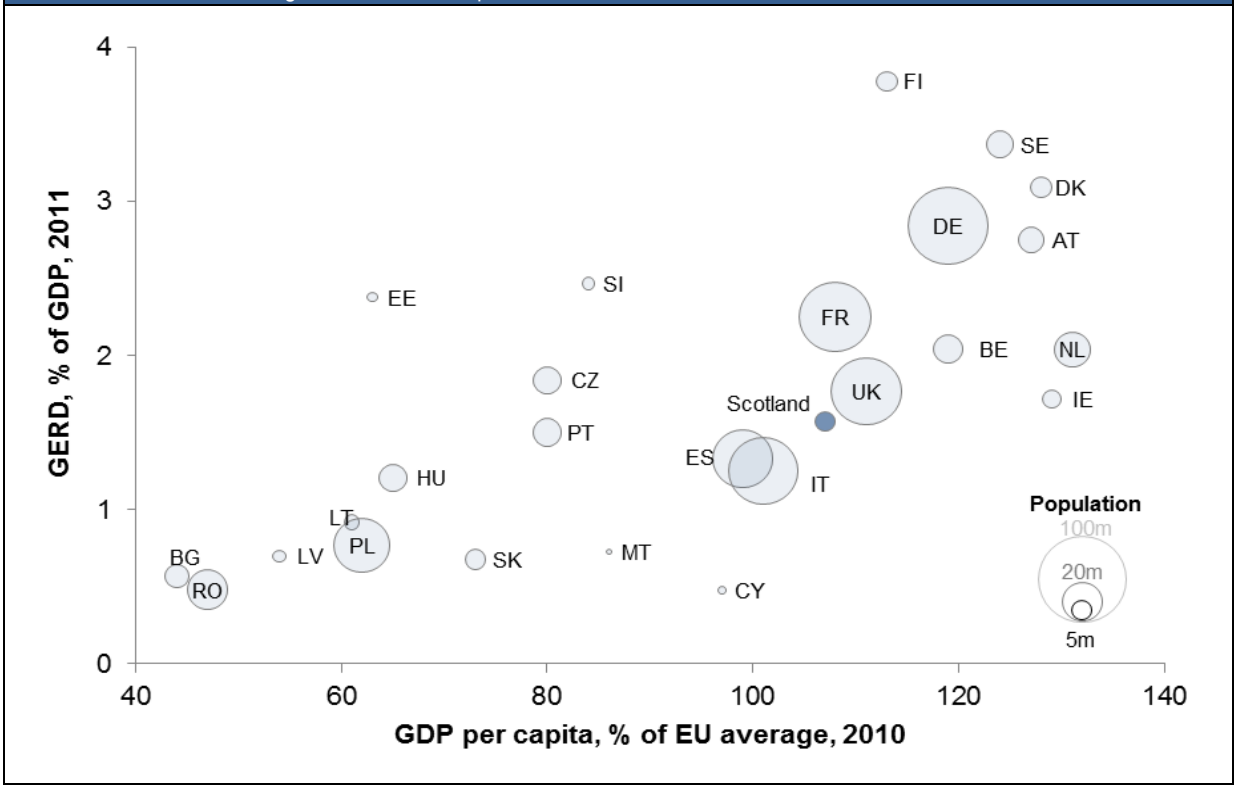
A noticeable trend is that the nations which are outperformed by Scotland, in terms of their expenditure on R&D as a proportion of GDP, tend to be the nations of Southern Europe such as Portugal, Spain and Italy (Figure 2 and Figure 3).

However, the nations which outperform Scotland are generally those of Northern Europe including Finland, Sweden and Denmark. Specifically, Denmark 3.1 per cent), Sweden (3.4 per cent) and Finland (3.8 per cent).

Figure 3: GERD as a percentage of GDP, 2011

Source: Eurostat

GERD data for Greece is not available. Luxembourg is not shown because its GDP per capita index (266) would compress the horizontal scale. Luxembourg's GERD was 1.43 per cent of GDP in 2011.



In relation to UK performance, Scotland ranks 6th amongst UK nations and regions in terms of total GERD, GERD per capita, and GERD as a percentage of GDP (Figure 4). The East of England and South East are the strongest performers in the UK on these measures.

Scotland accounts for around seven per cent of total UK GERD in 2011. This is over three and a half times the proportion contributed by the devolved nation of Wales (2 per cent) and the devolved nation of Northern Ireland (1.9 per cent). However, Scotland's performance still lags behind a number of UK regions including East of England, South East and North West.

Figure 4: Gross Expenditure on R&D by Government Office Region, 2011

Sources: Scottish Government and ONS.
Note: GERD as a percentage of GDP figure differs slightly from Figure 1 as the figures reported in this table include the private non-profit sector.

	GERD, £ millions	GERD per head of population, £	GERD as a percentage of GDP	Percentage of UK GERD
East of England	4,695	801	3.62	17.1
South East	6,490	750	2.96	23.7
North West	2,924	414	2.07	10.7
London	3,321	405	1.03	12.1
South West	2,136	403	1.85	7.8
Scotland	**1,934**	**368**	**1.57**	**7.1**
East Midlands	1,594	351	1.72	5.8
Northern Ireland	520	288	1.53	1.9
West Midlands	1,601	285	1.47	5.8
Yorkshire & the Humber	1,097	207	1.06	4.0
North East	513	198	1.08	1.9
Wales	556	181	1.03	2.0
UK	**27,380**	**433**	**1.79**	**100.0**

Since 2001, GERD has increased by 19.4 per cent in real terms (excluding the private non-profit sector sector). GERD is comprised of both public and private sector spending on R&D. A breakdown of the GERD figures shows that since 2001, BERD has increased by 4.8 per cent in real terms, HERD has increased by 47.7 per cent and GovERD has decreased by 1.5 per cent[7].

In 2011, GERD in Scotland totalled £1,934 million. This comprised:

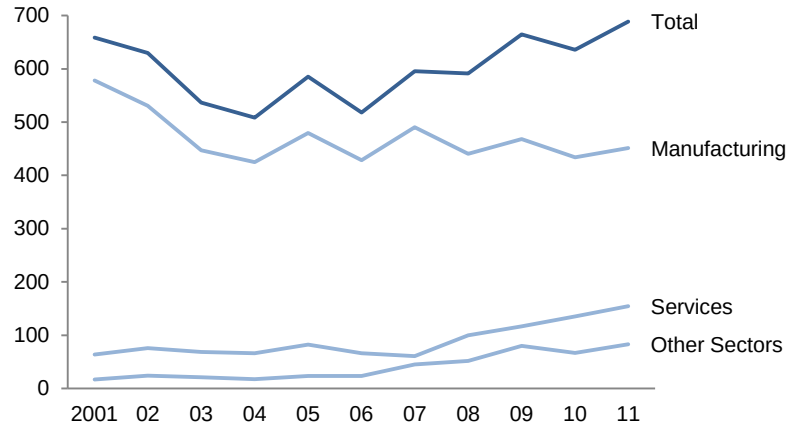
- Business Enterprise R&D (BERD) expenditure of £689 million
- Higher Education R&D (HERD) expenditure of £953 million
- Government Expenditure on R&D (GovERD) of £283 million
- Expenditure by the private non-profit sector of £9 million

2.1.2 Business expenditure on R&D

Business expenditure on research and development (R&D) is crucial to the competitiveness of Scotland's economy. It is considered to be a key determinant of productivity growth and economic performance.

[7] Gross Expenditure on Research and Development in Scotland 2011 – Scottish Government http://www.scotland.gov.uk/Resource/0041/00417243.pdf

Figure 5: BERD Expenditure in Scotland, £ million (real terms, 2011 prices)
Source: Scottish Government, ONS



As Figure 5 shows, BERD expenditure in Scotland in 2011 was £689 million. This was up by £53 million (8 per cent) in real terms from the previous year. In 2011, BERD expenditure in Scotland accounted for 4.0 per cent of total UK BERD expenditure, and for 0.56 per cent of Scottish GDP.

The 2011 BERD figures for Scotland show that:

- **By sector:** BERD expenditure in Scotland is dominated by the Manufacturing sector (£452 million, 65.5 per cent), followed by the Services sector (£155 million, 22.5 per cent) and then other sectors (£83 million, 12.0 per cent), such as extractive industries. Over one third of Scottish BERD expenditure was supported in just two product groups in the manufacturing sector: 'Pharmaceuticals' and Precision instruments and optical products; photographic equipment'. Over the past decade, BERD expenditure in non-manufacturing sectors has grown substantially from a low base.
- **By ownership:** US-owned firms undertook 41 per cent of business R&D in Scotland, followed by Scottish owned firms (30 per cent).
- **By funding source:** Just under three quarters (73 per cent) of R&D undertaken by businesses in Scotland was funded by businesses, 8 per cent was funded by the government, 18 per cent came from overseas and 1 per cent was funded from other sources.
- **By size of firm:** The largest companies (400 employees and over) accounted for 56 per cent of total BERD expenditure.
- **By local authority:** Almost 45.0 per cent of BERD expenditure was undertaken by businesses located in just three local authority areas: The City of Edinburgh (22.5 per cent), West Lothian (12.1 per cent) and Aberdeen City (10.2 per cent).
- **By UK regions and countries:** Within the UK, the bulk of BERD expenditure takes place within the South East (26.0 per cent) and the East of England (20.9 per cent) regions. In terms of expenditure as a percentage of GDP, Scotland ranked eighth out of the 12 UK regions/countries in 2011.
- **By international comparisons**. BERD expenditure as a percentage of GDP has historically been lower in Scotland than in other countries. The BERD expenditure as

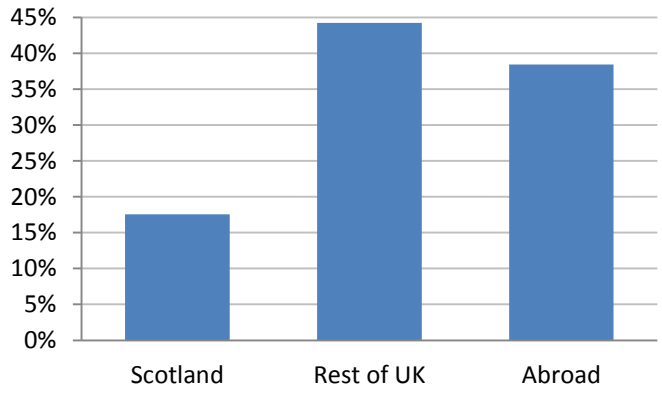
a percentage of GDP figures for 2011 are currently not available for the majority of countries and as a result the EU average for 2011 is not yet available. From the limited international data available for 2011 it can still be seen that leading countries have expenditure levels more than three times higher than Scotland (e.g. 1.92% of GDP in Germany).

That a high proportion of Scotland's BERD activity is concentrated in a small number of sectors and regions, and that foreign-owned companies carry out a high proportion of total BERD is not unsurprising given the promotion efforts by the Scottish Government and Scottish Development International to attract foreign direct investment (FDI) into Scotland. Although recent figures show a decline in the number of FDI projects in Scotland, for the second year running Scotland was the leading region in the UK for generating employment for FDI with almost 6,000 jobs created in 2011; over 2,000 than any other region[8].

There are already a significant number of foreign-owned enterprises operating in Scotland. Although foreign-owned enterprises accounted for just one per cent of the total number of registered enterprises in Scotland in 2012, they accounted for almost two fifths (38 per cent) of large enterprises as Figure 6 shows. This is a long running trend within the Scottish economy.

Figure 6: Ownership of registered large (250+) enterprises, Scotland, 2012

Source: Businesses in Scotland 2012 (Scottish Government)



A key policy issue is whether inward FDI boosts the economic development of the host country. Aside from the job creation and output created by the new investment, economic literature tends to suggest that overall, FDI has wider positive impacts, particularly through positive spillover effects in terms of boosting productivity if domestic firms and making the economy more efficient. In addition, it is thought that FDI can lead to agglomeration economies; inward investors are attracted to an area where there are already a concentration of firms in the same industry leading to a clustering effect. However, FDI may lead to negative impacts for the host economy. One of which is the emergence of a branch plant economy where a foreign country has a number of plants within the host country . A branch plant economy in one which a foreign nation has lots of factories/plants set up in the

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http://www.ey.com/Publication/vwLUAssets/2012_Scotland_Attractiveness_Survey/$FILE/EY_2012_Scotland_Attractiveness_Survey.pdf

national economy (for instance this famously happened with American firms in Canada). This may occur because foreign firms want to take advantage of a new market or because cost/tax regimes are preferable. There are concerns amongst economists that this leads to the host economy's manufacturing base becoming too reliant on outside expertise and resources. This may lead to less research and development spending in the national economy.

This criticism has been applied to the Scottish economy; Scotland has historically been a branch plant economy for countries like the US and Japan who want to set up operations, often low skilled work, in a cheap European country where they can also gain access to the European Union (and hence the free market). The problem with this type of industrial strategy is that, in times of economic difficultly, Scotland's industries main be vulnerable to closure from their foreign owner in an attempt to reduce costs. Indeed, this was the case in 2002 when the Taiwanese company *Chunghwa Picture Tubes* massively scaled back its operations in Scotland – cutting Scottish jobs from 639 to between 40-50. The company cited "current global economic conditions" for its decision.

These are long-standing concerns about the Scottish economy. However, more recently the efforts of Scottish Development International (SDI) have been focused on attracting high value jobs to Scotland. The 2010 evaluation of SDI[9] estimated that the number of high value added (HVA) jobs supported by SDI supported investors was 2,166 in the year 2009/10. This is an increase from 1,774 in 2006/07. The total number peaked in 2007/08 at 2,578.

Recent success stories in this area include the investment of £15.5 million by Toshiba in the Scottish life sciences sector[10] and the generation of 500 new jobs by Avaloq Innovation to support their new software development centre in Edinburgh[11].

There is a great of deal of potential for Scotland to expand and strengthen its BERD activity by diversifying across sectors and regions and increasing the level of R&D activity carried out by Scottish companies.

2.1.3 Key messages

- Although Scotland's expenditure on GERD has risen since 2006, Scotland is a mid-ranking performer within the UK and lags behind the EU average and a number of key comparator countries such as Denmark, Sweden and Finland.
- Business expenditure on R&D – a key driver of productivity and economic performance within economies – is weak. Not only is Scotland's BERD performance historically lower than its comparators, its concentrated within the manufacturing sector and dominated by large and foreign-owned firms.
- Spending on higher education R&D in Scotland remains world class with Scotland coming top within the UK's regions and nations and third amongst those OECD countries for which the most recent data was available.
- Despite Scotland's knowledge exchange index – which tracks exchange of knowledge between universities to the wider economy – rising slightly in recent years, the gap between Scottish performance on HERD and BERD suggests that

[9] Scottish Development International Policy Evaluation Report May 2010
http://www.sdi.co.uk/~/media/SDI/Files/documents/about-us/independent-evaluation-report-2010.pdf
[10] http://www.sdi.co.uk/news/2011/07/sdi-ls-toshiba-invests-15-and-half-million-in-scots-life-science-sector.aspx
[11] http://www.sdi.co.uk/news/2012/02/avaloq-centre-to-create-500-jobs.aspx

more support is needed to encourage business-to-academia linkages, commercialisation of research produced by Scotland's world class higher education sector and encourage business investment.

2.2 Innovation

Increasing the level of research and development activity, encouraging innovation, and improving levels of commercialisation is recognised by the Scottish Government as being vital to boosting Scotland's growth performance.

Smart specialisation means identifying the unique characteristics and assets of a country and its region, highlighting each region's competitive advantages, and rallying regional stakeholders and resources around an excellence-driven vision of their future. It also means strengthening regional innovation systems, maximising knowledge flows and spreading the benefits of innovation throughout the entire regional economy . For the 2014-2020 programming period, the European Commission has proposed that smart specialisation is an ex ante conditionality for supporting investments in two key policy areas – one of which is strengthening research, technological development and innovation. This focus suggests that an developing an evidence base that assesses and identifies of Scotland's strengths in this area is crucial.

The *Government Economic Strategy*[12] identifies that innovation in its widest sense must be recognised and encouraged across the entire business base, whether large or small, long-term established or starting up, science and technology based or more traditional or service based business. This involves developing new processes, products, services and business models to take advantage of global and market opportunities, often through incremental change.

In addition to research and development undertaken by business in Scotland, it is important to ensure that the knowledge generated in Scotland's universities is effectively exchanged with business. Enhanced knowledge exchange from universities has the potential to contribute to both improved economic output from existing businesses and the creation of new, high value businesses with the capacity to grow and energise Scotland's GDP performance. It also has the potential to deliver social and cultural gains for Scotland. In recognition of this, Scotland's National Performance Framework[13] includes an indicator on knowledge exchange from university research. The indicator is an index which captures the Scottish Higher Education (HE) sector's income from a variety of knowledge exchange activities ranging from the commercialisation of new research to the delivery of professional training and consultancy services. Over the period 2002-03 to 2010-11, there has been an overall increase in the knowledge exchange index. In 2010-11, the latest year for which data is available, the index rose by 2.2 per cent. This was driven by an increase in: income from non-UK industry, commerce and public corporations; income from venture capital; and income from third sector translational awards.

Research and development expenditure by higher education is similarly positive with respect to Scotland's performance. In line with the long term trends, Scotland continues to perform well on HERD but less so on BERD. In 2011, in terms of HERD expenditure as a percentage

[12] http://www.scotland.gov.uk/Publications/2011/09/13091128/0
[13] http://www.scotland.gov.uk/About/Performance/scotPerforms/indicator/knowledge

of GDP, Scotland came top of the UK countries/regions and came third highest among OECD countries for which data is available.[14]

Scotland's innovation performance is also tracked through wider innovation measures. The Community Innovation Survey provides a regular snapshot of innovation inputs and outputs. It also looks at the constraints faced by UK businesses in their innovation efforts across the range of UK industries and business enterprises.

The 2011 UK Innovation Survey[15] found that 29 per cent of businesses in Scotland were 'innovation active' during the three-year period 2008-10.[16] This compares with 31 per cent of businesses in the UK as a whole and 38 per cent of Scottish businesses in the 2009 survey, which covered activity in the period 2006-08. However, as well as changes to the sampling for the survey, there is generally variation in the regional innovation estimates between surveys reflecting differences in industrial make-up and the associated variability in business and product life cycles across sectors. Uncertainty in the UK economy is also likely to have had an impact between the two surveys. These factors combined limit the comparability between the 2009 and 2011 survey results for Scotland.

As Figure 7 shows, acquisition of capital and internal R&D were the two largest components of innovation expenditure by businesses in Scotland in 2010. Acquisition of external R&D accounted for 23.8 per cent of innovation expenditure in the UK as a whole, but only 2.3 per cent of innovation expenditure in Scotland. It is unclear why there should be such a stark difference between the proportion of R&D acquired externally, which includes acquiring R&D through merger and takeover activities. A possible explanation may be differences in the structure of the Scottish and UK economies. For example, Scotland has a very different business makeup compared to the UK as a whole. The most recent data showed that Scotland had a business stock rate of 769 enterprises per 10,000 adults in 2012 compared to 935 enterprises per 10,000 adults in the UK as a whole[17].

Figure 7: Innovation expenditure in 2010, percentage of total expenditure

Source: UK Innovation Survey

	Scotland	UK
Acquisition of capital	42.7	30.3
Internal R&D	37.3	33.9
All forms of design	9.5	4.5
Market introduction of innovations	4.5	4.4
Acquisition of external R&D	2.3	23.8
Training for innovative activities	2.1	1.7
Acquisition of external knowledge	1.7	1.5
Total	100.0	100.0

The UK Innovation Survey looks at the factors driving innovation, barriers to innovation and reasons as to why some businesses do not innovate. Key results for Scotland are as follows.

[14] http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/RD/GERDreport

[15] http://www.bis.gov.uk/policies/science/science-innovation-analysis/cis

[16] Innovation active business are those which are engaged in any of the following: introduction of a new or significantly improved product or process; in innovation projects that are not yet completed or abandoned; or new and significantly improved forms of organisation, business structures or practices and marketing concepts or strategies.

[17] Businesses in Scotland 2012, http://www.scotland.gov.uk/Resource/0041/00411283.pdf

- **Factors driving innovation:** Among broader innovators,[18] improving quality of goods or services was the factor most frequently rated as highly important to the decision to innovate (38 per cent of broader innovators). This was followed by increased market share (29 per cent), reducing costs per unit (26 per cent), and increasing range of goods and services (25 per cent). These results reinforce the known strong customer-focused approach to innovation.
- **Constraints to innovation:** Cost factors (in particular, the availability and cost of finance and the direct cost of innovation) and perceived economic risks were the constraints to innovation activity that were most frequently rated as highly important. UK-level data indicates that SMEs are more likely than large firms to rate these constraints as highly important. In Scotland, those in engaged in innovation activity were over three times as likely to perceive cost factors as barriers than businesses that did not innovate. This suggests that businesses learn about barriers to innovation as a result of their attempts to innovate.

In the data for the UK as a whole, the most frequently cited reason for not innovating was factors constraining innovation (cited by a third of non-innovators) with just over a quarter of non-innovators reporting that there was not a market need.

The proportion of innovators that export is much higher than the corresponding proportion of non-innovators. Data for Scotland from the 2011 UK Innovation Survey indicates that 20.8 per cent of innovators were exporters, compared to only 3.3 per cent of non-innovators.

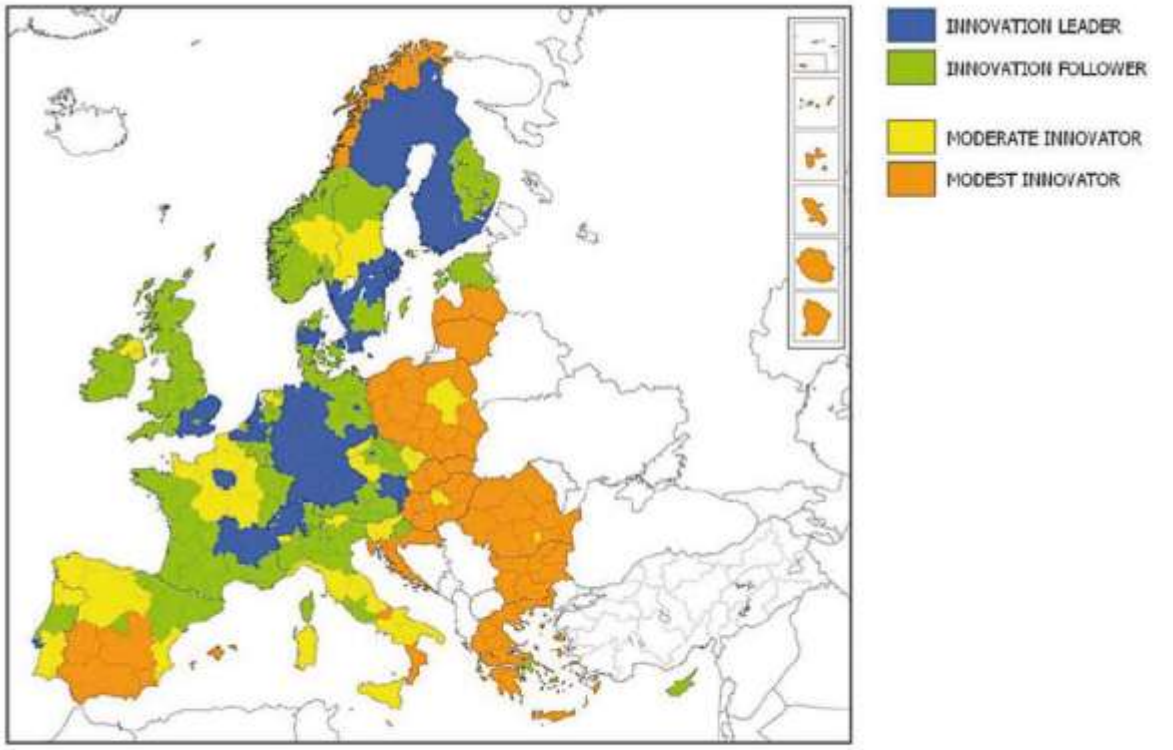
The Regional Innovation Scoreboard provides a comparative assessment of how European regions perform with regard to innovation. The report covers 190 regions across the European Union, Croatia, Norway and Switzerland. The Regional Innovation Scoreboard 2012 classifies the European regions into four innovation performance groups. There are 41 regions in the first group of "innovation leaders", 58 regions belong to the second group of "innovation followers", 39 regions are "moderate innovators", and 52 regions are in the fourth group of "modest innovators".

As an innovation follower, Figure 8 shows that Scotland performs well in comparison with the rest of the UK - with the East of England and the South East reported as innovation leaders and the majority of the rest of the UK seen as innovation followers. Scotland compares favourably with the rest of the EU also. Figure 8 shows that Scotland dominates Eastern and much of Southern Europe when it comes to innovation. Whilst Scotland is comparable to nations such as Denmark, Finland and Sweden, many of the regions within these nations are innovation leaders.

[18] Broader innovators comprise innovation active businesses (as defined in footnote 16) and businesses carrying out activities in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

Figure 8: Regional Performance Groups

Source: Innovation Union Scoreboard 2013



The EU Member States Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta are not included in the RIS analysis. Group membership shown is that of the IUS. Map created with Region Map Generator.

In addition to the evidence from the Innovation Surveys, Scotland's innovation performance can also be measured through the number of patent applications per million population. Data from Eurostat[19] shows that patent applications to the European Patent Office by Scottish businesses have fallen considerably over the last few years while the EU and UK average have not shown such drastic declines. Eastern Scotland, a previously strong patent application region, has seen a particularly marked decline.

2.2.1 Key messages

- Recent evidence suggests that the proportion of Scottish firms that are innovators may be stalling and that Scotland continues to lag behind the UK.
- In comparison with other EU regions, Scotland is considered to be an innovation follower. This lags behind some regions within the key comparator countries of Denmark, Finland and Sweden who are judged to be innovation leaders.
- Costs of innovation – in particular the availability and costs of finance and the direct cost of innovation – are the most cited barriers to undertaking innovative activity especially amongst those firms already innovating. This suggests that not only to firms learn about the barriers to innovation as a result of their attempts to innovate but also that support is still required once firms have taken this step.

[19] http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/main_tables

- A clear link between innovation and internalisation exists. Those firms that do innovate are much more likely to be exporters than non-innovators.

3 Thematic Objective 2: Enhancing access to and use and quality of ICT

The thematic objective of enhancing access to and use and quality of ICT covers issues such as:

- extending broadband deployment and the roll-out of Next Generation Access (NGA) broadband networks;
- developing ICT products and services; e-commerce and enhancing the demand for ICT;
- strengthening ICT applications for e-government, e-learning, e-inclusion and e-health.

This section presents the evidence base for Scotland where it exists. This is an area of increasing importance to the Scottish Government with a number of strategies, such as the Scotland's Digital Future: A Strategy for Scotland[20] and Scotland's Digital Future: Delivery of Digital Public Services[21], which are driving forward progress at a fast pace to deliver Scotland's ambition to be a world class digital nation by 2020.

3.1 Fixed broadband infrastructure

The flagship initiative on A Digital Agenda for Europe, set out in Europe 2020, aims to speed up the roll-out of high-speed internet in order to reap the benefits for households and firms.

This ambition is complemented by the focus in the Government Economic Strategy[22]. The GES identifies next generation broadband infrastructure as a support for future innovation in the digital economy and the means of ensuring Scotland's businesses (particularly in rural communities) remain competitive in the global digital environment to take advantage of the new opportunities this revolution will provide. It will also help the transition to a low carbon economy - allowing people to travel less and work from home more.

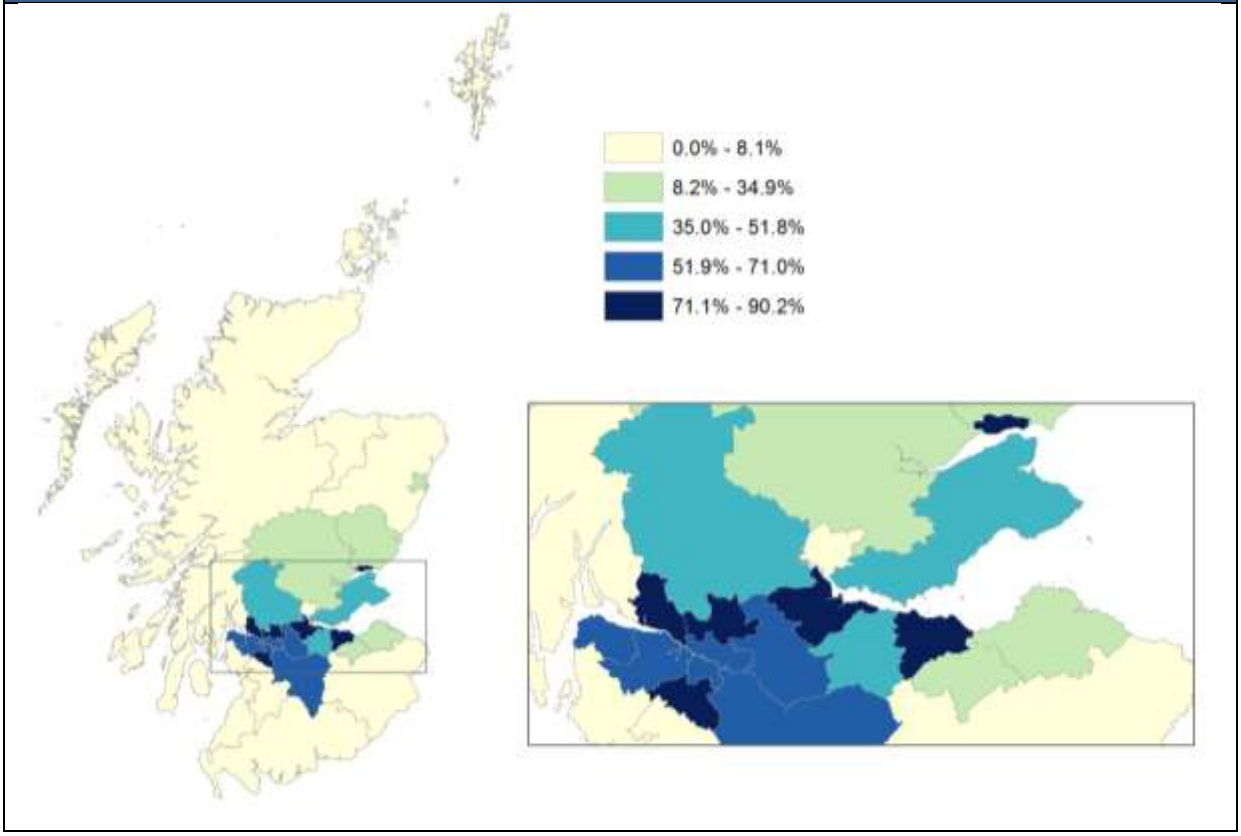
Scottish Ministers' aspiration is for Scotland to be a leading digital nation by 2020. Ensuring the right next generation broadband infrastructure is in place is critical to achieving that ambition. Broadband like roads and railways is a vital part of Scotland's infrastructure and is one that must be invested in to achieve the Government's stated ambitions.

Data from the UK communications regulator Ofcom sows that in 2012, 45 per cent of homes and business premises in Scotland were in "superfast" or NGA (cable or fibre-to-the-cabinet) network coverage areas, compared to 65 per cent in the UK as a whole[23]. As shown in Figure 9, NGA broadband coverage is concentrated in the populous central belt of Scotland and parts of the east coast. Several local authorities in Scotland have with no superfast coverage with those without coverage concentrated with rural and remote locations.

[20] http://www.scotland.gov.uk/Resource/Doc/981/0114237.pdf
[21] http://www.scotland.gov.uk/Publications/2013/02/4411
[22] http://www.scotland.gov.uk/Publications/2011/09/13091128/0
[23] Ofcom, 2012, Infrastructure Report: 2012 Update. Due to the methodology used, the actual coverage is likely to be slightly lower than indicated by this data.

Figure 9: Proportion of addresses in coverage area of superfast networks in 2012

Source: Ofcom

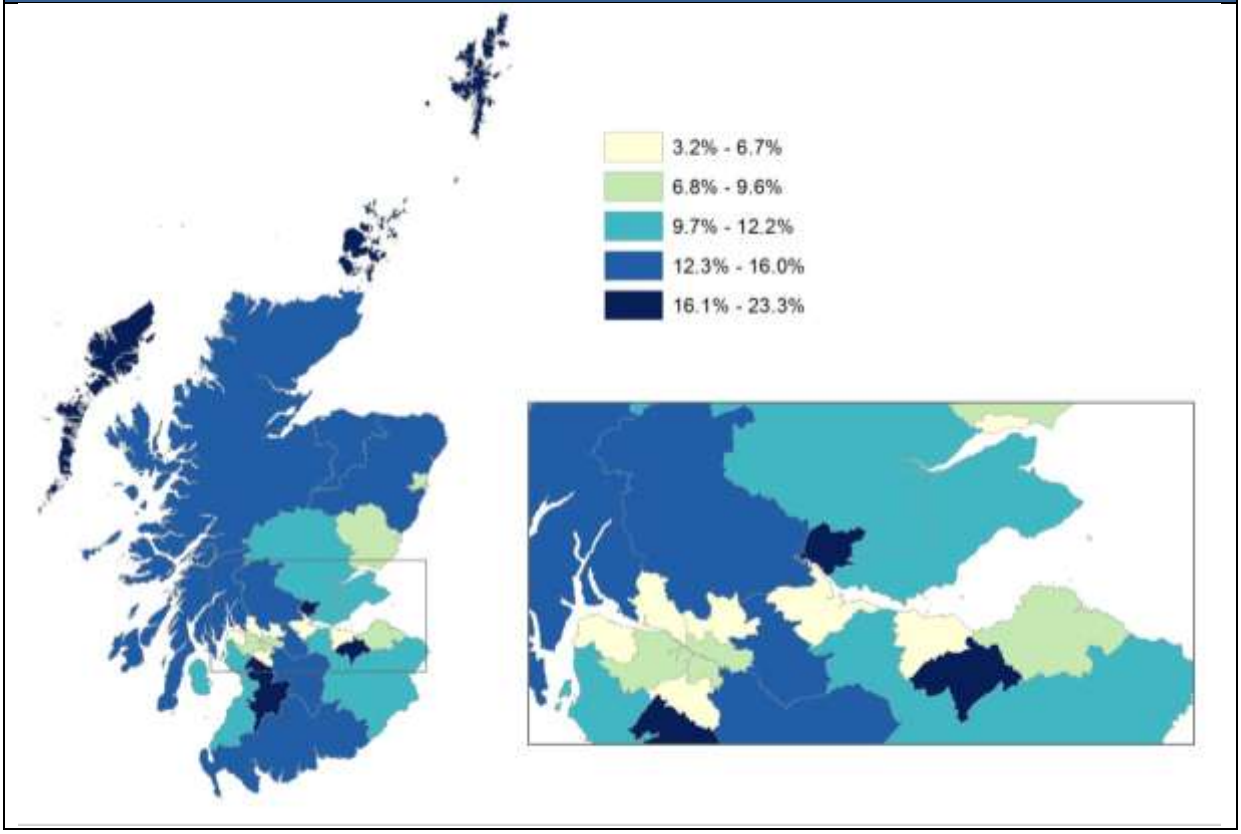


Ofcom data also indicates that 10 per cent of fixed broadband lines in Scotland achieved average download speeds of less than 2 Mbit/s in 2012.[24] This was equal to the corresponding proportion for the UK as a whole. As Figure 10 shows, the Highlands and Islands – a region of low population density – has a relatively high proportion of slow lines. A number of local authority areas in the Lowlands and Uplands, including Clackmannanshire, East Ayrshire and Midlothian, also have a higher than average proportion of slow lines.

[24] Ofcom, 2012, Infrastructure Report: 2012 Update. http://d2a9983j4okwzn.cloudfront.net/downloads/ofcom-uk-broadband-speed-report-2012.pdf.

Figure 10: Proportion of broadband connections not achieving 2 Mbit/s downstream, 2012

Source: Ofcom



Although there are differences in time period covered and definitions of NGA[25], a recent EU study on broadband coverage across Europe in 2011[26]at a NUTS3 level shows that:

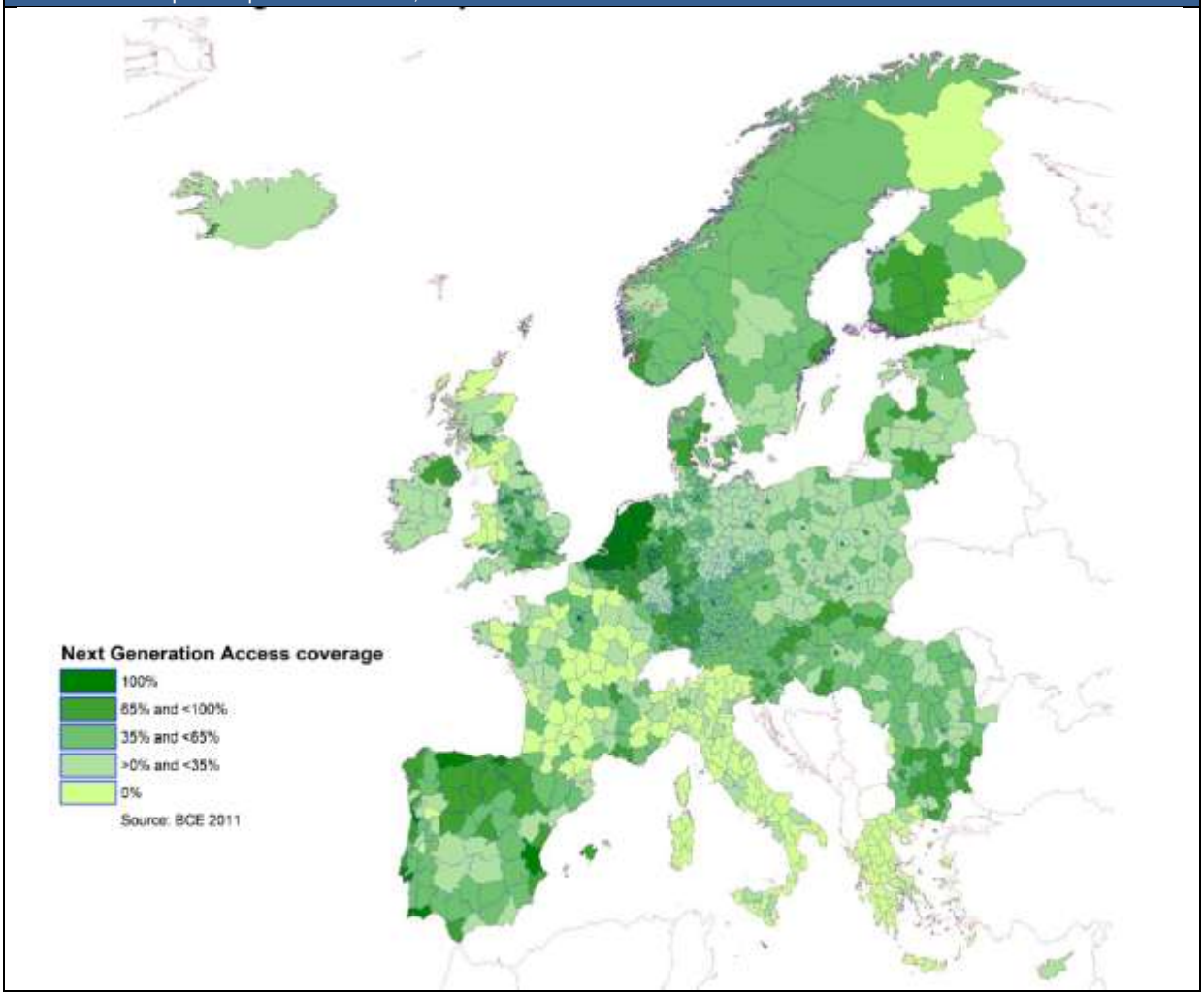
- coverage in many of the less populated areas of Scotland lags behind a number of European NUTS3 regions;
- some of the most densely populated countries - the Netherlands, Malta, Belgium - are already at or near 100 per cent NGA coverage. However, 208 of the 1324 NUTS 3 areas had 0 per cent NGA availability at the end of 2011, many of them in Western Europe.
- Eastern European countries are taking a lead in terms of NGA coverage. Countries such as Lithuania, Bulgaria and Slovenia have seized the opportunity to overcome the deficiencies of their legacy networks by rolling out fibre.

[25] he NGA Coverage combination combines the coverage of the three main fixed-line Next Generation Access technologies; VDSL, Docsis 3 Cable and FTTP. All three are capable of delivering the target of 30Mbps downstream, although VDSL will fall short of that capability where a premises is too far from the serving VDSL node - Broadband coverage in Europe in 2011 - http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?action=display&doc_id=1102

[26] http://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-2011

Figure 11: NGA Coverage at NUTS3 level, 2011

Source: Point Topic/European Commission, 2012



The Scottish Government has set out its intent to deliver a step change in broadband speeds by 2015, paving the way for delivery of a world class, future-proofed digital infrastructure across Scotland by 2020. So far, at least £240 million of public sector funding has been made available to deliver digital infrastructure improvements across Scotland.

The Step Change 2015 Programme comprises two ambitious digital infrastructure projects that will address the current digital divide, connect communities and create a platform for future economic development and regeneration.

The contract for the £146 million Highlands and Islands Broadband project was signed in March 2013. The project, led by Highlands and Islands Enterprise (HIE) and delivered by BT, is being hailed as the UK's most complex and challenging broadband project ever. It means that around 84% of Highlands and Islands homes and businesses will have access to fibre broadband by the end of the project and with nearly all local authorities expected receive a minimum coverage of 75 per cent.

The project for the Rest of Scotland will be delivered by BT, and is being led by the Scottish Government working together with local authorities and Broadband Delivery UK. This project also has a stated ambition of achieving a minimum of 75 per cent coverage within each local authority covered by the project.

During 2012, the Scottish Government commissioned an independent study to quantify the anticipated economic and social benefits of the public sector investment in NGA broadband infrastructure[27]. In total, over a 15-year period (2013–2028), the study estimated that the public sector investment in NGA networks in Scotland will create £1 billion of direct and induced impacts, and lead to a further £2 billion in economic benefits (discounted to 2013). This represents a total economic impact of upgrades funded by the public sector investment over the 15-year period of 2.9% of Scotland's GVA in 2011.

The benefits for Scotland are particularly high due to the high number of business sites within the intervention area, as business benefits make up a substantial proportion of the total benefits, Further, the public sector investment in NGA networks presents the opportunity for the Scottish Government to increase employment in Scotland, enabling greater numbers of parents, over-65s, the disabled and those living in remote areas to work from home

The report estimates that an average of 870 jobs will be created directly over the five-year roll-out period, with a further 14,000 created as a result of the public sector investment (indirect and induced), based on a proportion of the economically inactive population becoming active through the intervention

In addition to the economic impact and job creation of the roll-out, the study identified a number of wider benefits, of particular relevance to Scotland's rural areas:

- Reducing social exclusion – the socially excluded tend to be groups of low-income individuals, those with less education, immigrants with a language barrier, and rural populations.
- Enhancing communication and increasing participation in community activities, community volunteering, and interaction between different community segments – particularly, overcoming the communication problems faced by those in rural areas.

The study also notes that next-generation broadband enhances the performance of e-health and e-learning applications, and makes home working more efficient. These benefits are particularly relevant to remote rural areas, which may not have ready access to health and education services or may have limited local employment opportunities.

3.2 Internet take-up

The provision of digital infrastructure will only contribute to economic growth in Scotland if it is fully utilised and harnessed by its citizens and businesses.

3.2.1 Internet use by citizens

Data from the Scottish Household Survey – the Scottish Government's preferred source of data on digital participation by individuals - shows that 76 per cent of households in Scotland had access to the Internet at home in 2012; this proportion has increased steadily from 40 per cent in the first quarter of 2004.[28] Home Internet access increases with net annual household income, from around half of households for those with income less than £15,000 up to 98 per cent of those with an income greater than £40,000. The vast majority (96 per

[27] This work was undertaken by Analysys Mason and at present, it is unpublished.
[28] Scottish Government, 2012, Scotland's People Annual Report: Results from 2011 Scottish Household Survey. http://www.scotland.gov.uk/Publications/2012/08/5277/downloads

cent) of households that had access to the Internet from home in 2012 reported having a broadband connection.

In addition to measuring household Internet connections, the Scottish Household Survey asks about Internet use by individuals (this could be at home, at work, or at another location). Overall, 76 per cent of adults surveyed across Scotland in 2011 said that they used the Internet. Just 1 per cent of those said that they only used it for work purposes, suggesting that the majority of users make use of the Internet for personal purposes, at least some of the time.

There is a clear relationship between age and use of the Internet, with substantially lower proportions of people using the Internet in older age bands. In 2011, just 4 per cent of men and women aged 16 to 24 did not use the Internet, whereas the corresponding figures for those aged 75 and over were 73 per cent and 86 per cent respectively.

The SHS asked adults who make no personal use of the Internet the reasons why they did not (Figure 12). The most common responses were related to people's preferences or requirements: 30 per cent said they did not like using the Internet or computers, and 26 per cent said they did not need to use the Internet or computers. Sixteen per cent said that there is nothing of interest on the Internet.

Not knowing how to use a computer is another common reason for not using the Internet: around a quarter of non-users (23 per cent) said that they did not know how to use a computer, and 7 per cent said that it would be too difficult to learn to use the Internet. Cost also seems to be an issue, with 11 per cent saying that they could not afford a computer and 3 per cent saying that an Internet connection would be too expensive.

Figure 12: Reasons for not using the Internet: proportion of adults who make no personal use of the Internet, 2011

Source: Scottish Household Survey 2011.
Note: Percentages add to more than 100% as multiple responses were allowed.

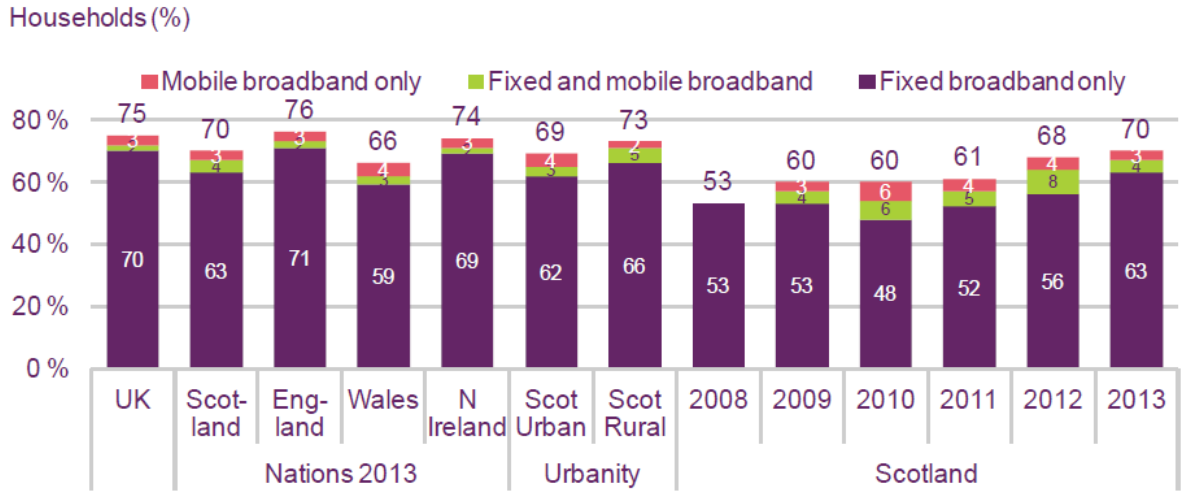
Reason	%
I don't like using the Internet or computers	30%
I don't need to use the Internet or computers	26%
I don't know how to use a computer	23%
There's nothing of interest to me on the Internet	16%
I can't afford a computer	11%
It would be too difficult to learn how to use the Internet	7%
I prefer to do things in person rather than use computers	8%
Internet connection would be too expensive	3%
I am concerned about privacy e.g. keeping credit card or personal details safe	3%
I have a disability or illness that prevents me	3%
I am worried about the unsuitable or inappropriate material on the Internet	1%
Other reason	8%

While the data above from the Scottish Household Survey provides the most accurate information about Internet use in Scotland due to its large sample size, it does not provide

comparisons with the UK as a whole. The Communications Market Report from Ofcom provides annual survey data that is comparable across the UK. As shown in Figure 13, this source indicates that 70 per cent of households in Scotland connected to the Internet at home in the first quarter of 2013, compared to 75 per cent of households in the UK as a whole[29]. It also charts the growth in broadband uptake in Scotland since 2008.

Figure 13: Broadband take-up at home

Source: Ofcom Communications Market Report 2013



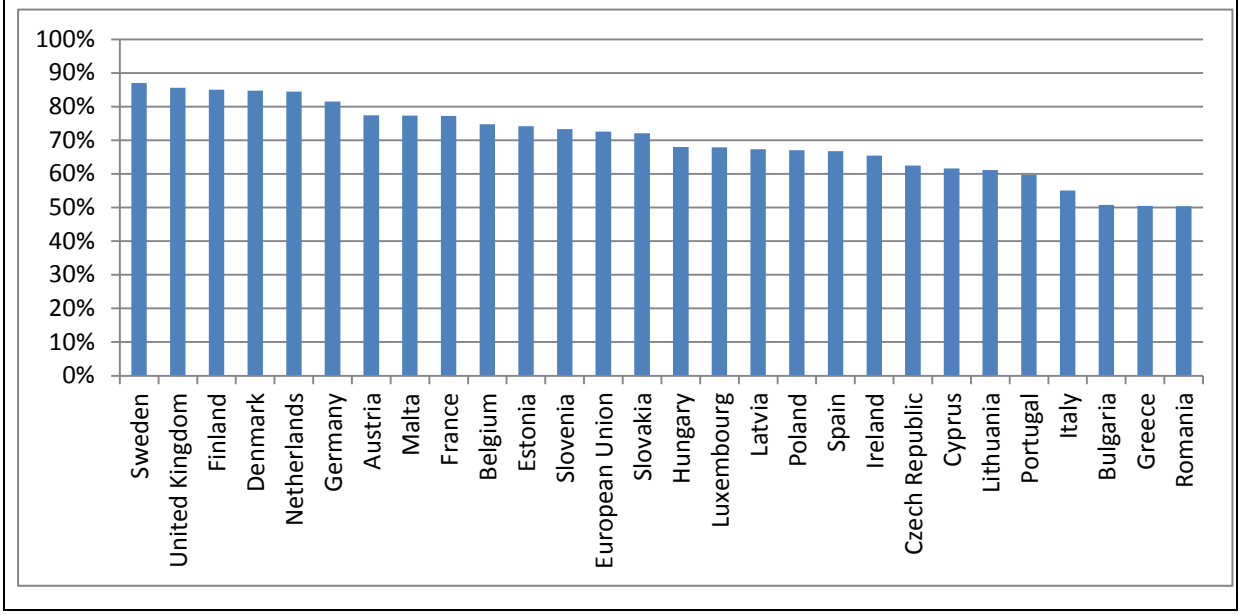
Although there is limited comparable data on Scotland's position within the EU, there are international comparisons with the UK available. Figure 14 shows that the UK performs very well in comparison with its European neighbours when it comes to home access to broadband. With broadband take-up of households at almost 86 per cent of the population[30], the UK ranks above the levels for Denmark and Finland and comes second only to Sweden.

[29] Ofcom, 2013, Communications Market Report: Scotland. http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/Scotland_CMR_2012_final.pdf

[30] Based on the question "Do you or anyone in your household have access to the Internet at home, regardless of whether it is used? (by any device)". The discrepancy between the figure quoted in figure 13 (76 per cent) and figure 14 (80 per cent) for proportion of homes with broadband may be caused differences in the way each question was phrased.

Figure 14: European comparison of broadband take-up at home, 2012[31]

Source: Eurostat[32]



3.2.2 Internet use by SMEs

Online applications have the potential to increase business productivity by enhancing communications with customers and suppliers and by making business processes more efficient.

Data from the Small Business Survey shows that in 2012, 52 per cent of SMEs in Scotland had their own website (Figure 15).[33] This increased with business size, from 48 per cent of the self-employed to 94 per cent of medium sized employers.

Figure 15: Proportion of SMEs with website/broadband, 2012

Source: Small Business Survey 2012

Size band (employees)	Has own website	Has broadband
Self-employed	48%	85%
Micro (1-9)	60%	93%
Small (10-49)	86%	99%
Medium (50-249)	94%	98%
All SMEs	52%	87%

[31] Households with at least one member aged 16-74. Broadband connection includes: DSL, wired fixed (cable, fiber, Ethernet, PLC), fixed wireless (satellite, WiFi, WiMax) and mobile wireless (3G/UMTS).

[32] https://ec.europa.eu/digital-agenda/en/create-graphs

[33] Scottish Government, 2012, Small Business Survey Report 2012. http://www.scotland.gov.uk/Topics/Economy/ASBS/Report2012

In 2012, 87 per cent of SMEs reported that they had broadband. Almost all small and medium sized employers had broadband: 99 per cent and 98 per cent respectively. The size band with the lowest take-up of broadband was the self-employed, with 85 per cent broadband take-up.

The most mentioned reason for not having broadband was lack of need (47 per cent).

A survey of 1000 SMEs carried out for the Scottish Government in autumn 2010 indicated that take-up of the Internet among SMEs in Scotland was 75 per cent, and that broadband was used by the vast majority of Internet-connecting firms.[34] Although there are methodological differences between this survey and the Small Business Survey, the two sets of survey results suggest that broadband take-up among SMEs has increased considerably between 2010 and 2012.

The 2010 survey also asked businesses about how well informed they felt about broadband generally, and about how broadband applications can enhance business competitiveness. Of the SMEs in Scotland that used the Internet, three quarters reported that they felt reasonably or very well informed. However, a small cohort (6 per cent) felt "not at all well informed". Smaller businesses and those in remote rural areas tended to feel on average less well informed.

Figure 16: Purposes for which businesses use the internet, Scotland and UK, 2012

Source: Small Business Survey 2012
Base (unweighted): Scotland n=498, UK n=2,745

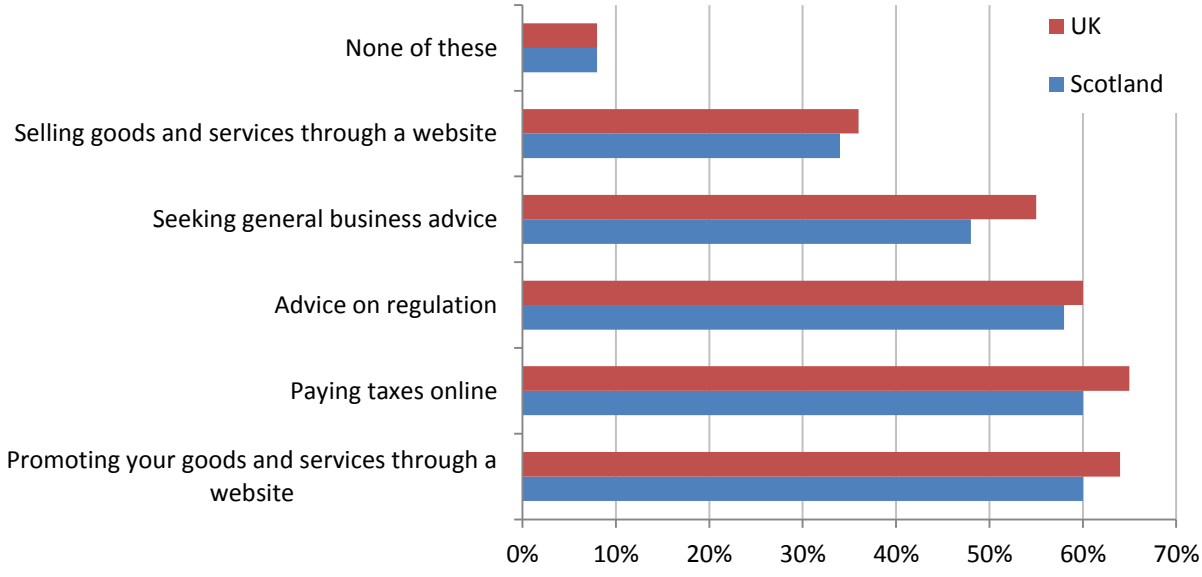


Figure 16 shows the purposes for which SMEs used the Internet in 2012. The two most cited purposes for which the business used the Internet were to promote their goods and services through a website or to pay taxes online (both 60 per cent). Scottish businesses lag slightly behind the UK when it comes to utilising the internet for business purposes. Although just a

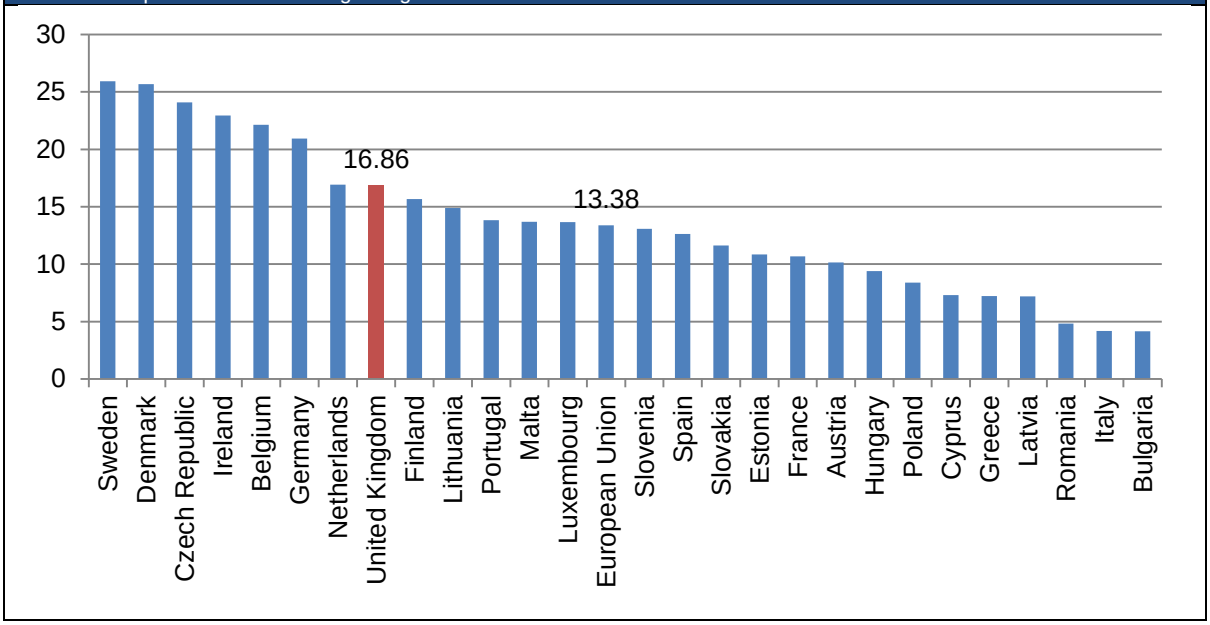
[34] EkosGen, 2011, Research on Broadband and Business in Scotland. http://www.scotland.gov.uk/Publications/2011/02/23091236/14

small difference, the efficiency and productivity gains to be made from greater use of online services suggest that Scotland should aim to improve on this in order to compete more effectively with UK businesses.

Although there are limited comparison between Scotland and other countries, Figure 17 gives an indication of the UK's relative performance compared with other EU nations when it comes to online sales carried out by SMEs. It shows that 16.9 per cent of SMEs in the UK carried out sales online. This is lower than the leading nation (Sweden at 25.9 per cent) and just above the EU average of 13.4 per cent.

Figure 17: Proportion of SMEs[35] using any computer network for sales (at least 1%) in the European Union, 2012[36]

Source: European Commission Digital Agenda Scoreboard[37]



There have been a number of recent studies focusing on the use of digital and ICT technologies by SMEs. The Federation of Small Businesses (FSB) asks its members annually about internet use. It found that Scottish FSB members are reliant on the internet for running their business; 94 per cent use email and 80 per cent or more download information/ documents from the internet, pay bills or complete tax returns. More than seven in 10 members maintain a business website and access online resources for advice, guidance and information.

Similar to the findings from the Small Business Survey, a recent report by Lloyds Banking Group[38] found that over a third (37 per cent) of UK SMEs do not have a website and that one in five (20 per cent) are 'deliberately disconnected' from the internet. Figure 18 shows

[35] 10-249 persons employed

[36] This excludes the financial sector

[37] http://digital-agenda-data.eu/charts/analyse-one-indicator-and-compare-countries#chart={"indicator-group":"ecommerce","indicator":"e_esell","breakdown-group":"any","breakdown":"ent_sm_xfin","unit-measure":"pc_ent","ref-area":["BE","BG","CZ","DK","DE","EE","IE","EL","ES","FR","IT","CY","LV","LT","LU","HU","MT","NL","AT","PL","PT","RO","SI","SK","FI","SE","UK","EU27"]}

[38] http://businesshelp.lloydstsbbusiness.com/assets/pdf/Britains-Digital-Opportunity.pdf

outlines the proportion of SMEs not yet undertaking online tasks by region in the UK. This shows that on a number of the tasks considered, Scotland performs well in comparison with other regions. However, the small sample sizes at regional level should be noted.

According to the Lloyds report, for those SMEs that have developed their use if online technology many have experienced benefits from this shift. The most frequently mentioned advantages included time savings (78 per cent), attracting more customers (62 per cent), increased marketing effectiveness (58 per cent) and cost savings (54 per cent). In addition, 51% of SMEs have reported an increase in sales as a result of their Internet use.

Figure 18: Proportion of SMEs not yet undertaking online tasks by region

Source: Lloyds Banking Group, 2012

	North n=142	Midlands n=75	South (excl. London) n=223	London n=64	Scotland n=64	Wales n=49
Find things (use search engines and navigate around websites)	11%	13%	15%	13%	12%	18%
Communicate with customers and suppliers online	23%	35%	28%	27%	25%	31%
Provide information via a website	31%	43%	37%	29%	23%	33%
Transact – Making payments	33%	47%	40%	45%	34%	47%
Transact – Placing orders with suppliers	41%	44%	42%	41%	31%	37%
Transact – Taking orders and payments	63%	64%	65%	58%	50%	69%
Provide information via website	31%	43%	37%	29%	23%	33%

A report produced by the Federation of Small Businesses[39] revealed the results of a survey question intended to discover what would encourage a small business to invest in technology. The results show that 40 per cent of businesses surveyed responded that improved digital infrastructure in their area would encourage them to invest.

3.2.3 Use of digital public services

Use of digital public services – both by individuals and businesses – is seen by the Scottish Government as a key enabler of its public service reform programme. Scotland's Digital Future: Delivery of Public Services sets out the ambitions and vision for Scotland as a country in which digital technology provides a foundation for innovative, integrated public services delivered to those in most need and this use of digital technologies provides a firm basis for a shared commitment to, and responsibility for, public services.

A focus on shifting to digital delivery of public services should deliver not only efficiency savings to the public sector but also better services for citizens and businesses and more efficient use of public resources. Providing public services digitally is not only cheaper for government, it also enables services to be delivered faster, easier and at a time convenient for the user. This leads to resources being freed up for alternatives uses as well as

[39] The Federation of Small Businesses – The Digital Imperative http://www.techradar.com/news/world-of-tech/management/fsb-and-intellect-say-small-firms-need-it-help-1146784

delivering a real difference to citizens and businesses. Digital public services may also benefit the wider economy through innovation and the development of new ways of doing things creating economic growth potential.

The Scottish Household Survey collects data on individuals already engaging with the public sector through digital channels. Among internet users in Scotland, 62 per cent had ever used a Local Authority website for any purpose and 64 per cent had ever used a Government website for any purpose (Figure 19). The most commonly stated reason for using a public authority website was to find information.

Figure 19 : Use (ever) of public services on the Internet in Scotland 2012 (proportion of Internet users)

Source: Scottish Household Survey, 2012[40]

Local authority website	%	Government website	%
Finding information	52	Apply for road tax	39
Download a form	13	Apply for or renew my TV licence	20
Access services like report a fault, renew library books	11	Apply for or renew passport	16
Make payment like council tax or parking fine	10	Look for information about health services	13
Ask a question	8	Register to vote	11
Make a complaint	5	Complete income tax assessment	10
Participate in a discussion forum	1	Look for information about health or healthy living	9
Some other purpose	9	Apply for benefits	6
Any purpose	62	Other	9
None of these	38	Any purpose	64
		None of these	36

An alternative data source which is comparable across the UK but has a smaller sample size is the annual Ofcom Communications Market Report for Scotland.[41] The survey for this report asked adults aged 16+ with access to the internet at home whether they or other household members used local council/government websites. In 2013, 31 per cent of adults in Scotland said that they did use these websites. This was lower than the proportion in the UK as a whole (38 per cent). The Ofcom results for Scotland are much lower than those from the SHS. A possible explanation for this is that the Ofcom survey asks about *current* use of government websites, while the SHS asks whether these websites have ever been used.

In 2012, the UK lagged behind the leading European nations when it came to the proportion of the population interacting with eGovernment services (Figure 20)[42] [43]. In the UK, 43 per

[40] http://www.scotland.gov.uk/Publications/2013/08/6973

[41] http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr12/scotland/

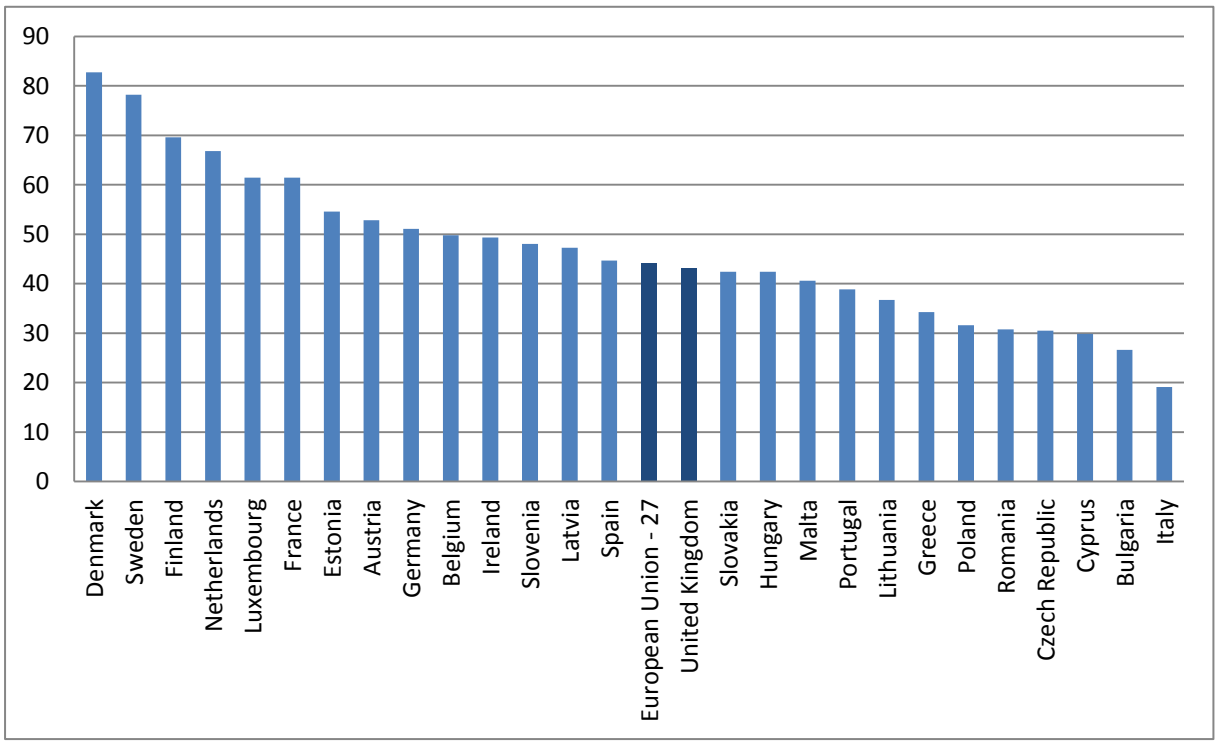
[42] Individuals aged 16-74, carrying out this activity over the internet in the last 12 months. The use of eGovernment services include obtaining information from public authorities web sites, downloading official forms or sending filled in forms.

[43] Figures are obtained from the EU Digital Agenda and based on Eurostat data http://ec.europa.eu/digital-agenda/en/create-graphs

cent of the population interacted online with eGovernment services in the last 12 months – this is similar to the EU average (44 per cent) but behind a number of leading EU nations. For example this compares with 83 per cent for Denmark, 78 per cent for Sweden and 70 per cent for Finland.

Figure 20: Proportion of population using eGovernment services in the last 12 months, 2012

Source: Eurostat



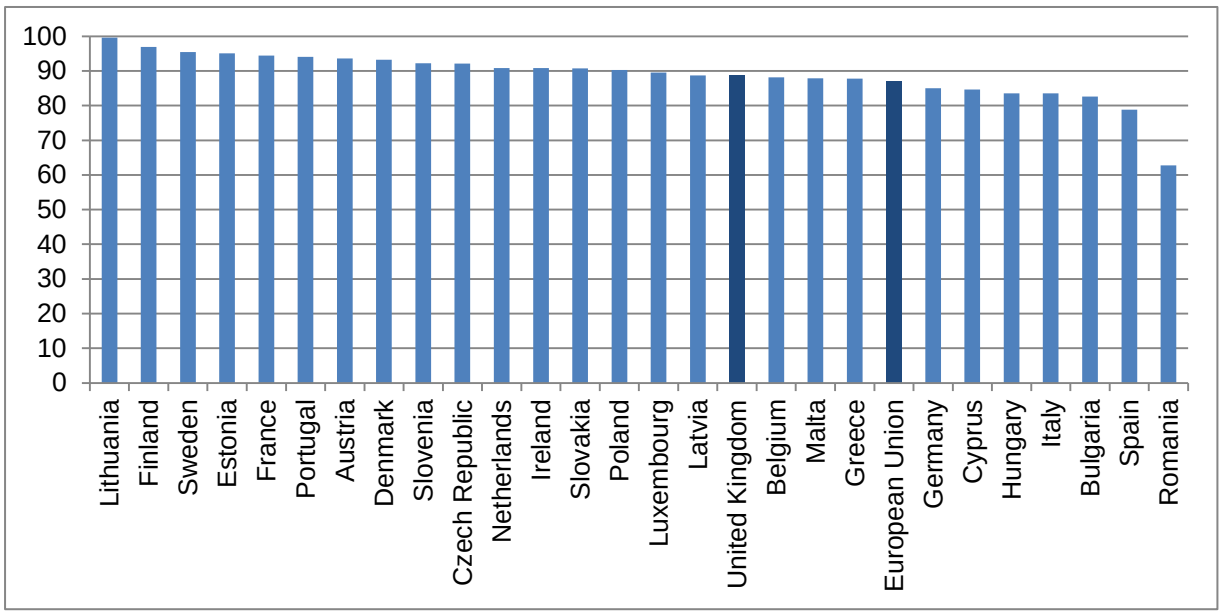
There is currently no official data available on the use of digital public services by businesses in Scotland. However, there is data available which allows comparisons to between the UK and other European countries.

In 2012, 89 per cent of UK businesses used eGovernment services – this is slightly ahead of the EU27 average (87 per cent)(Figure 21)[44]. Despite the UK having a significantly greater availability of eGovernment service for businesses, use of eGovernment services amongst businesses is behind that of leading countries such as Finland and Sweden.

[44] 2010 figures from EU Digital Agenda Scoreboard http://ec.europa.eu/digital-agenda/en/create-graphs

Figure 21: Businesses using eGovernment services, 2010

Source: Eurostat



3.2.1 The ICT sector

Productivity gains can be a key driver of economic growth. As such, the potential for ICT to increase productivity will be crucial for the future of the Scottish economy. Research[45], based on historical evidence, suggests that the continued adoption and exploitation of ICT could generate an additional £2.8 billion of GVA to the Scottish economy over the next 5 to 7 years.

The ICT sector makes a significant contribution to the Scottish economy. As Figure 22 shows the sector had total employment of 49,700 and GVA of £3.6 billion in 2010. These totals do not include the substantial amount of ICT activity that is carried out within non-ICT firms.

[45] eSkills UK – Technology Counts – IT and Telecoms Insights 2010 https://www.e-skills.com/Documents/Research/Insights-2010/Tech-Counts-Scotland.pdf

Figure 22: The ICT sector in Scotland, 2010

Source: Office for National Statistics, Annual Business Survey
(Compiled by Scottish Government)

Sub-sector	*Employment, thousands*	*Turnover, £m*	*GVA, £m*
Electronics	**7.6**	**1,419.7**	**442.0**
Manufacture of electronic components and boards	2.3	378.5	160.2
Manufacture of computers and peripheral equipment	1.1	222.8	21.6
Manufacture of communication equipment	0.5	39.6	19.7
Manufacture of consumer electronics	0.6	48.9	24.4
Manufacture of magnetic and optical media	-	-	-
Wholesale of electronic and telecommunications equipment and parts	1.0	508.4	119.9
Repair of computers and communication equipment	2.2	221.4	96.3
IT	**29.3**	**3,324.2**	**1,695.0**
Wholesale of computers, computer peripheral equipment and software	1.9	1,016.7	161.1
Software publishing	0.6	21.5	11.6
Computer programming, consultancy and related activities	24.8	2,100.6	1,389.0
Data processing, hosting and related activities	1.9	168.2	123.2
Web portals	0.1	17.1	10.0
Telecoms	**12.8**	**3,544.7**	**1,467.0**
ICT Totals	49.7	8,288.5	3,604.0

3.2.2 Key messages

- "Superfast" or next generation access (NGA) broadband is expected to deliver significant economic benefits over the next 15 years including increased economic output, job creation, reduced social exclusion and increased community cohesion. These benefits are of importance to the whole of the Scottish economy - but will most crucially have a significant impact in Scotland's rural areas.
- However, Scotland currently has poor fixed NGA infrastructure, particularly in rural and remote areas. Indeed, many of Scotland's rural areas suffer slow basic broadband speeds; slowing down productivity within these areas. When compared with other regions of the EU, Scotland's rural areas once again lag behind.
- Use of digital connectivity by Scotland's population and business could be improved.
- Whilst a significant proportion of Scotland's adults are using the internet, a significant minority choose to not do so. Use of digital public services lags by Scottish citizens lags behind that of much of the EU including countries such as Denmark, Norway and Sweden, where the vast majority of the population utilise eGovernment services.
- Evidence suggests that whilst nearly all SMEs in Scotland have broadband access and that many of these businesses use the internet to run their businesses (for example, to pay bills or complete tax returns), this has not been translated into the exploitation of digital connectivity to realise economic potential. An area where Scotland lags behind other EU nations, such as Norway.
- Independent research suggests that, based on historical evidence, that the continued adoption and exploitation of ICT could generate an additional £2.8 billion of GVA to the Scottish economy over the next 5 to 7 years. Those firms that have already made the shift to exploiting digital technologies have reported a number of benefits including increased sales, cost and time savings and attracting more customers.

4 Thematic Objective 3: Enhancing the competitiveness of SMEs

A key thematic objective of the 2014-2020 ERDF Programmes is to enhance the competitiveness of SMEs with a focus on:

- promoting entrepreneurship, in particular by facilitating the economic exploitation of new ideas and fostering the creation of new creation;
- developing new business models for SMEs, in particular for internationalisation.

This section provides an evidence base on:

- SMEs' contribution to Scotland's business stock;
- Start-up and survival rates of SMEs;
- Barriers to establishing new firms and growth by SMEs including analysis on access to finance by SMEs in Scotland;
- The extent of exporting and internationalisation by Scottish SMEs including evidence on potential barriers.

This section reviews the available evidence to establish the need for ERDF intervention by outlining Scotland's performance in both UK and EU contexts and, where possible, regional variations in performance within Scotland.

4.1 Scotland's Business Stock

Any increase in the business stock is a good indicator of an active entrepreneurship climate in the economy. Also, competition drives innovation, efficiency and quality improvements thereby improving productivity. The number of businesses in Scotland (or the business stock) reflects a combination of both the numbers of new businesses created (start-ups) and the survival of existing businesses. Historically, Scotland has lagged behind the UK in terms of start-ups and has a low level of business stock relative to its population size. A strong private sector is essential for economic growth and wealth creation, and small businesses - which account for the majority of all enterprises - create vital jobs and are often the lifeblood of local communities. That's why a fundamental aim of the Scottish Government is to improve the business creation, sustainability and growth of small businesses in Scotland. As a reflection of the importance of business creation to the economy, the Scottish Government has a National Performance indicator to increase the number of businesses as measured by the total number of VAT/PAYE registered private sector enterprises in Scotland per 10,000 adults.

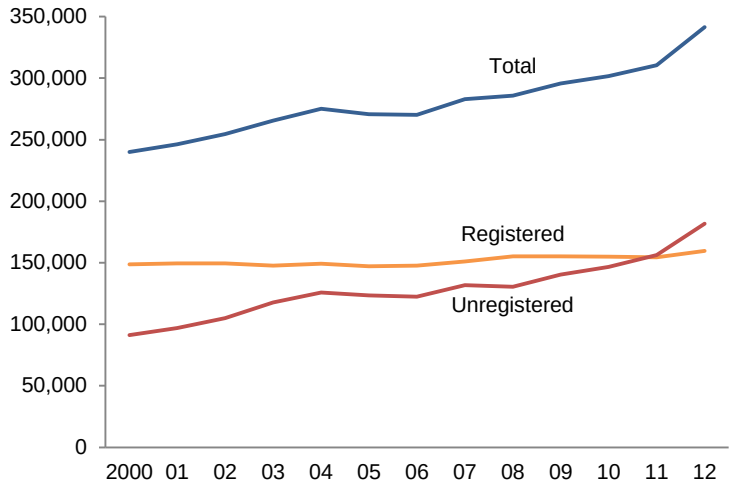
The latest update to the National Performance indicator shows that the provisional 2012 registered business stock rate is 368 businesses per 10,000 adults - an increase on the 2011 rate of 356 businesses per 10,000 adults[46]. The increase over the latest year marks a turning point in the previous declining trend experienced since 2008. The rise in the registered business stock rate, between 2005 and 2012, takes the rate to its highest point since the start of the series.

[46] http://www.scotland.gov.uk/About/Performance/scotPerforms/indicator/businesses#chart

The number of private sector enterprises operating in Scotland as at March 2012 is estimated at 341,360. Despite the recent challenging economic conditions, the estimated number of enterprises in Scotland has increased in each year since 2006. Between March 2011 and March 2012 the estimated number of enterprises increased by 9.9 per cent (30,835 enterprises).

Figure 23: Number of enterprises in Scotland

Source: Businesses in Scotland 2012 (Scottish Government)



As Figure 23 shows, the number of unregistered businesses (small sole traders or partnerships with no employees and an annual turnover of less than the VAT threshold) has increased substantially since 2000. This suggests that there has been a substantial level of entrepreneurship in Scotland during this period. However, it is likely that the strong increase in the number of enterprises since 2008 has been due in part to a reduction in opportunities for employment in existing firms. As discussed in section 4.2.3 (below), data from the Small Business Survey 2012 indicates that lack of other work choices was a motivation for more than half of new-start SMEs in Scotland over the past four years.

In March 2012, SMEs (enterprises with fewer than 250 employees) made up 99 per cent of all enterprises in Scotland, and provided 43 per cent of all jobs and 36 per cent of turnover (Figure 24). The 2,410 large enterprises operating in Scotland accounted for 64 per cent of turnover.

Figure 24: Share of enterprises, employment and turnover by size of enterprise, 2012

Source: Businesses in Scotland 2012

Size band	*Proportion of enterprise count*	*Proportion of Scottish employment*	*Proportion of Scottish turnover*
0-49 employees	98%	33%	24%
50-249 employees	1%	10%	12%
250+ employees	1%	57%	64%
All enterprises	100%	100%	100%

Analysis from Businesses in Scotland 2012 shows that:[47]

- **Comparison with UK.** Scotland has lower number of businesses per 10,000 population than the UK as a whole. In 2012, Scotland had a business stock rate of 769 enterprises per 10,000 adults, compared to 935 enterprises per 10,000 adults in the UK as a whole.[48]
- **Sector.** While SMEs make up the majority of enterprises within all sectors, in terms of the total stock of SMEs in the economy, a higher proportion of SMEs are found within the Construction and Professional, Scientific and Technical Activities sectors.

4.1.1 Distribution of employment by size of business

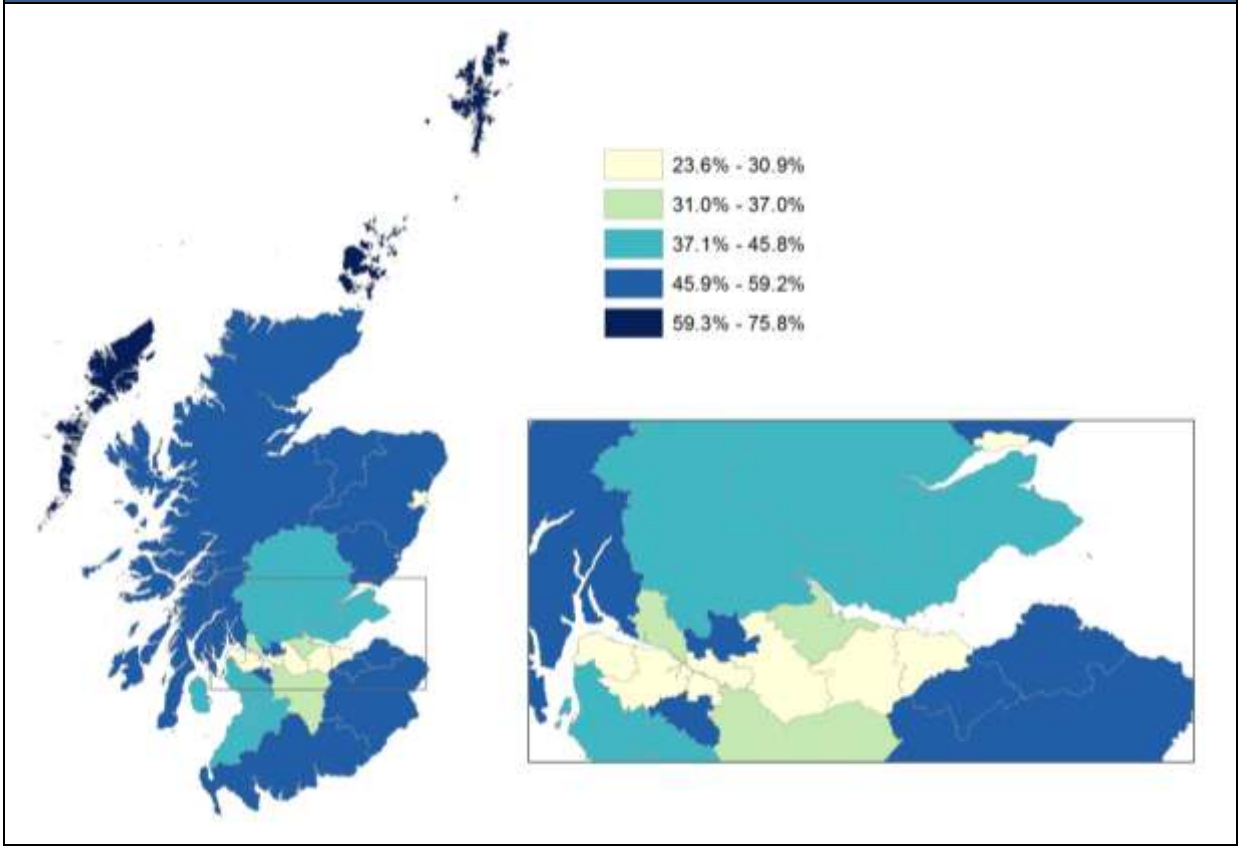
In Scotland's larger cities and most of the central belt, a relatively low proportion of employment is in small enterprises, as the data for 2012 in Figure 25 shows. In the Cities of Aberdeen, Edinburgh, and Glasgow, only around one quarter of employment was in small enterprises. In the three island local authorities, by contrast, over 60 per cent of employment was in small enterprises. In Scotland as a whole, 33 per cent of employment was in small enterprises. It should be noted that this data does not include employment in unregistered enterprises.

[47] http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/Corporate

[48] Source: UK - Business Population Estimates 2012, Department for Business, Innovation and Skills. Scotland – Businesses in Scotland 2012. Note that the Scotland data for the business stock rate is restricted to enterprises that are companies, sole proprietorships, partnerships or public corporations to ensure as much consistency as possible between the UK and Scotland results.

Figure 25: Employment in small enterprises as proportion of total employment, March 2012

Source: Businesses in Scotland 2012. Excludes unregistered enterprises



4.1.2 Self-employment

The proportion of people in employment who are self-employed has risen in recent years in both Scotland and the UK, as Figure 26 shows. The proportion is lower in Scotland than in the UK as a whole (12.2 per cent and 14.3 per cent respectively in 2012).

The rate of self-employment is higher in the Highlands and Islands than in Scotland as a whole. This is the case for both men and women.

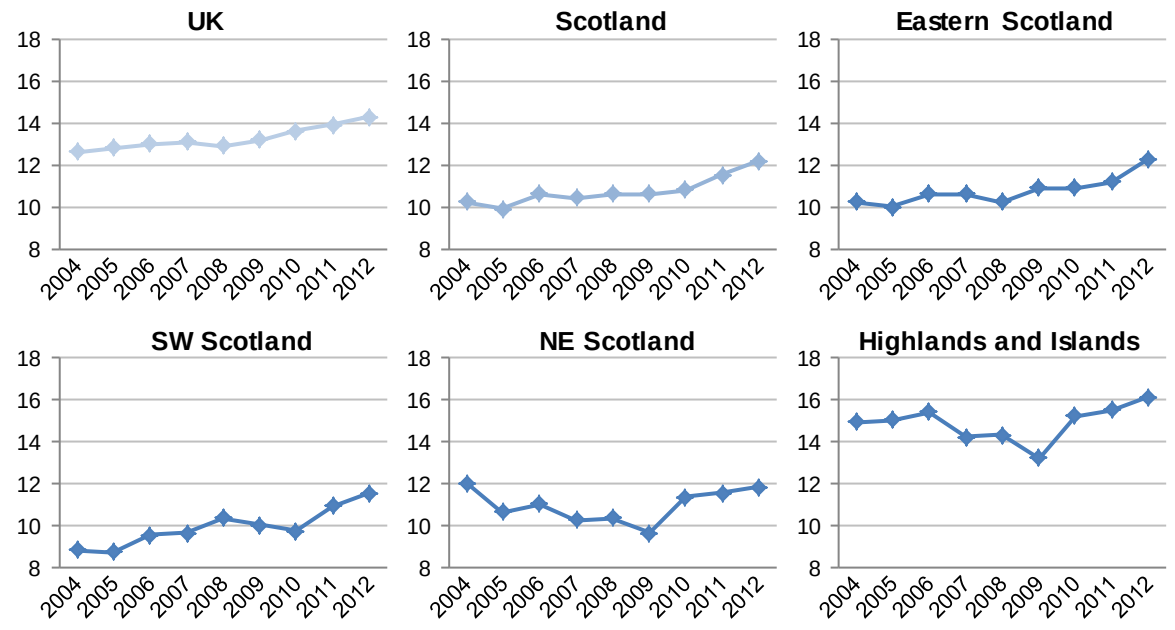
The rate of self-employment in Scotland is consistently higher among men than among women. In the year ending March 2012, 16.1 per cent of employed men in Scotland were self-employed. This was approximately twice the rate for females, 8.0 per cent.

As would be expected given the dominance of sectors such as agriculture and tourism, self-employment is around twice as prevalent in rural Scotland as in urban areas. In 2011, 22 per cent of workers in remote rural areas and 18 per cent of workers in accessible rural areas were self-employed. In the rest of Scotland, 10 per cent of people were self-employed.[49]

[49] Source: Scottish Government, Rural Scotland Key Facts 2012. http://www.scotland.gov.uk/Publications/2012/09/7993/downloads. Data from Annual Population Survey (ONS).

Figure 26: Percentage of people aged 16+ in employment who are self-employed

UK, Scotland, and NUTS 2 regions in Scotland. Note that vertical axis does not start at zero.
Source: Annual Population Survey (ONS)



4.1.3 Key messages

- Scotland has a lower business stock than the UK as a whole; an historical trend that still continues.
- Scotland's business stock has experienced a recent increase marking a turning point following a declining trend since 2008. This increase has been driven by substantial growth in unregistered businesses. Whilst this may be indicative of a rise in entrepreneurship in Scotland, its more likely to be reflective of the impact of poor economic conditions on work choices.
- The Scottish economy is dominated by small and micro businesses, particularly in rural areas. However, large firms provide over half of Scotland jobs and even more of Scotland's turnover.

4.2 Business Start-ups and Entrepreneurship

Scotland's small businesses are vital to the sustainable growth and recovery of the national economy. Continued new firm formation and entrepreneurship activity within Scotland is a key element of this. The birth of new firms is often seen as one of the key determinants of job creation and economic growth. Enterprise births are thought to increase the competitiveness of firms, by obliging them to become more efficient. As such, they stimulate innovation and facilitate the adoption of new technologies, while helping to increase overall productivity within an economy.

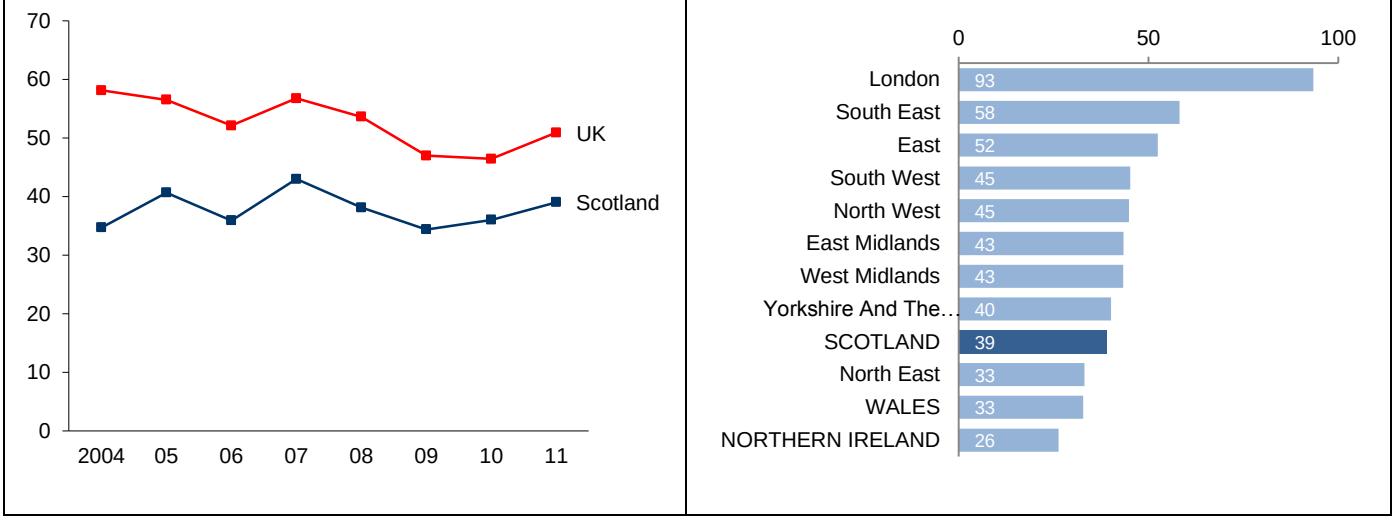
Business start-up rates provide an indication of the level of new firm formation and entrepreneurship within a country. There are a number of different sources of data that are used to measure start-up rates and entrepreneurial activity:

- VAT/PAYE registrations – the official source for measuring business start-ups.
- CSCB data – data from the Committee of Scottish Clearing Banks on new business accounts opened.
- Global Entrepreneurship Monitor – a global project with 59 participating countries, which measures the percentage of the adult working age population trying to start a business, or that own or manage a business that is less than 3.5 years old.

4.2.1 VAT/PAYE registrations

VAT/PAYE registrations are the official source of business start-up statistics[50]. The number of new business registrations in Scotland has varied over the past eight years, fluctuating between 14,375 and 18,165. The number of registrations in 2011 was 16,940.

Figure 27: VAT/PAYE enterprise births per 10,000 resident adults aged 16+, UK regions
Source: ONS Business Demography



VAT/PAYE registration rates per 10,000 resident adults (ages 16 and over) allow comparisons between Scotland and the UK (Figure 27).

- In Scotland, registrations per 10,000 resident adults increased from 36 in 2010 to 39 in 2011 while VAT/PAYE registrations per 10,000 resident adults for the UK increased from 46 to 51 over this period.
- In the UK as a whole, the 2010 birth rate was the lowest rate since the series began in 2002. The birth rate increased in 2011 in all English regions and UK nations, with the exception of Northern Ireland.

Figure 26 also shows that there is variation in registration rates across UK regions with the South and the East of England, particularly London, having a noticeably higher number of business start-ups than elsewhere in the UK. Excluding London and the South East, the UK figure would be 42 registrations per 10,000 resident adults in 2011. However, Scotland has historically had one of the lowest registration rates per adult population of all the UK nations and regions and this continued to be the case in 2011.

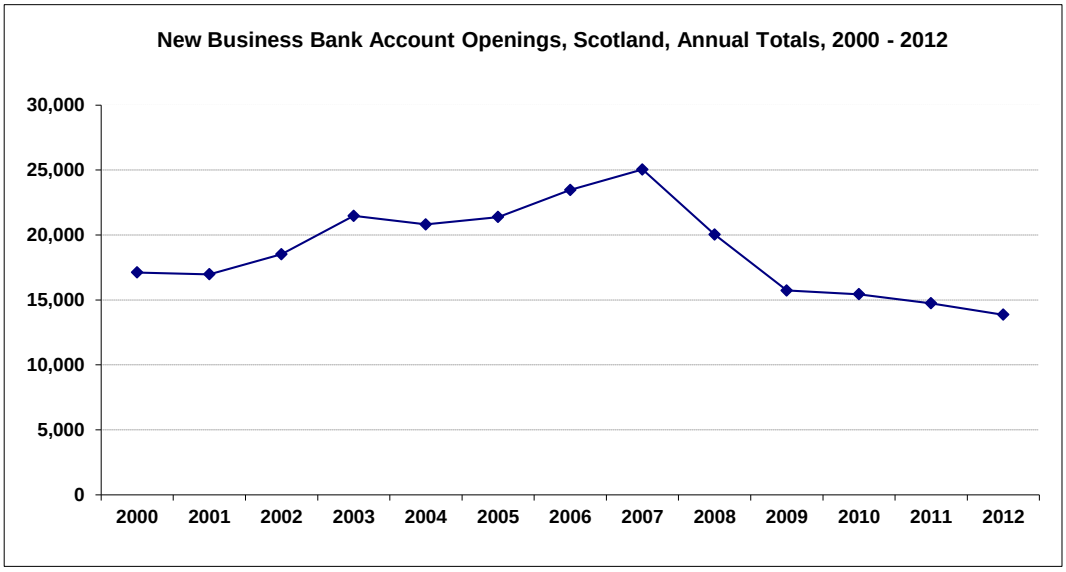
[50] It should be noted that VAT/PAYE registration excludes the smallest businesses

The ONS Business Demography statistics[51] show that a degree of variation across local authorities in Scotland.

- Aberdeen city, Aberdeenshire, City of Edinburgh, Glasgow City, Highland and Stirling have VAT/PAYE enterprise birth rates that are consistently above the Scottish average
- In 2011, Aberdeen City, Aberdeenshire, and City of Edinburgh had start-up rates above the UK average.
- A number of local authorities consistently perform below the Scottish average. These include Dundee City, East Ayrshire, Fife, Inverclyde, Renfrewshire and West Dunbartonshire among others.

4.2.2 Committee of Scottish Clearing Banks data on new businesses

Figure 28: Number of new business accounts opened
Source: Committee of Scottish Clearing Bankers



New business statistics are produced quarterly by the Committee of Scottish Clearing Banks (CSCB) which records the number of new business accounts opened. These figures only cover the main Scottish clearing banks and, therefore, do not include accounts opened at other financial institutions. Furthermore, new business accounts will not always represent business start-ups, as new accounts could be set up by existing businesses. For these reasons, the data should be treated with caution when drawing conclusions about business start-up trends.

In the year ended 31 December 2012 there were 13,856 new business accounts opened. This represents a decrease in the number of business accounts opened of 6.0 per cent compared to the year ended 31 December 2011. Annual trends in the data show that historically there was a general rise in new business accounts until the recession. In 2013 Q2 there were 3,143 new business accounts opened – representing an decrease of 14.7 per cent on 2012 Q2.

[51] http://www.ons.gov.uk/ons/rel/bus-register/business-demography/2011/index.html

4.2.3 Reasons for starting a business

In the Small Business Survey 2012, SMEs that had been trading for less than four years were asked whether they started up to take advantage of a business opportunity or because there were no better choices for work. Of these new-start SMEs, 46 per cent were motivated to start-up in business to take advantage of a business opportunity. A further 29 per cent reported that it was because there were no other choices for work. The remaining 25 per cent of new-start SMEs reported that they were motivated to start-up in response to a combination of both opportunity and no other choice for work.[52]

4.2.4 Business survival rates

Although business start-ups are seen as a key determinant of growth, innovation and competition within an economy, business survival rates are important, particularly in relation to recent policy interest in high growth firms and the contribution they make to the economy.

Business survival rates in Scotland are broadly in line with those in the UK. In both economies, survival rates have generally fallen since 2006. In Scotland, 96.5 per cent of firms born in 2006 survived one year, but only 85.5 per cent of firms born in 2010 survived one year.[53]

The Scottish five-year survival rate for businesses born in 2006 and still active in 2011 was 46.3 per cent. This was slightly higher than the UK rate (45.0 per cent)

Business survival rates exhibit a large degree of variation within Scotland. For example, five-year rates in Orkney are 66.7 per cent, while in West Dunbartonshire after five years only 37.5 per cent of business established in 2006 remained in operation in 2011.

By broad industry – using data for the UK as a whole – some notably high five-year survival rates include health with a survival rate of 60 per cent and education with a survival rate of 52.8 per cent. Hotels and catering was the lowest with only 35.7 per cent of businesses surviving for five years.

The fact that these start-up survival rates exhibit a high degree of regional and industry variation is unsurprising. Certain industries will be subject to greater competition via entry as a result of lower barriers to entry (i.e. a low cost for firms to compete in the market). Likewise, competition effects are likely to explain higher survival rates in rural areas compared to urban ones.

4.2.5 Global Entrepreneurship Monitor

The Global Entrepreneurship Monitor claims to be the largest research project on entrepreneurship in the world, with 69 participating countries in 2012. GEM records entrepreneurial activity by measuring Total Early-stage Entrepreneurial Activity rates (TEA) – the percentage of adults either actively starting an enterprise or running a new enterprise less than 3.5 years old. This provides another measure of entrepreneurship. The TEA rate in Scotland increased from 6.2 per cent in 2010 to 6.9 per cent in 2012. However, the Scottish

[52] Scottish Government, 2012, Small Business Survey Report 2012. http://www.scotland.gov.uk/Topics/Economy/ASBS/Report2012

[53] ONS Business Demography 2011, http://www.ons.gov.uk/ons/rel/bus-register/business-demography/2011/index.html

TEA rate remains below the rate of the UK as a whole (9.8 per cent in 2012), but matches the average of a set of 20 comparator high income innovation-driven nations.[54]

The Regional Entrepreneurship Acceleration Program (REAP) faculty at MIT argue that innovation based entrepreneurship (IBE) provides a greater contribution to regional economic development than small and medium sized enterprises in that they are able to develop global advantage through innovation, whereas SMEs tend to be restricted to local or regional advantage.

A group of GEM team scholars[55] developed a methodology of assessing national systems of entrepreneurship that is in accord with the REAP perspective – The Global Entrepreneurship and Development Index (GEDI). The REAP Scotland team commissioned a GEDI-based analysis of innovation-driven entrepreneurial capacity in Scotland. This analysis was then used to identify gaps between what current policies aim to address and bottlenecks in the entrepreneurial ecosystem revealed by the GEDI analysis.

Among the underlying variables, three weaknesses in institutional variables emerged: the current level of participation in post-secondary education among young adults (18-22), the level of internet usage, and Gross Expenditure in Research and Development (GERD). These lead to problems further down the line with start-up skills, networking, and process innovation.

A mathematical sensitivity analysis suggested that three attitude pillars (opportunity perception, start-up skills and networking) and all of the five "aspirational pillars" could be acting as bottlenecks in the ecosystem, thus preventing the ecosystem from being able to develop its full potential. The GEDI results and stakeholder meetings[56] suggest that the alleviation of a small number of issues could lift a range of pillars. Several programmes to raise aspirations and skill levels in networking and selling appear to have been successful, however, scaling up programmes like this would be a challenge.

4.2.6 Key messages

- Evidence from a range of sources on new firm formation suggests that Scotland has performed reasonably well during the recessionary period.
- However, Scotland has historically had a lower business birth rate per adult population than all other regions in the UK. This continues to be the case despite recent improvements.
- The latest available analysis of Scotland's innovation-based entrepreneurship ecosystem which suggested that Scotland is relatively weak in Opportunity Perception, Start-up Skills, Networking, and Aspirations.

4.3 Barriers to start-ups and entrepreneurs

The Global Entrepreneurship Monitor (GEM) reports for Scotland provides an assessment of the level of entrepreneurial activity within the economy. Over recent years, GEM has

[54] Jonathan Levie, 2012, Global Entrepreneur Monitor Scotland 2012, University of Strathclyde Business School. http://www.strath.ac.uk/huntercentre/research/gem/

[55] Acs, Z.J., E. Autio, and Szerb, L. (2012), National Systems of Entrepreneurship: Measurement Issues and Policy Implications. SSRN eLibrary.

[56] These were a set of meetings in which experts were invited to debate the issues raised by the GEDI analysis.

investigated the barriers to entrepreneurship from the perspective of both non-entrepreneurially active individuals and nascent entrepreneurs[57] and business founders. Figure 29 outlines the barriers cited by non-entrepreneurs and entrepreneurs. The order and frequency of answers in both figures reveal the differences between imagined and real barriers to starting a business in Scotland.

It is striking that around half of both non-entrepreneurs and entrepreneurs in the UK and Scotland mentioned 'getting finance' as one of their biggest barriers/difficulties. This issue was mentioned about twice as often as the next most frequently mentioned barrier or difficulty. The order of the remaining issues is different in Scotland and the UK. Lack of interest was the second biggest barrier among non-entrepreneurially active Scots, followed by concerns over job security and debt. By contrast, the second and third most frequently mentioned difficulties of entrepreneurs in Scotland were 'getting staff' followed by 'lack of skills or knowledge in starting and running a business'. Across the UK, just 6 per cent of founders or nascent entrepreneurs mentioned getting staff as one of their biggest difficulties compared with one in four of Scots (25 per cent). Getting staff seems to be a bigger problem for Scots entrepreneurs than lack of skills or knowledge; they were half as likely to mention not knowing how to start or run a business as one of their biggest difficulties. These differences are statistically significant.

Other difficulties mentioned by more than 10 per cent of entrepreneurs which were infrequently mentioned by non-entrepreneurially-active individuals included the complexity of regulations and getting customers.

Figure 29: Barriers to start-up faced by non-entrepreneurs and nascent entrepreneurs

Source: GEM Scotland 2011

Biggest barriers to starting a business or becoming self-employed, as perceived by non-entrepreneurially active respondents aged 18-64	UK	Scotland
Getting finance for the business (2005 to 2010)	50.6	50.1
Lack of interest in starting a business (2004 to 2010)	**16.6**	**19.0**
Loss of security/income from current job (2008 to 2010)	13.8	14.5
Fear of debt/loss of security/income (2005 to 2007)	**16.0**	**13.3**
Lack of skills/knowledge (2004 to 2010)	12.7	12.4
Age (2004 to 2010)	9.0	9.7
Not having an idea for a business (2004 to 2010)	9.8	9.6
The time commitment it would require (2004 to 2010)	10.5	9.5
The economic climate at the moment (2010 only)	6.4	8.6
The chance that the business might fail (2004 to 2010)	7.6	7.3
Fear of debt (2008 to 2010)	4.0	4.5
The complexity of regulations (2004 to 2010)	2.9	2.5
The economic climate at the moment (2005 to 2010)	1.7	2.3

Biggest difficulties faced by founders and nascent entrepreneurs in starting a business or becoming self-employed, 2011, aged 18-64	UK	Scotland
Getting finance for the business	46.0	43.2
Getting staff	**6.3**	**24.7**
Not knowing how to start and run a business	**28.0**	**14.1**
The complexity of regulations	15.8	12.5
Getting customers	8.4	12.0
The economic climate at the moment	9.6	8.7
The time commitment//managing family/ caring commitments	7.7	5.8
Not having an idea for a business	3.2	3.9
Loss of security/income from current job	4.1	1.6
The chance that the business might fail	4.4	1.6
Fear of debt/not being able to keep up with repayments	6.3	1.1
Health	1.5	0.9
Age	0.3	0.6
Lack of interest in starting a business	2.1	0.4

[57] That is, those that are actively involved in setting up a business they will own or co-own

Some of these issues are explored further in more detailed research on the barriers to entrepreneurship. Addressing these barriers may help overcome the market failure associated with entrepreneurship and lead to an increase in the business start-ups rate,

- **Skills**. In order for an entrepreneur to establish a business start-up they must possess the necessary skills to do so, or there must be a suitable method of education in place to teach these skills. Pena (2002) found that the human capital of the entrepreneur (education, business experience and level of motivation), organisational capital (firm's capacity to adapt quickly to changes and the ability to implement successful strategies), and relational capital (development of productive business networks and an immediate access to critical stakeholders) are important intangible assets, which seem to be related positively to the success of a start-up.[58]
- **Entrepreneurship team**. The academic literature on start-ups and entrepreneurship is increasingly placing focus on the concept of the "entrepreneurial team". Although definitions vary, the basic concept is that the entrepreneur alone does not act alone and does not have all the information necessary to move from an idea to a successful business. But rather, an entrepreneur's ability to surround themself without people and resources which can guide them in their venture is of crucial importance. Historically we have often had the romantic idea of the lone entrepreneur with the unique ability to take-on the business world and face down any challenges that might arise. However, more recent research[59] is beginning to suggest that, in fact, small teams of entrepreneurs are more likely to have the necessary variety of skills and resources necessary to survive and prosper. -Researchers have established that there is a strong association between venture success and team created ventures (e.g., Eisenhardt & Schoonhoven, 1990)[60].
- **Cultural and motivational factors**. It has been widely established that it is common for an entrepreneur to have had an entrepreneurial parent or close relative.[61] This presence of a strong entrepreneurial influence from an early age exposes them to the attitude, culture, and methods required to set up a business. In 2000, GEM found that although respect for those who try is significantly more widespread in Scotland than in the rest of the UK, it also found that there was more resentment of wealth entrepreneurs in Scotland than in other nations[62], A possible explanation for this apparent contradiction is that while attempts to start a new business are applauded, success is not.
- **Fear of failure**. In 2000, GEM also found that found that, in Scotland, the fear of failure acts as a particularly strong deterrent when it comes to starting a business. For instance, the percentage of those responded "yes" to the statement – "fear of failure would prevent you from starting a business" was 10 per cent higher in Scotland than in the UK as a whole. The authors also suggest that there is a social stigma attached to failure in Scotland, and that this is manifested in public criticism of entrepreneurs whose businesses fail. However, the authors also feel public criticism is declining in intensity, as the media are currently more supportive of entrepreneurship and this helps to shape public opinion.

[58] http://www.emeraldinsight.com/Insight/viewContentItem.do;jsessionid=322F9014228132DED454477419476978?contentType=Article&hdAction=lnkpdf&contentId=883958

[59] http://www.scribd.com/doc/131419627/What-is-an-Entrepreneurial-Team-pdf

[60] Schjoedt, Entrepreneurship Teams: Definition and Determinants

[61] Cooper et al (1994), *'Initial human and financial capital as predictors of new venture performance.'*

[62] http://www.strath.ac.uk/media/departments/huntercentre/research/gem/media_79740_en.pdf

- **Access to Finance.** Often the initial, and most significant, barrier for an entrepreneur is securing sufficient financial backing to get the business running. Many entrepreneurs develop their initial idea using personal finance; however this may not be sufficient to cover the entry cost, and may also delay the time to market. Fielden et al (2000) found that financial difficulties and the attitudes of banks towards new business owners are the main barriers to successful business start-ups.[63] The Scottish Government undertakes a regular survey on SME Access to Finance. The latest survey found that survey found that new start firms (those established less than two years ago) had higher levels of demand for bank finance in 2012 and higher rejections rates than all SME firms[64].
- **Regulation/Tax.** Government regulation and taxes can pose a barrier deterring entrepreneurs to pursue their business ideas and create a start-up. They also risk forcing entrepreneurs to emigrate to other countries with better tax benefits, less regulation, and incentives for business start-ups.

4.3.1 Barriers to SME growth

A report by the UK Government in 2008[65] stated that research to date suggests that the bulk of SMEs in the UK are 'steady state' firms while only a small proportion are 'high growth' making a disproportionate contribution to income and job generation. Past research shows there are many factors affecting growth including owner-manager characteristics and motivations; business characteristics; strategic influences; and external environment. In addition, access to finance is often cited as a key barrier to SME growth.

Evidence in Scotland seems to confirm that the majority of large firms in Scotland have been large for some time. As at March 2011, there were 2,230 large enterprises (with 250 or more employees in the UK) operating in Scotland.[66] Looking at where these large companies (in 2011) came from, we can determine that:

- 1,135 (51 per cent) of these businesses had also been large in 2001, and had not undergone any significant business restructuring.
- 250 of these businesses had grown from being medium-sized in 2001. These constituted 7 per cent of all the medium-sized businesses operating in Scotland in 2001.
- 25 of these businesses had been small in 2001, and therefore grew substantially to become large in 2011.
- The remaining 820 businesses are a mix of start-ups (genuine home-grown, new enterprises within a company group, inward investment companies) and businesses that have been restructured in some way.

The SME Access to Finance 2012 Survey by the Scottish Government asked SMEs about growth objectives. This survey found evidence of a shift towards firms stating that they will either become smaller or stay the same size. Firms revised down growth objectives in the

[63] http://www.emeraldinsight.com/Insight/viewContentItem.do?contentType=Article&hdAction=lnkpdf&contentId=873669

[64] http://www.scotland.gov.uk/Topics/Economy/access-finance

[65] www.bis.gov.uk/files/file49983.doc

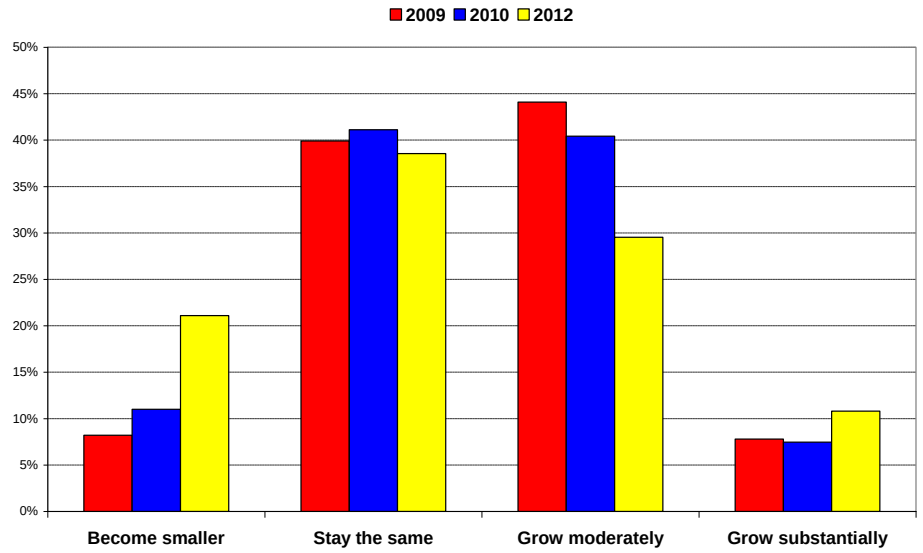
[66] This date is taken from the Inter-Departmental Business Register, the source of data on businesses registered for VAT and/or PAYE in the UK, is not really constructed to analyse business growth – as it does not flag up company restructures but looking at data from 2001 to 2011, we can make the following observations:

2012 survey, with an increase in the proportion of firms stating that they will stay the same or become smaller (Figure 30). This is driven by both a rise in the proportion of firms who expect to become smaller (up 10 percentage points) and the fall in the proportion of firms who expect to grow moderately (down 11 percentage points).

Firms which responded 'getting smaller' gave a number of reasons for doing so, including 'lack of demand due to economic conditions' (49 per cent), 'reluctant to take on more staff' (25 per cent), 'reluctant to take on more borrowing' (20 per cent), 'want to stay below VAT threshold' (15 per cent), 'don't have the resources' (17 per cent), 'unable to obtain the finance' (11 per cent) and a number of lifestyle choices[67].

Figure 30: Growth objectives of SMEs in Scotland

Source: SME Access to Finance 2012 Survey



A recent study by BIS, Scottish Enterprise, Welsh Government and Invest NI[68] also investigated growth ambitions among SMEs. Figure 31 shows the differences in SME ambitions in terms of future plans and past experience across the UK nations. On future plans, the study found that across the UK that 80 per cent of SMEs intend to grow while 70 per cent have specific plans to grow in the future. However, Scotland lags behind the other UK nations on both these measures. However, it should be noted that the evidence from the survey is more mixed on past experiences of growth and caution most be used when interpreting the results given the sample sizes.

[67] Note that respondents could give more than one answer so totals do not sum to 100%.

[68] http://www.evaluationsonline.org.uk/evaluations/Search.do?ui=basic&action=show&id=502

Figure 31: Country variations by future plans and past three years' experience

Source: Business Growth Amongst SMEs. Sample size 1250. Breakdown by country: England 80%, N Ireland 4%, Scotland 10%, Wales 6%.

	England	NI	Scotland	Wales	UK
Future plans					
Intend to grow	81%	86%	71%	74%	80%
Specific plans to grow	72%	64%	62%	68%	70%
Past 3 years' experience					
Taken steps to grow	83%	83%	80%	73%	82%
Increased turnover	36%	33%	31%	29%	35%
Decreased turnover	32%	41%	34%	34%	33%
Increased employment	20%	19%	17%	15%	19%
Decreased employment	28%	25%	20%	30%	27%

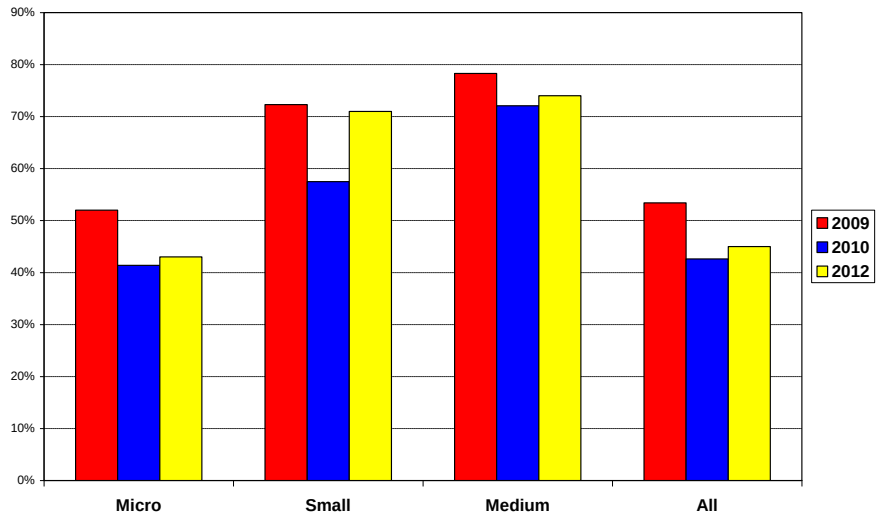
4.3.2 SME Access to Finance

Access to finance is often cited as a key barrier to SME growth. The Scottish Government has conducted a survey since 2009 to provide an assessment of the demand and supply of finance to the SME sector in Scotland. The latest survey was undertaken in February and March 2012.

Demand for finance has remained broadly stable in the 2010 and 2012 surveys, but is below the level reported in the 2009 survey. 45 per cent of firms sought finance (either renewing existing facilities or new and/or additional borrowing) over the three year period to 2012, compared to 43 per cent in the three years to 2010. The greatest increase in the percentage of firms who applied for finance was from small firms (10-49 employees), where demand increased by 13 percentage points with demand from small and medium firms remaining broadly constant (Figure 32).

Figure 32: Demand for finance by size of firm

Source: SME Access to Finance 2012 Survey, Scottish Government



For those firms that did not borrow, around 74 per cent of these firms stated that they did not need to borrow. There was evidence of a decrease in 'discouraged borrowers', with only 22 per cent of reasons for not borrowing based on discouragement, compared to 29 per cent in the 2010 survey.[69]

There has been an improvement in overall supply of finance compared to the 2010 survey in that a greater proportion of firms report that they are offered exactly what they wanted. However, the proportion of firms who ultimately secure none of the finance sought increased slightly to 11 per cent (Figure 34).

- The average (mean) proportion of finance secured across all firms remained broadly similar to that reported in the 2010 survey, with small (10-49 employees) and medium (50-249 employees) sized firms securing a higher proportion of the amount sought than they did in the 2010 survey.
- Of the firms that applied for finance in the preceding three-year period, the proportion that were rejected outright has decreased from 24 per cent in the 2010 survey to 17 per cent in the 2012 survey. (Figure 33).
- Similarly, the overall percentage of total applications rejected outright has decreased from 21 per cent to 15 per cent.

Figure 33: Percentage of firms rejected outright for finance (base: firms that applied for finance)

Source: SME Access to Finance 2012 Survey

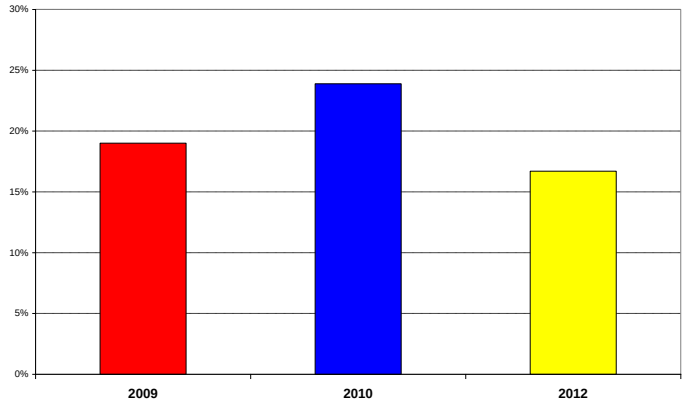
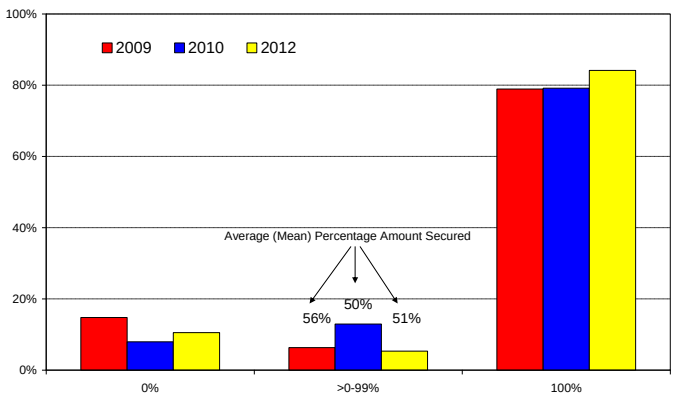


Figure 34: Percentage of firms reporting success in securing finance applied for (base: firms that applied for finance)

Source: SME Access to Finance 2012 Survey



Evidence on access to finance for SMEs generally focuses on the extent to which small and medium-sized businesses demand and obtain financing from the banking sector. However, this is not the only source of financing available. As well as private sector funding such as business angels, there are also a number of public sector led sources of funding for SMEs and early stage enterprises. Across the EU, this is available in different forms such as grants, loans and, in some cases, guarantees. Support is available either directly or through

[69] Discouraged borrowers are defined as firms who stated that they had 'not wanted to borrow in the current climate', 'thought that they would be turned down', 'thought that it would be too expensive' or 'preferred not to borrow' as reasons for not borrowing.

programmes managed at national or regional level, such as the European Union's Structural Funds. SMEs can also benefit from a series of non-financial assistance measures in the form of programmes and business support services. Some of these are explored in more detail below.

- **Venture Capital**. Empirical evidence shows that venture capital significantly promotes innovation and business growth and creates significant spill-over effects. Venture Capital backed firms introduce more radical innovations and pursue more aggressive market strategies compared to other start-ups. There are currently around 1,000 venture capital-backed businesses in the UK with £12.3m of venture capital invested in them[70]. The high growth potential of the businesses makes them vital to future economic growth.
- **Business angels**. Nesta research shows that angel finance plays an increasingly pivotal role in financing SMEs, particularly growth businesses. The economics of angel investments means they can back high growth businesses smaller than those in which Venture Capital firms invest and can focus on particular regions. Recent figures suggests that in 2009/10, there was over 320 business investments in the UK investing £50.5m Of this total, 78 investments were by Scottish business angels with a reported investment activity of £18.2m[71]. Expanding angel activity will provide a substantial intelligence source of finance to promising companies.
- **Joint European Resources for Micro and Medium Enterprises (JEREMIE)**. JEREMIE is a joint initiative of the European Commission and the European Investment Fund with the European Investment Bank. It aims to improve access to finance for micro to medium sized enterprises and in particular the supply of micro-credit, venture capital finance or guarantees and other forms of innovative financing. Special emphasis is given to supporting start-ups, technology transfer, technology and innovation funds and micro-credit.
- **Joint European Support for Sustainable Investment in City Areas(JESSICA).** JESSICA, is an initiative of the European Commission developed in co-operation with the European Investment Bank (EIB) and the Council of Europe Development Bank (CEB). It supports sustainable urban development and regeneration through financial engineering mechanisms. In Scotland, a £50m JESSICA Holding Fund was established in 2010, managed by the European Investment Bank (EIB). This is capitalised by £24m ERDF funding and matched by £26m from the Scottish Government.
- **Scottish Investment Bank**. The aim of SIB is to support Scotland's economic development by growing Scotland's private sector funding market to ensure that both early stage and established SMEs with growth and exporting potential have adequate access to growth capital. The SIB Loan Fund provides mezzanine loans between £250,000 and £5m to Scottish businesses on a wholly commercial basis is backed by an ERDF awards grant of £20m matched with a combination of SE, LA, pension funds and bank finance.

[70] http://admin.bvca.co.uk/library/documents/RIA_2012.pdf

[71] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32218/11-p116-annual-report-business-angel-market-uk-2009-10.pdf

4.3.3 Key messages

- Access to finance is one of the key barriers to starting a business for both entrepreneurs and non-entrepreneurs alike. However other barriers – such as skills, innovation, support from others and cultural factors - are also important to address.
- Evidence from a range of sources suggests that Scottish SMEs either lack or have downgraded their growth ambitions.
- The Scottish Government's 2012 SMES Access to Finance Survey found to have improved slightly with demand for finance remaining broadly stable and overall supply of finance improving between 2010 and 2012. However, economic conditions have moved on since then with the most recent evidence from the Bank of England suggesting that credit conditions remain constrained in the economy, particularly for small enterprises.
- Traditionally evidence on access to finance by SMEs has focused on lending by banks. However, more recently, attention has turned to alternative financial instruments, such as business angels and the Scottish Investment Bank, and how SMEs might utilised these sources of funding.

4.4 Internationalisation

4.4.1 Benefits of exporting

A review of internationalisation evidence commissioned by Scottish Enterprise and Scottish Development International (SDI)[72] found there are significant economic benefits from exporting and other forms of internationalisation such as outward foreign direct investment (FDI) and joint ventures.

Exports are also increasingly viewed by governments across the world as key to economic recovery and growth. Both the Scottish and UK Governments have recently re-asserted the crucial role that exports play in leading the economic recovery and sustainable growth with economic recovery thought to depend on strong export growth. A recent Department for Business, Innovation and Skills (BIS) review of the evidence on internationalisation[73] lends support to this assertion, finding that exporting firms have weathered the recession better than non-exporters, being more likely to report growth in turnover and employment. BIS note that this is has been driven, in part, from demand from overseas markets.

Economic theory and empirical evidence demonstrate the significant gains that can be achieved both at the firm and economy level through exporting. The BIS review found that studies at the UK firm level have consistently demonstrated a productivity benefit from exporting. They find that this is primarily due to an increase in productivity as firms prepare to export but also, in part, from 'learning by exporting'. The research commissioned by Scottish Enterprise and Scottish Development International (SDI) estimated that 'learning by exporting' can boost firm productivity by 16-18 per cent. Scottish Enterprise note that this may, in part, be due to "exposure to a richer source of knowledge and technology that may be unavailable in the domestic market". The BIS review also found that exporting firms

[72] http://www.evaluationsonline.org.uk/evaluations/Browse.do?ui=browse&action=show&id=351&taxonomy=INT

[73] Department for Business, Innovation and Skills (2010) Internationalisation of Innovative and High Growth SMEs
http://www.bis.gov.uk/assets/biscore/economics-and-statistics/docs/10-804-bis-economics-paper-05

contribute more to productivity growth than non-exporters, with exporters accounting for 60 per cent of UK productivity growth over the period 1996-2004.

The literature suggests a strong two-way link between exporting and innovation, with innovation helping or encouraging a firm to export in the first place and exporting itself also driving investment in innovation and R&D. This is echoed in research[74] using the UK's Community Innovation Survey which found that innovative firms are more likely to export, and that exporting increases the likelihood of undertaking R&D.

In addition to productivity and innovation gains, the evidence[75] identifies a number of other key benefits at the firm level from internationalisation including economies of scale, enabling a level of growth not otherwise possible, higher profit margins, diversification of risk through reaching a wider customer base and better prospects of surviving.

4.4.2 Data on international exports and exporting firms

The success of Scottish exports reflects the competitiveness of Scottish companies, their links to world markets and world economic conditions. The Scottish export market has faced challenging conditions in recent years, particularly as a result of the slowdown in trade flows as a result of the recession in the global economy.

The Government Economic Strategy recognises the importance of international trade and investment to the Scottish economy. In addition to exports, greater exposure to international trade promotes productivity and competition within Scottish markets. Being open to international markets can boost the Scottish economy as firms learn new ideas, adopt new technologies and seek out new opportunities and in doing so, build their confidence, ambition and leadership aspirations. To track progress in this important area, Scottish Government has a National Performance indicator to increase the value of exports to the Rest of the World. The indicator measures the growth in the value of goods and services that Scotland exports to other countries, and, as set out in the Government Economic Strategy, is supported by an ambitious target for Scottish businesses to deliver a 50 per cent increase in the value of international exports by 2017.

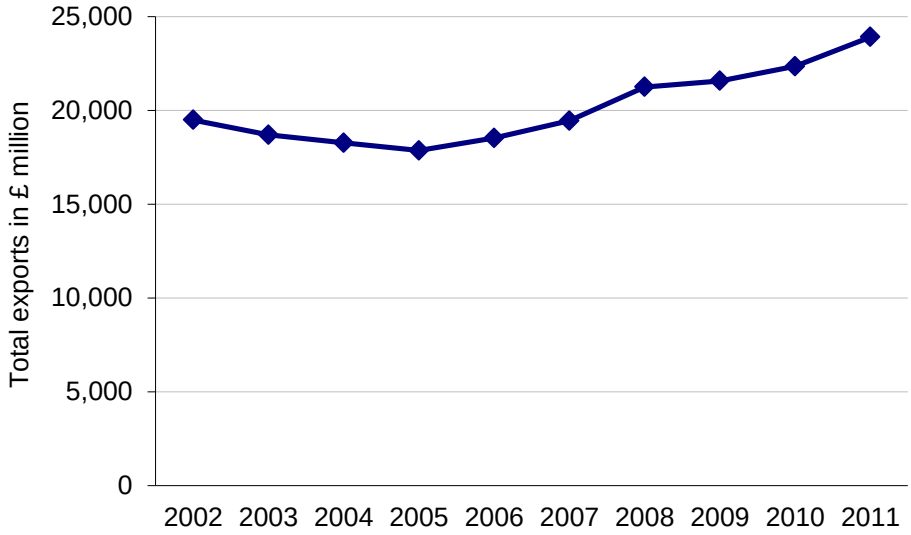
In 2011, the value of Scottish exports to the rest of the world (not including the UK) was £23.9 billion (Figure 35). This represents an increase of seven per cent on the previous year when Scottish exports were valued at £22.4 billion. There has been a steady annual increase in the total value of Scottish exports since 2006 when Scottish exports were valued at £18.5 bn. This represents an increase of 29.1 per cent (or an average of 5.2 per cent per year) in the value of Scottish exports to the rest of the world between 2006 and 2011.

[74] Harris, R (2010) Study of the Relationship between Innovation, Exporting and the use of E-Commerce http://www.ukti.gov.uk/uktihome/aboutukti/ourperformance/research/benefitsofinternationalisation.html

[75] Scottish Enterprise (2010), Exporting and Economic Growth https://www.scottish-enterprise.com/~/media/SE/Resources/Documents/About%20us/Research/Economic%20research/exports_and_economic_growth.ashx

Figure 35: Value of Scottish exports to the rest of the world (excluding rest of UK), 2020 to 2011

Source: Global Connections Survey



The Global Connections Survey shows that SME exporting firms account for around 40 per cent of the value of Scottish international exports. As Figure 36 shows, this proportion has been broadly consistent over time.

Figure 36: Total international exports by broad industry sector and size of company (£ millions)

Source: Global Connections Survey.
Note: The value of oil & gas extracted from the UK Continental Shelf is not included.
Note: The "Total exports" row includes some companies with exports but no reported employment details.

Sector & Company Size	*Exports by year*					
	2006	*2007*	*2008*	*2009*	*2010*	*2011*
Primary	**495**	**720**	**625**	**840**	**1,005**	**1,125**
Large	230	370	285	445	365	500
Medium	145	220	185	245	490	405
Small	125	135	155	150	150	220
Production & Construction	**11,895**	**12,605**	**13,625**	**13,195**	**13,920**	**15,135**
Large	8,480	8,700	9,565	9,035	9,650	10,210
Medium	2,605	3,035	3,195	3,230	3,415	3,890
Small	810	870	865	935	855	1,030
Services	**6,090**	**6,080**	**6,945**	**7,440**	**7,355**	**7,555**
Large	2,385	2,060	2,305	2,945	3,075	3,270
Medium	1,365	1,310	1,485	1,550	1,615	1,670
Small	2,345	2,710	3,155	2,950	2,665	2,620
Total Exports	**18,530**	**19,450**	**21,250**	**21,570**	**22,350**	**23,915**
Total Large	11,095	11,130	12,150	12,425	13,090	13,980
Total Medium	4,115	4,565	4,865	5,020	5,520	5,965
Total Small	3,275	3,710	4,180	4,035	3,670	3,870

Data from the Small Business Survey shows that 13 per cent of SMEs in Scotland in 2012 were exporters. This figure was down from 16 per cent in 2007.[76] The likelihood of being an exporter increases with the size of the business; 12 per cent of the self-employed and 13 per cent of micro employers were exporters in 2012, compared to 22 per cent of small-sized and 37 per cent of medium-sized employers.

Of the SMEs that were not exporters in 2012, four per cent stated that they had plans to start exporting or licensing their products or services outside the UK in the next 12 months.

4.4.3 Barriers to exporting

In the 2012 Small Business Survey, non-exporters that did not have export plans for the next 12 months were asked to list the barriers preventing their business from exporting.[77] The most commonly-cited barriers were:

- not having a product or service suitable for exporting (68 per cent)
- exporting not being part of their business plan (15 per cent)
- having sufficient business in the UK already (5 per cent)
- too costly (3 per cent)
- lack of management time (3 per cent)
- difficulty finding overseas customers (3 per cent)

The BIS review found that the main barriers faced by firms are those relating to information and capabilities. Specifically, the review found that the most common barriers included: gaining access to networks and contacts in overseas markets; navigating unfamiliar business environments (including language and cultural differences); legal and regulatory frameworks; and finally managerial capability (including a lack of understanding of the competitive environment and the lack of management time/expertise to pursue opportunities in overseas markets).

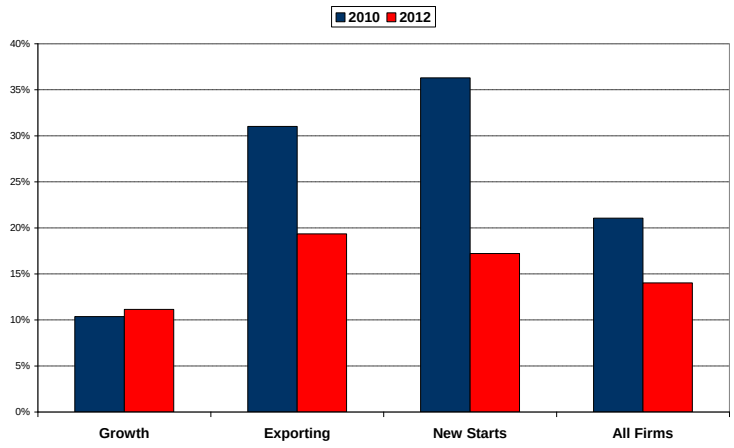
The BIS work also found that the incidence and nature of barriers to internationalisation tend to be greater for innovative firms and that they do not diminish rapidly with export experience - but vary across markets and increase as firms seek to enter high growth markets, which are also culturally more remote.

Evidence from the Scottish Government's SME Access to Finance Survey 2012[78] also highlighted the problems exporting firms face in securing finance with the findings suggesting that exporting firms have a higher outright application rejection rate than all other types of firms. The analysis found that 19 per cent of applications from exporting firms were rejected outright compared to an average application rejection rate of 15 per cent for all SMEs (Figure 37).

[76] Scottish Government, 2012, Small Business Survey Report 2012. http://www.scotland.gov.uk/Topics/Economy/ASBS/Report2012. In this survey, an exporter is defined as a business which sold goods or services or licenced products outside of the UK.
[77] 767 businesses were asked this question.

Figure 37: Application rejection rates by type of firm

Source: SME Access to Finance Survey 2012



4.4.4 Key messages

- Despite the significant economic and firm-level benefits to exporting, only a small proportion of Scottish SMEs are exporters. The likelihood of exporting increases with the size of business with the self-employed and micro business least likely to be exporters. This suggests the structure of the Scottish economy may have an impact.
- Similarly, innovate firms are more likely to be exporters. Evidence shows that this is an area where Scotland lags behind.
- Access to finance is once again mentioned as a barrier. Other barriers include: not having a suitable product or service to export and sufficient information and capabilities.

4.5 High growth firms

Although business start-ups are vital for job creation and economic growth, in recent years Scottish Enterprise has reoriented its business support initiatives away from increasing the number of business start-ups in favour of encouraging the growth of companies as discussed in research commissioned by Scottish Enterprise on high growth firms in Scotland[79]. Part of the rationale for this change was evidence that the business birth rate strategy had, to some degree failed (Fraser of Allander, 2001), supporting various academic studies which argued that simply encouraging more and more people to start their own businesses does not lead to job creation or economic growth (van Stel and Storey, 2004; Muller et al, 2008; Shane, 2009). However, this policy shift was also based on the recognition that Scotland has proportionately fewer companies of scale than the rest of the UK, apart from Wales and Northern Ireland and that developing more companies of scale offered greater potential for improving Scotland's economic development. For example, there has been a steady decline in the number of sizeable public companies with their headquarters outside of London, the effect of which is to widen the gap between London and the rest of the UK (Financial Times, 2010). The advantages of such companies are the presence of a global head office, employment of graduates and investment in a local supply chain (Bolger, 2010).

[79] http://www.scottish-enterprise.com/~/media/SE/Resources/Documents/GHI/High-growth-firms-in-scotland.ashx

In 2002, the Scottish Enterprise Business Birth Rate Strategy was effectively superseded with a focus on SMEs with high growth potential. As a consequence, initiatives such as the creation of the High Growth Start-up Unit and the Companies of Scale programme – providing tailored support to help companies achieve rapid growth - were adopted by Scottish Enterprise. More recently, Scottish Enterprise has developed a segmentation model of the Scottish business base as part of its approach towards stimulating firm growth in Scotland. This shift in policy focus is one that acknowledges that high growth firms are responsible for a significant proportion of economic growth. Analysis from Nesta[80] suggests that fast-growing, innovative businesses can make the economy thrive, spurring on weaker incumbents to become more innovative or risk being forced out of the market. Such 'creative destruction' increases the levels of innovation in the economy, driving productivity and economic growth. Nesta also found that high growth firms generate positive spillover effects in their regions. The research found that if two regions had the same average level of firm growth, the one with the greater proportion of high-growth companies will generate more jobs.

High-growth firms[81] account for a small proportion of the overall business stock at both the Scotland and UK level. Research conducted by SE[82] suggests that there were 825 high growth firms (HGFs) with 10 or more employees in Scotland over the period 2006-09, representing 4 per cent of all firms of that size band. While this figure is less than that found in other studies (see Anyadike-Danes et al, 2009) it is broadly in line with other smaller European economies. This research also found that

- Medium and larger-sized enterprises dominate the composition of the Scottish population of HGFs.
- The majority of Scottish HGFs are less than 25 years old, but only a small proportion are genuine gazelles (those high growth firms that are less than five years old).
- Services are the single largest source of Scottish HGFs whilst high tech sectors are weakly represented.
- The vast majority of Scottish HGFs are based around Scotland's main urban agglomerations of Glasgow, Edinburgh, Dundee and Aberdeen.
- A substantial proportion of HGFs (39 per cent) are foreign-owned.

The focus on the prevalence of high growth firms extends across the UK. Work by Nesta, an independent charity which promotes innovation in the UK, has found that high-growth firms make up seven per cent of all UK firms but account for a disproportionate share of job creation[83]. Over the three periods since 2002, the average share of high-growth firms is above five per cent in all the cities considered in their analysis. As Figure 38 shows, of the

80 http://www.nesta.org.uk/areas_of_work/economic_growth/high_growth_firms/assets/features/the_vital_6_per_cent

81 Whilst a number of definitions for high growth firms (HGFs) have been put forward in recent years, the majority of organisations examined (BIS, OECD, NESTA and Scottish Enterprise) tend to converge around defining HGFs as those achieving average annual growth of 20 per cent or more over a period of 3 years. Where the definitions differ is around the measures of growth, for instance whether it should be calculated based on turnover, employment or both.

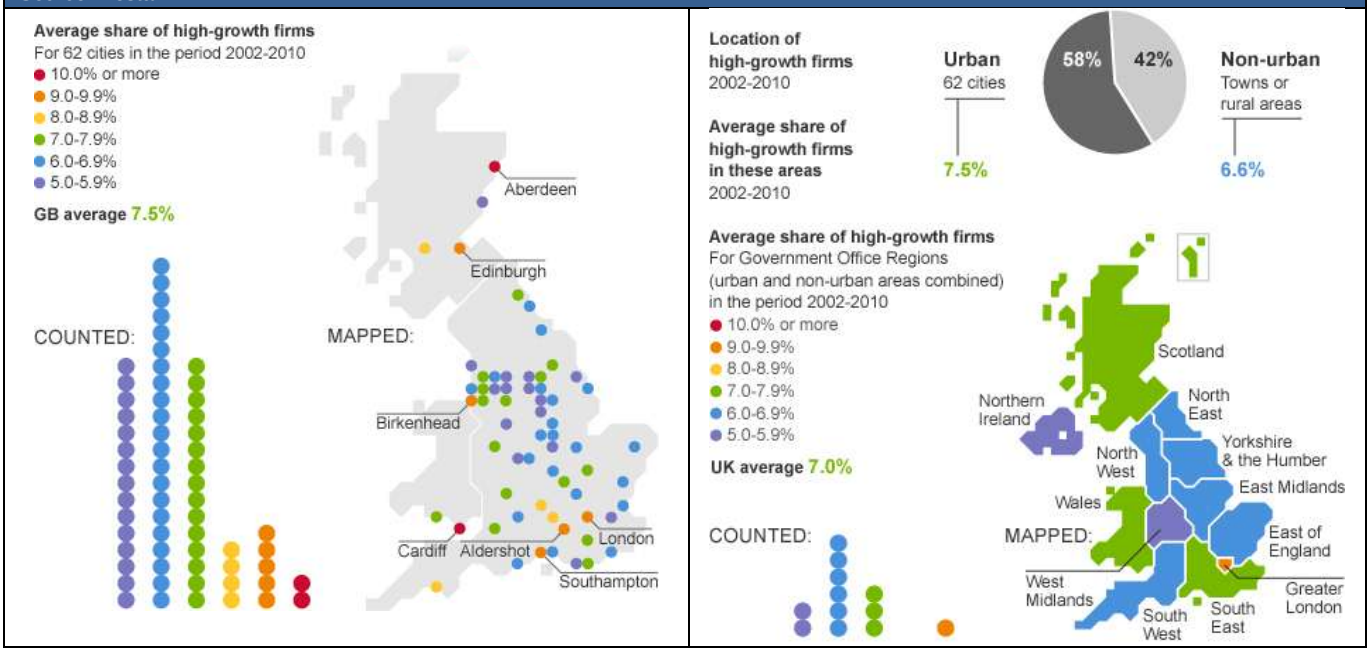
82 Note that HGFs were identified from the commercial business database FAME rather than from analysis of official data sources to enable the authors to identify particular firms for qualitative research. The FAME database carries some limitations in terms of its coverage of smaller firms.

83 Note: there are differences in the time periods and methodologies used between the SE and Nesta strudies.

four Scottish cities included within this analysis, Aberdeen and Edinburgh perform particularly well in comparison with other cities within the UK. Further analysis by Nesta found that 40 per cent of UK high growth firms are located outwith cities; a figure which is relatively stable over time, and confirms that high-growth firms can emerge both in big cities and small villages.

Figure 38: Nesta's analysis on the geography of high growth firms

Source: Nesta



Looking at the prevalence of high growth firms across UK regions and nations shows that Scotland performs similarly to Wales and lags behind only Greater London and the South East (Figure 38). In addition, HGFss can be found across all sectors, and include both established firms and start-ups, small businesses and large ones.

The significant contribution that a minority of firms achieving high growth make to the economy suggests that further consideration could be given to the specific barriers to growth, or market failures, that potential high-growth firms may face at key 'trigger points', when the firm is on the cusp of high growth. The characteristics of high-growth firms highlighted by the various studies suggest that policy aimed at targeting high-growth potential firms in the economy should focus on creating a business environment, supporting firms in entering international markets and also consider sales and marketing strategies. Firms may also face specific market failures, for example barriers to entry in export markets or access to finance in particular in cases of high risk innovation. Both NESTA and SE argue that policy should be specifically targeted at the small number of companies with high growth potential. An approach such as this however carries the challenge of identifying potential high-growth firms. Secondly, where firms are supported when they have already gone through a period of high growth, there may be significant deadweight associated with intervention. These targeting challenges are also faced by broader volume-based initiatives aimed at increasing the broader business birth rate.

Nesta's 2011 report on barriers to growth[84] also found that:

[84] http://www.nesta.org.uk/home1/assets/features/barriers_to_growth

- The state of the economy is the main obstacle facing UK firms but high growth firms are better are overcoming it.
- Finance is a disproportionately important obstacle for high growth firms.
- Finding the right staff is holding back high growth UK firms and management skills are also a problem,
- Regulation and competition are issues for high growth firms but less so than for slower growth firms.

4.5.1 Key messages

- High growth firms are receiving increasing policy importance. Whilst they make up a relatively small proportion of the business stock in the economy, they account for a disproportionately larger proportion of job creation and are felt to be the key future economic growth.
- Whilst high growth firms make up only a small portion of Scotland's firms, Scotland has a similar prevalence to Wales and lags behind only Greater London and the South East
- The majority of Scotland's high growth firms are concentrated in Scotland's most populated areas, such as Aberdeen, Edinburgh and Glasgow.

5 Thematic Objective 4: Supporting the shift towards a low-carbon economy in all sectors

One of the thematic objectives of the 2014-2020 ERDF programme is supporting the shift towards a low-carbon economy in all sectors through:

- promoting the production and distribution of renewable energy sources
- promoting energy efficiency and renewable energy use in SMEs
- supporting energy efficiency and renewable energy use in public infrastructures and in the housing sector
- developing smart distribution systems at low voltage levels
- promoting low-carbon strategies for urban areas.

The transition to a low carbon economy is central to the Scottish Government's policy objectives for sustainable economic growth. Tackling climate change and reindustrialising our energy sectors through a progressive agenda of low carbon measures demonstrates there is both the political will and investor confidence in building Scotland's place as a power house of Europe.

The Scottish Government believes that it is possible to achieve economic progress while reducing harmful carbon emissions and evidence from Scotland proves that a low carbon economy is viable and the correct path to pursue in balancing environmental management with economic priorities.

Scotland has ambitions targets for renewable energy and greenhouse gas emissions including:

- to deliver the equivalent of 100 per cent of gross consumption through renewable sources in 2020, with an interim target of 50 per cent by 2015
- a reduction in greenhouse gas emissions of at least 80% by 2050, with an interim 42% reduction target by 2020, compared to a 1990 baseline

This section discusses generation and use of renewable energy, energy efficiency, and greenhouse gas emissions in Scotland.

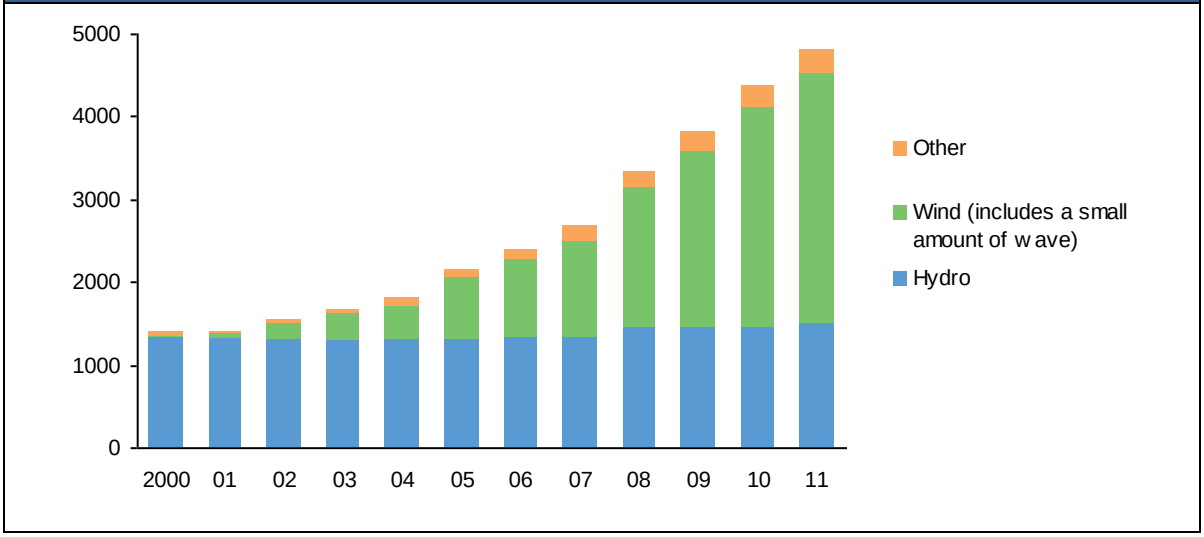
5.1 Renewable energy

5.1.1 Renewable electricity capacity and generation

Installed renewable electricity capacity in Scotland has risen year on year since 2000. As shown in Figure 39, there has been an increase from 1391 MW in 2000 to 4810 MW in 2011. Wind accounts for almost two thirds of renewable electricity capacity, while hydro accounts for slightly under one third.

Figure 39: Installed capacity of renewable electricity in Scotland, MW of electricity

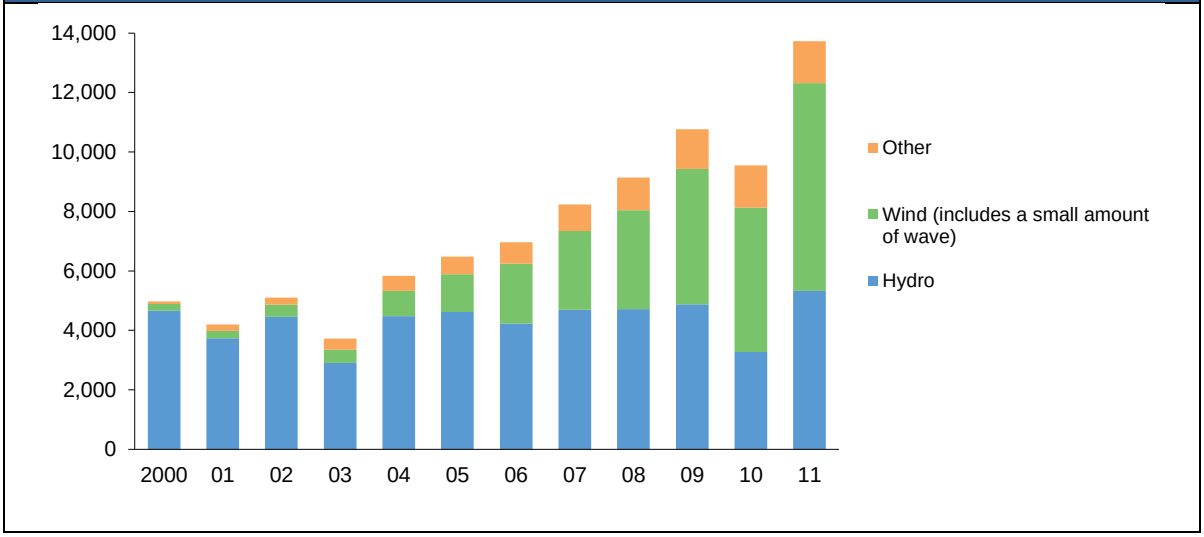
Source: Department of Energy and Climate Change



Generation of renewable electricity from non-hydro sources has grown rapidly since the start of the century from a starting point of almost zero, as shown in Figure 40. Building upon a long established base of hydro generation, the growth in deployment thus far has been predominantly through onshore wind. Landfill gas and other biofuels, which make up most of the "Other" category in the chart, also make a substantial contribution.

Figure 40: Electricity generated from renewables in Scotland, GWh

Source: Department of Energy and Climate Change



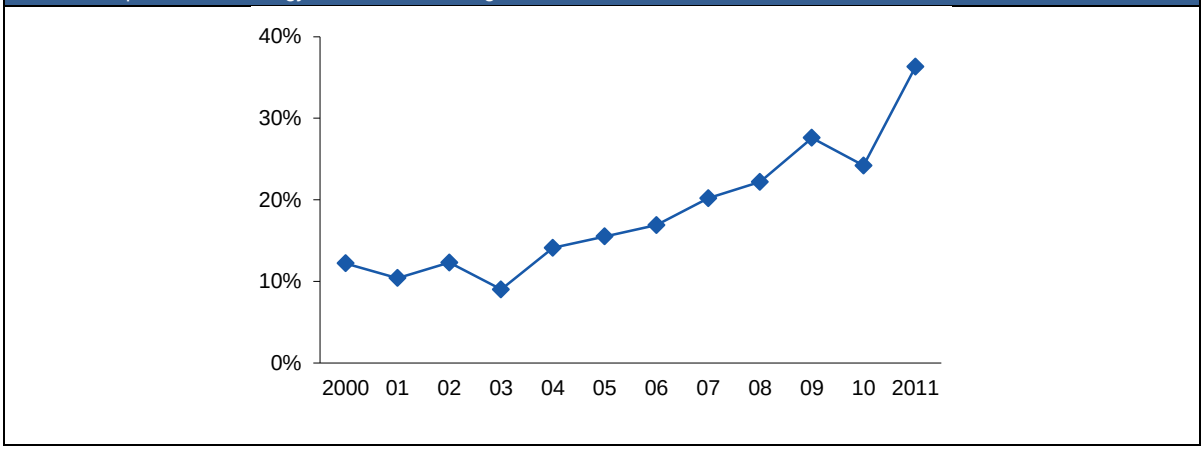
The amount of electricity generated by renewables in Scotland has nearly trebled since 2000, as Figure 41 shows. In 2011, the amount of electricity generated in Scotland by renewable sources equated to 36.3 per cent of the gross annual consumption of electricity in Scotland, compared with 12.2 per cent in 2000.

The proportion of gross electricity consumption generated from renewables in 2011 was significantly higher in Scotland than in the European Union as a whole (20.4 per cent). However, a small number of European countries have a higher proportion of electricity consumption from renewables than Scotland; these include Norway (97.9 per cent), Sweden (58.7 per cent), Austria (55.2 per cent), and Portugal (43.6 per cent).

The Scottish Government has set a target to deliver the equivalent of 100 per cent of gross consumption through renewable sources in 2020, with an interim target of 50 per cent by 2015.

Figure 41: Renewables as a percentage of gross electricity consumption

Source: Department of Energy and Climate Change



Of the devolved UK administrations and English regions, Scotland has by far the greatest electricity generation from renewables per unit of economic activity (as measured by gross value added). In 2011, Scotland's generated 127 MWh of renewable electricity per million pounds of GVA, compared to 26 MWh/£m in the UK as a whole.[85]

5.1.2 Renewable energy potential

Scotland has significant growth opportunities in offshore wind, wave and tidal technologies. Scotland's practical offshore renewables resource has been estimated at 206 GW.[86] By harnessing around a third of this resource, installed offshore renewables capacity could reach 68 GW by 2050 - more than ten times Scotland's peak electricity demand. In particular, Scotland's wind and seas hold some of the most concentrated potential in the world, with an estimated 25 per cent of Europe's offshore wind and tidal potential and 10 per cent of Europe's wave potential. Around 20 per cent of the electricity generated in Scotland is exported to the rest of the UK.

A combination of Scottish Territorial Waters and Round 3 offshore wind sites has created up to 10GW of potential development. During 2012 just over 4GW was submitted to Marine Scotland Licensing Operations Team seeking planning consent, with a further 1.5GW expected in 2013. The offshore wind industry is therefore currently on target to play its full role in meeting the target to deliver the equivalent of 100 per cent of gross consumption

[85] Electricity generation data from Department for Energy and Climate Change; GVA data from Office for National Statistics.

[86] The Offshore Valuation Group (2010), The Offshore Valuation. http://www.offshorevaluation.org/

through renewable sources in 2020, and helping to decarbonise the UK power sector in line with the legally binding carbon budgets set out in the Climate Change Act.

The wave and tidal energy sector is still at an early stage; however, it has made remarkable progress in recent years. The European Marine Energy Center (EMEC) in Orkney provies developers of wave and tidal energy converters with purpose-built, accredited open-sea testing facilities. With 14 full-scale test berths, there have been more grid-connected marine energy converters deployed at EMEC than any other single site in the world, with developers attracted from around the globe. There are firm plans in place for pre-commercial and commercial arrays of wave and tidal machines from 2014 through to 2020. Much of the scale-up activity will take place within the Pentland Firth and Orkney Waters Strategic Area following on from the award of commercial leases in the area. These leases, the first of their kind in the world, amount to 1.6 GW of potential capacity which could be built out by 2020.

Onshore wind also presents a prime opportunity for communities and the rural sector to generate local revenue and sustain local economies, and could be a key contributor to the target for 500 MW of renewables in community ownership by 2020.

5.1.3 Renewable energy policies

The Scottish Government's actions to promote the renewable energy industry include:

- The £103 million Renewable Energy Investment Fund was opened for business in October 2012 and will leverage further private finance into green energy projects.
- The £35 million Prototyping for Offshore Wind Energy Renewables Scotland (POWERS) fund will support production of full-scale prototypes of next generation offshore wind turbines.
- The £18 million Marine Renewables Commercialisation Fund will accelerate the deployment of wave and tidal stream arrays in Scottish waters.
- Since May 2007, over 800 grants for community renewables, worth over £16 million were allocated under Community and Renewable Energy Scheme (CARES).
- The CARES Loan Scheme worth £7.75 million has supported 42 community-based energy generation projects since 2011. The recently relaunched scheme will make a further £23.5 million available to communities and rural businesses over the next three years.
- Scottish Enterprise manages the £70 million National Renewables Infrastructure Fund (NRIF) designed to strengthen port and manufacturing facilities and supply chain provision for manufacturing offshore wind turbines and related components.
- The Offshore Wind Expert Support Programme - a £0.9m support programme to help firms develop a Scottish supply chain in the emerging offshore wind industry.
- £13.9 million awarded through the Wave and Tidal Energy: Research, Development and Demonstration Support fund – WATERS 1 & 2. To support the testing of new wave and tidal prototypes in the seas around Scotland. The fund also assists in the development of new technologies up to the prototype stage, particularly those which increase the effectiveness of installation, operation and maintenance of marine energy devices.

Through our work on North and Irish Seas grid, we believe delivering closer market integration and interconnection requires a strategic, co-ordinated and collaborative approach between countries, regions and members states. It also requires significant and sustained

working with other UK and EU countries to standardise electricity markets, transmission and energy regulation. We are therefore working closely on these issues with Governments in the UK and Europe and participate in the EU-led North Seas Countries Offshore Grid Initiative.

5.1.4 Renewable heat

Heat is estimated to account for approximately half of Scotland's total energy use. Switching from fossil fuel to renewable sources of heat has the potential to reduce greenhouse gas emissions, and make a significant contribution to Scotland's overall renewable energy target. The Renewable Heat Action Plan[87] set a target of delivering 11 per cent of Scotland's projected 2020 heat demand from renewable sources, amounting to some 6.4 TWh. The two available estimates show that renewable heat output approximately doubled from 0.845 GWh in the financial year 2008/09 to 1.696 GWh in 2010. The latter figure represents 2.8 per cent of Scotland's forecast heat demand in 2020.

Actions taken by the Scottish Government on renewable heat include:

- In June 2012 we announced a £5 million boost to the budget for Home Renewables Loans, and an increase in the amount available for renewable heat to £10,000. The loans are providing support to individual householders to install renewable technologies in their homes and are available until March 2013 through the Energy Saving Trust, who have seen a sharp rise in the levels of interest since the announcement.
- We have funded heat mapping in Highland, Fife and Perth & Kinross and we are rolling out the heat mapping programme to all local authorities in Scotland with the aim of creating a pan-Scotland heat map. Heat mapping is fundamental in the development of our ambitions to decarbonise heat. Heat maps help identify and define future renewable heat opportunities in an area, particularly heat networks.

5.1.5 Renewable transport

Scotland has a renewable transport target of 10 per cent for the share of biofuels in transport petrol and diesel consumption by 2020. Biofuels were 3.5 per cent as a percentage of road fuels consumed in the UK in 2011. This was down slightly from 3.6 per cent in the previous year.[88] Data on renewable transport for areas within the UK is not yet available.

The Scottish Government's policies for renewable and active transport include:

- We are now in our third year of funding the installation of electric vehicle charging facilities and participating in the Department for Transport (DfT) - via its offshoot organisation the Office of Low Emission Vehicles (OLEV) - UK Plugged-in Places initiative. The programme will see the installation of a high powered interoperable network of charging facilities seven cities and primary road network together with commercial workplace and home charging facilities. By the end of 2012-13, expenditure on electric vehicle charging infrastructure and electric vehicle partnerships will total £9 million.

[87] http://www.scotland.gov.uk/Publications/2009/11/04154534/0 - 2010 and 2011 updates also available
[88] http://www.decc.gov.uk/assets/decc/statistics/source/renewables/et6_2.xls

- Subject to capital availability, the Scottish Government's Ferries Plan, published in December 2012, sets out a major programme of vessel investment, including fuel efficiency improvements, from 2015.
- Improvements in integrated public transport such as smart ticketing, and park-and-ride facilities, will support further modal shift to bus and rail and away from private car usage, particularly where complemented by local travel planning.
- Our Cycling Action Plan, covering skills development and cycle network improvements, sets out our plans for achieving our vision that by 2020, 10% of all journeys in Scotland will be taken by bike.[89]

5.2 Energy efficiency

5.2.1 Final energy consumption

Scotland has a target to reduce final energy consumption by 12 per cent by 2020, relative to a 2005-07 baseline. In Figure 42, the data for 2010 shows a slight increase in consumption compared to 2009 due in part to the economic recovery from the previous year and a particularly cold winter. Consumption in 2010 was 1.2 per cent higher than in 2009 but still 6.2 per cent lower than the 2005-2007 baseline against which the 12 per cent Energy Efficiency Target is measured.

Figure 42: Final energy consumption, by consuming sector, TWh

Note: All figures exclude renewables and waste.
Source: Department of Energy and Climate Change

Year	Industry & Commercial	Domestic	Transport	Total
2005	72	52	40	165
2006	69	51	41	160
2007	68	51	41	160
2008	71	49	41	161
2009	64	47	40	150
2010	66	47	39	152

Energy consumption per capita is higher in Scotland than in other parts of the UK. This is primarily due to two factors: Scotland's relatively high consumption in the industrial and commercial sector, and higher domestic energy consumption—which is due in part to the colder and wetter climate.

5.2.2 Energy efficiency programmes

The main energy efficiency programmes operated or supported by the Scottish Government are:

[89] Transport Scotland. Cycling Action Plan for Scotland: www.scotland.gov.uk/Publications/2010/06/25103912/0

- **Carbon Trust:** The Scottish Government has invested around £20 million since 2007/08 into the Carbon Trust for non-domestic advice and support. The Carbon Trust work with Scottish businesses that have an energy spend of over £30,000 per year and also with the public sector to reduce energy use, carbon emissions and to implement energy efficiency measures.
- **Energy Saving Trust:** The Scottish Government funds the Energy Saving Trust (EST) to manage the Energy Saving Scotland advice network, whose dedicated business advice service offers hands-on support to SMEs. They work with SMEs with an energy spend of less than £30,000 per year and advise on energy efficiency measures.
- **SERES:** The Scottish Energy and Resource Efficiency Service (SERES) partnership was established to simplify business access to energy and resource efficiency advice. It is a virtual partnership that brings together existing Scottish Government business support and advice programmes delivered through a range of organisations, including Zero Waste Scotland, Scottish Enterprise, Highlands and Islands Enterprise, Business Gateway, Energy Saving Trust, Carbon Trust, and the Scottish Environment Protection Agency.
- **Resource Efficient Scotland:** The Scottish Government will build on the existing SERES framework to further simplify the delivery landscape through the integration of its current non-domestic energy and material resource efficiency services.
- **SME loans:** The Scottish Government funds the Energy Saving Trust (EST) to manage the SME loans scheme. They provide loans of £1,000-£100,000 to install renewable energy technologies or measures that reduce energy consumption to SMEs, including for boiler replacements, heating controls and wood fuel heating systems, through the Energy Saving Scotland small business loans scheme.
- **CEEF:** The Central Energy Efficiency Fund (CEEF), launched in 2004, is one of the Scottish Government's key vehicles for delivering energy efficiency as well as renewable energy measures and reducing carbon emissions in the public sector in Scotland.
- **Salix:** Since 2008, Salix Finance have managed a £4 million revolving loans fund on behalf of the Scottish Government to fund low carbon investment projects in Scottish Further and Higher Education establishments.

Action is also being taken at local government level to improve energy efficiency. For example, Glasgow City Council's the Carbon Management Group / Energy Efficiency Unit (EEU) is tasked with reducing carbon emissions through:[90]

- **Energy Monitoring and Management**, including consumption monitoring and reduction target setting
- **Carbon Management**, including:
    - Energy Audits – based on the audits, key areas of over-consumption and bad practice are identified to assess the performance of each building and develop a programme of improvement
    - Developing educational programmes, events and competitions highlighting the importance of energy efficiency

[90] http://www.glasgow.gov.uk/index.aspx?articleid=4995

- Maintaining a database of energy related information
- Developing, monitoring and reviewing energy saving projects

5.3 Greenhouse gas emissions

Scotland's emissions of greenhouse gases in 2010 were 55.7 million tonnes of carbon dioxide equivalent ($MtCO_2e$). This was 22.9 per cent below 1990 levels. Taking the European Union Emissions Trading System (EU ETS) into account, emissions were down by 24.3 per cent over this period. The energy supply sector was the largest emitter of greenhouse gas emissions in 2010, contributing 37.2 per cent of the emissions in Scotland. Transport emissions contributed 19.2 per cent to the total, and the agriculture and related land use sector accounted for 18.8 per cent of the total.

Figure 43: Greenhouse Gas Emissions by Source, million tonnes of carbon dioxide equivalent, taking account of emissions and removals

Source: National Atmospheric Emissions Inventory

	1990	2010
Energy supply	22.32	20.74
Transport (excluding IA&S)	10.52	10.72
Agriculture and related land use	14.26	10.46
Residential	8.15	8.37
Business & Industrial process	13.15	7.89
International aviation and shipping (IA&S)	2.51	2.49
Waste management	6.57	2.15
Development	1.78	1.61
Public	1.23	0.87
Forestry	-8.30	-9.58
Total	72.18	55.73

Since 2010, the Scottish Government has had a statutory requirement to publish estimates of greenhouse gas emissions associated with planned government spending. The estimates are calculated using an Environmental Input-Output model, which estimates additional emissions across the economy associated with each £1 million of additional Scottish Government spending.[91]

Scotland has a number of targets for reducing greenhouse gas emissions. These targets include emissions from international aviation and shipping, and in reporting emissions reductions against these targets, Scotland takes account of emissions trading through the European Union Emissions Trading System (EU ETS). The Climate Change (Scotland) Act 2009 sets a statutory framework for GHG emissions reductions in Scotland with a reduction target of at least 80% for 2050 and an interim 42% reduction target by 2020. Both of these reductions are based upon the 1990 base year (1995 for the F-gases, i.e. hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride). The Act also requires

[91] For further details, see http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/CarbonAssessment. The most recent carbon assessment, for the 2013-14 Draft Budget, can be downloaded at http://www.scotland.gov.uk/Publications/2012/09/8738.

Scottish Ministers to set annual targets for emissions and the Scottish Parliament has passed legislation setting annual targets to the year 2027.

In 2010 Scottish GHG emissions, including international aviation and shipping and adjusted to take account of trading in the EU ETS were 54.7 MtCO2e, 24.3% lower than in the 1990 base year. Between 2009 and 2010, such emissions increased by 1.9% (1.0 MtCO2e).

Scottish Ministers must publish a report on proposals and policies for meeting each batch of annual targets. On 29 January 2013, Scottish Ministers published Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 - the Draft Second Report on Proposals and Policies (RPP2). The draft report sets out how Scotland can deliver its statutory annual targets for reductions in greenhouse gas emissions for the period to 2027 and updates the first RPP for the period to 2022 published in March 2011. It considers areas with major emissions and/or sequestration opportunities: energy supply with a focus on electricity generation; homes and communities; business, industry and the public sector; transport; waste and resource efficiency; and rural land use.

The draft report includes a new electricity decarbonisation target to achieve a carbon intensity of 50 gCO2/kWh of electricity generation by 2030. The carbon intensity of the grid was 347 gCO2/kWh in 2010 but is estimated to have fallen to 291 gCO2/kWh in 2011.[92]

5.4 Key messages

- Evidence shows that Scotland has a growing renewables sector.
- Over the last decade, installed renewable electricity capacity in Scotland has risen substantially. This is particularly the case for wind power.
- Electricity generated from renewable resources delivered higher equivalent proportion of Scottish gross consumption than the corresponding proportion for the EU as a whole However, a small number of European countries have a higher proportion of electricity consumption from renewables than Scotland.
- Of the UK nations and regions, Scotland has by far the greatest electricity generation from renewables per unit of economic activity (as measured by gross value added).
- Scotland has significant growth opportunities in offshore wind, wave and tidal technologies.
- Evidence shows that renewable heat output approximately doubled in the period from 2008/09 to 2010.
- Total final energy consumption in Scotland fell between 2005 and 2010.
- Scotland's is making progress towards reducing emissions - emissions of greenhouse gases have also been declining and are now almost a quarter below 1990 levels.

[92] Scottish Government, 2013, Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027: The Draft Second Report on Proposals and Policies.
http://www.scotland.gov.uk/Publications/2013/01/3958/downloads

6 Thematic Objective 6: Protecting the environment and promoting resource efficiency

Protecting the environment and promoting resource efficiency is one the thematic objectives of the 2014-2020 ERDF programmes. The regulations for the programmes state that this includes:

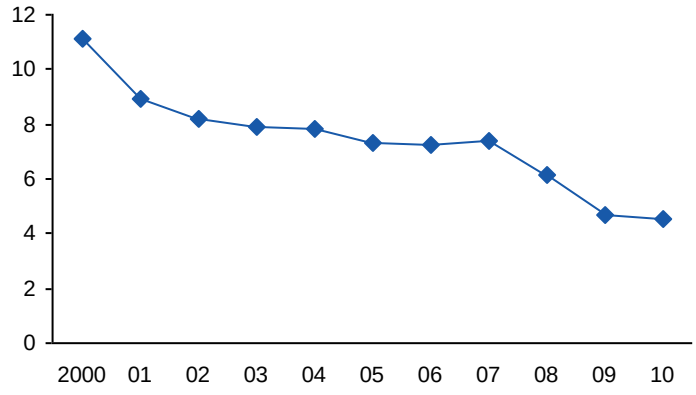
- addressing the significant needs for investment in the waste sector to meet the requirements of the environmental acquis
- addressing the significant needs for investment in the water sector to meet the requirements of the environmental acquis
- protecting, promoting and developing cultural heritage
- protecting biodiversity, soil protection and promoting ecosystem services including NATURA 200015 and green infrastructures
- action to improve the urban environment, including regeneration of brownfield sites and reduction of air pollution.

This section discusses key environmental trends in Scotland.

6.1.1 Waste

In Scotland, 4.56 million tonnes of waste were landfilled in 2010. This was down by 59 per cent from 11.14 million tonnes in 2000, as Figure 44 shows.

Figure 44: Waste sent to landfill, million tonnes
Source: Scottish Environment Protection Agency



The quantity of local authority collected municipal waste rose from 3.21 million tonnes in 2000/01 to 3.44 million tonnes in 2006/07, and has since fallen gradually to 3.06 million tonnes in 2011/12.[93]

[93] The definition of municipal waste has changed slightly over the time period in which these data have been collected. The current definition of municipal waste is household and similar waste. Local authority collected

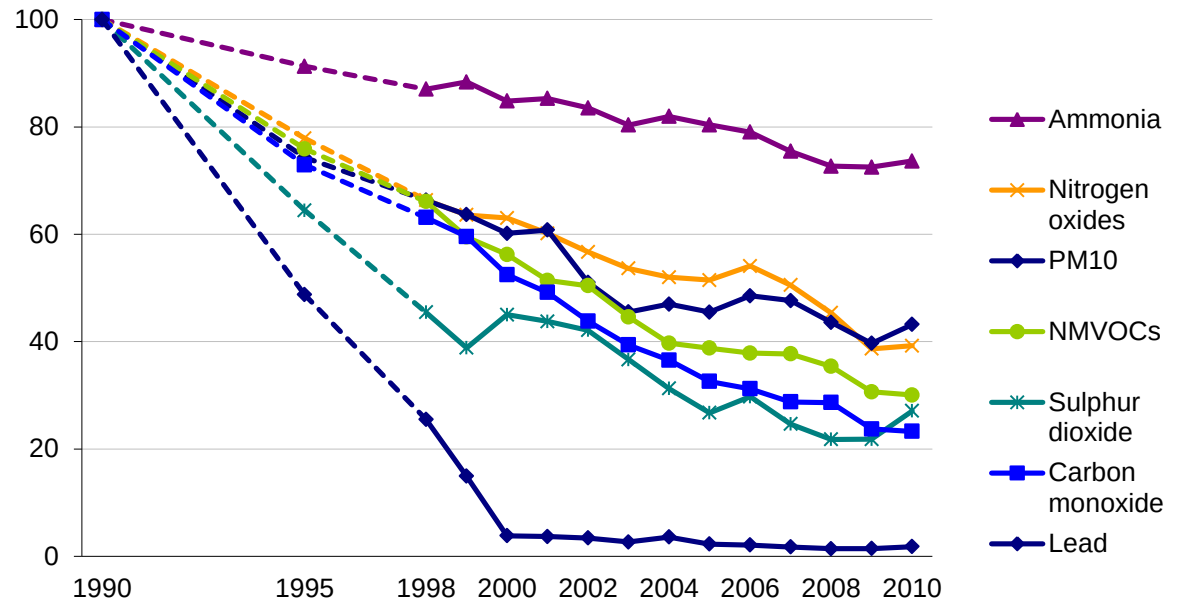
Over the period from 2000/01 to 2011/11, the percentage of local authority collected municipal waste recycled or composted rose from 4.5 per cent to 38.2 per cent. This reflects more than an eight-fold increase in the amount of material recycled.

6.1.2 Air quality

As Figure 45 shows, Scotland's air quality has improved since 1990 in terms of the quantity of seven key pollutants monitored in the Scottish Government's *High Level Summary of Statistics* on the Environment.[94]

Figure 45: Index of Scottish air pollutant emissions 1990-2010

Index (1990=100)
Source: National Atmopheric Emissions Inventory



6.1.3 River water quality

Low standards of river water quality may threaten the aquatic environment, drinking water quality and recreational water use. Sewage, industry, urban development and agriculture are some of the factors that may affect river water quality.

The Scottish Environment Protection Agency (SEPA) has established an indicator of river water quality based on a network of sites covering 253 water bodies. The indicator is based on a set of five water quality parameters which are sensitive to organic pollution,nutrients

municipal waste is all waste for which the councils make arrangements, with the exclusion of: abandoned vehicles; road maintenance waste; commercial waste that is delivered to local authority owned or run landfill sites where the local authority has no part in the collection or disposal arrangements that have led to this delivery; industrial waste collected from industrial premises and taken for disposal or treatment separately from any other waste; and construction and demolition waste that is collected and taken for disposal or treatment separately from any other waste. Bricks and rubble taken to civic amenity sites are included in municipal waste.

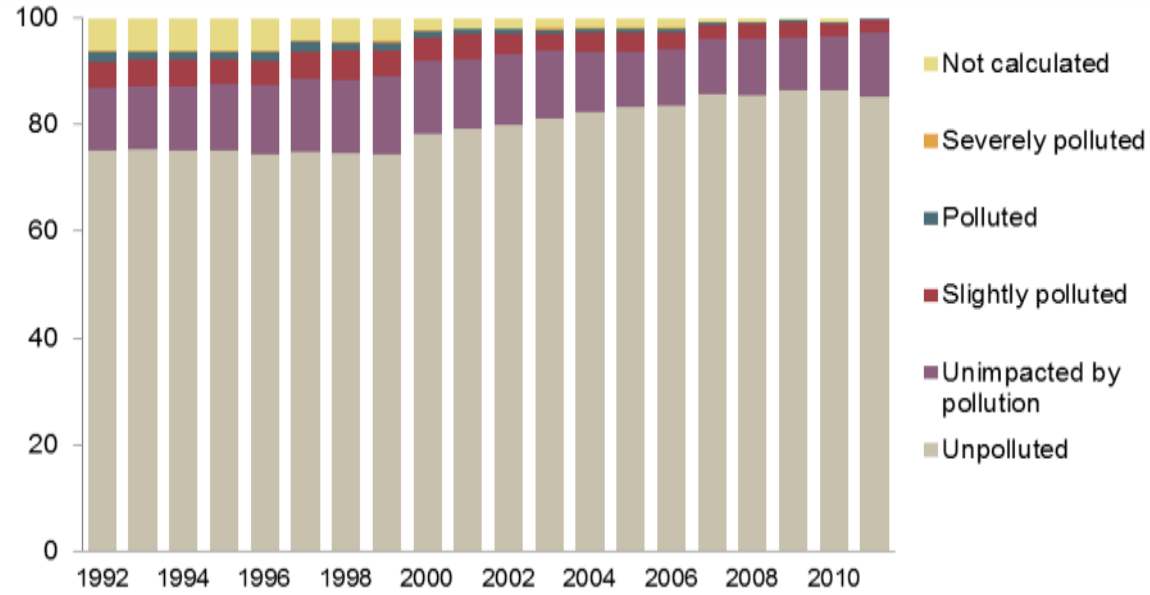
[94] http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment/TrendExcel

and toxic substances and provide a measure of species diversity. Each of the parameters is assessed over a rolling 3 year period and the results weighted by river length.

Between 1992 and 2011, the proportion of river length that was classed as slightly polluted, polluted or severely polluted in Scotland rose from 6.8% in 1992, to 7.4% in 1998, before falling to 2.8% in 2011. The main drivers of slightly polluted, polluted and severely polluted rivers are inputs of nutrients, leading to degraded biological and nutrient quality. The proportion of river length classed as unpolluted rose from 85.7% in 2007 to 86.5% in 2010 before falling to 85.2% in 2011 accompanied by a rise in river length classed as unimpacted by pollution.

Figure 46: River Water Quality 1992-2011

Source: Scottish Environment Protection Agency (SEPA)



The enrichment of waters by nutrients, such as nitrates and phosphates, may lead to damage to the aquatic environment through the accelerated growth of algae and other plant life. Regulations have been made designating 14% of the area of Scotland as Nitrate Vulnerable Zones (NVZs).[95] In NVZs, mandatory rules on farming practices aim to reduce nitrate water pollution from agricultural sources.

6.1.4 The work of the Scottish Environmental Protection Agency

The Scottish Environment Protection Agency (SEPA) is Scotland's environmental regulator. Described in broad terms, SEPA's responsibilities include regulating:

- activities that may pollute water or air
- waste storage, transport, treatment and disposal

[95] Under The Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2002 and The Designation of Nitrate Vulnerable Zones (Scotland) (No. 2) Regulations 2002 and EC Nitrates Directive (91/676/EEC) Annex 1A(3)

- the keeping and disposal of radioactive materials
- activities that may contaminate land.

SEPA's other principal responsibilities include:

- monitoring, analysing and reporting on the state of Scotland's environment
- running Scotland's flood warning systems
- helping implement the National Waste Strategy
- controlling, with the Health and Safety Executive, the risk of major accidents at industrial sites
- operating the Scottish part of the Radioactive Incident Monitoring Network.

SEPA's work on air quality involves working with and directing local authorities and other partners to manage and improve the quality of air. SEPA also provides policy and operational advice to government, industry and the public on pollution control and other environmental issues.

SEPA has a duty to protect the environment and human health from the effects of waste management and disposal. In particular, SEPA licences and monitors waste management facilities such as landfills and incinerators, administers producer compliance schemes for particular waste streams, regulates the transfrontier shipment of wastes and responds to pollution incidents and fly-tipping. SEPA also collects data on waste production, recycling and disposal and is a statutory consultee in the planning process.

6.1.5 The Work of Scottish Natural Heritage

Scottish Natural Heritage (SNH) is a public body whose purpose is to:

- secure the conservation and enhancement of nature and landscapes
- foster their understanding and facilitate their enjoyment and
- promote their sustainable use and management.

SNH fulfils its purpose by:

- Providing advice to the Scottish Government and its agencies, local authorities, developers, land managers and others. SNH advises on how best to meet Scotland's international obligations as well as legal requirements to protect and enhance Scotland's nature and landscapes.
- Gathering evidence to inform the public and promote the wider benefits of protecting and enhancing nature and landscapes in the public interest. SNH's work includes surveillance and monitoring, sharing good practice, championing the value of nature and encouraging people to enjoy the outdoors.
- Targeting action to protect and enhance nature and landscapes, working in partnership with others. Examples include work on protected places, action to protect certain plants and animals, restoring damaged habitats, and providing better places to live in Scotland's towns and cities.

SNH's *Corporate Strategy and Priorities 2012 to 2015* sets out the following actions that SNH will take over the five years from 2012:[96]

- **Biodiversity**. Interpreting and assisting Scotland to achieve the new global and EU 2020 targets to maintain Scotland's contribution to halting the loss of biodiversity
- **Climate change**. Contributing to Scotland's low carbon economy, by maximising the capacity of the natural environment, such as peatland, to store carbon and providing advice on adapting to the impacts of climate change
- **Development advice**. Supporting onshore and offshore renewables to meet Scotland's renewable energy targets. Establishing marine planning and Marine Protected Areas to improve environmental quality and guide better decision-making for marine development. Engaging with development planning to create better places for people to live, work and play in.
- **Protected places**. Maintaining and enhancing the quality of Scotland's best nature and landscapes, showing how they help Scotland to meet its biodiversity targets, and how they deliver wider benefits for the local economy, jobs and tourism.
- **Land use**. Supporting the implementation of Scotland's Land Use Strategy. Advising on reform of the Common Agricultural Policy and renewal of the Scotland Rural Development Programme to deliver investment in our natural assets and secure public benefits from them.
- **Wildlife management**. Getting the best from Scotland's wildlife: balancing management for wildlife with wider land use, other environmental interests, and public health and safety.

6.1.6 Steps taken by SMEs to reduce environmental impact

The Small Business Survey 2012 asked SMEs whether they had taken any steps to reduce their environmental impact.[97] Twenty-three per cent of SMEs reported that they had taken a lot of steps, and 39 per cent reported that they had taken a few steps. The proportion taking steps to reduce environmental impact increased with company size.

Twenty-two per cent of those having taken steps to reduce their environmental impact had done so to comply with regulations. Of these, 71 per cent had taken additional steps which were above those required by regulations.

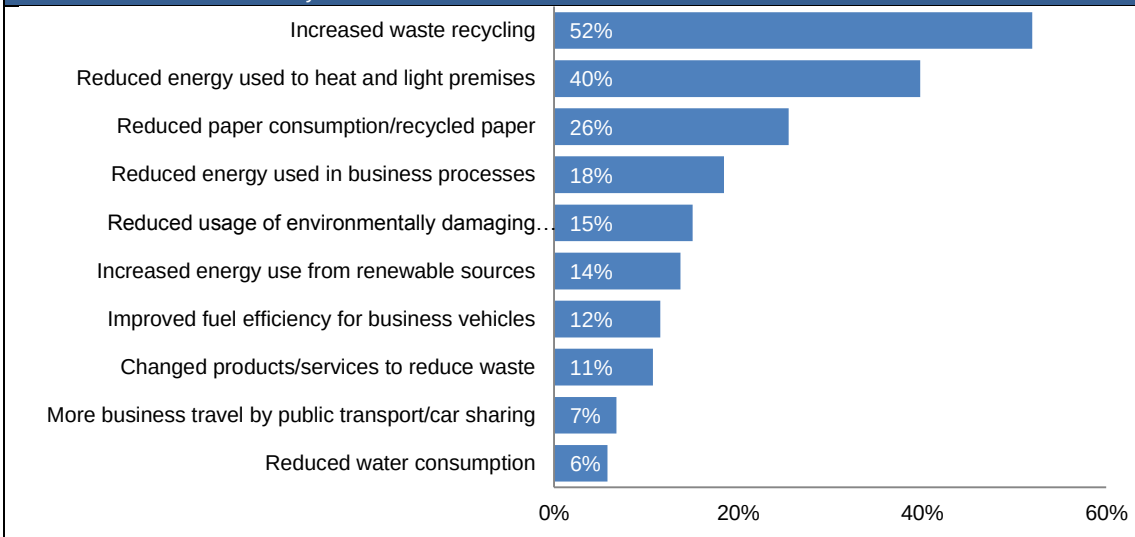
Figure 47 shows that, of SMEs that had taken steps to reduce their environmental impact, 52 per cent had increased waste recycling and 40 per cent had reduced energy used to heat and light premises.

[96] http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=1864

[97] Scottish Government, 2012, Small Business Survey Report 2012. http://www.scotland.gov.uk/Topics/Economy/ASBS/Report2012

Figure 47: Steps taken so far to reduce environmental impact, 2012. Base: SMEs that have taken steps to reduce environmental impact.

Source: Small Business Survey 2012



Around two thirds (66 per cent) of SMEs reported that they would not do more than they do currently to reduce their environmental impact. The majority of those that said this felt they had done enough already to reduce their environmental impact (64 per cent). Only 8 per cent thought that the cost of making changes was prohibitive. Another less cited class of barriers was being a home or mobile worker or having an office that was too small (8 per cent).

6.2 Key messages

- Scotland is taking forward efforts to reduce waste and to promote resource efficiency.
- Landfill waste has fallen significantly over the last decade. Whilst a significant proportion waste is now being recycled or composted.
- Over the period from 2000/01 to 2010/11, the proportion of local authority collected municipal waste recycled or composted rose from 4.5 per cent to 38.2 per cent.
- Scotland's air quality has improved since 1990 in terms of the quantity of seven key pollutants monitored by the Scottish Government.
- Between 1992 and 2011, the proportion of river length that was classed as slightly polluted, polluted or severely polluted in Scotland rose from 6.8% in 1992, to 7.4% in 1998, before falling to 2.8% in 2011.
- Whilst a large proportion of SMEs have taken at least some steps to reduce their environmental impact, two thirds have reported that they would not do more than they do currently to reduce their environmental impact.

7 Thematic Objective 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures

One of the thematic objectives of the 2014-2020 ERDF programmes is promoting sustainable transport and removing bottlenecks in key network infrastructures. This includes:

- supporting a multimodal Single European Transport Area by investing in the Trans-European Transport Network (TEN-T) network
- enhancing regional mobility through connecting secondary and tertiary nodes to TEN-T infrastructure
- developing environment-friendly and low-carbon transport systems and promoting sustainable urban mobility
- developing comprehensive, high quality and interoperable railway system.

This section discusses Scotland's progress and policies in promoting sustainable transport.

7.1 Use of public and active transport for travelling to work

The Scottish Government monitors fifty National Indicators to track progress towards the achievement of National Outcomes[98] and the Scottish Government's Purpose[99]. One of these indicators measures progress in increasing the proportion of journeys to work made by public or active transport.

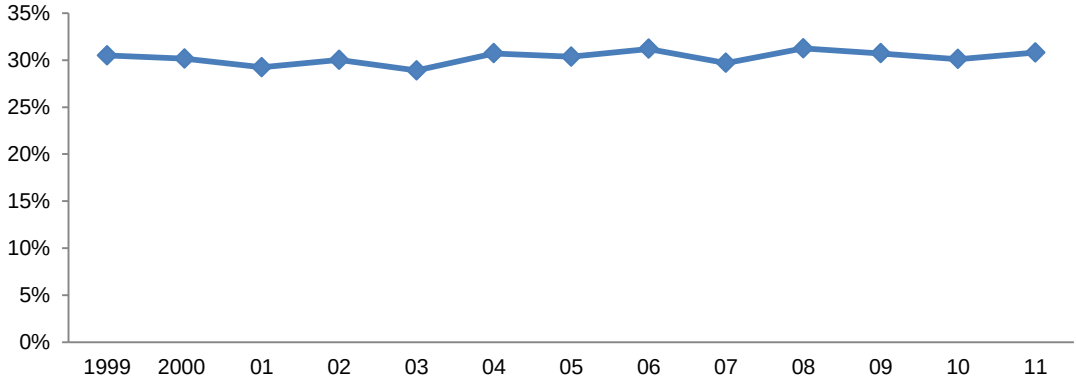
The proportion of adults in Scotland usually travelling to work by public transport or active transport (such as walking or cycling) has remained broadly stable at around 30 per cent over the past decade, as Figure 48 shows. In 2011, the proportion was 31 per cent. Walking (13 per cent) and bus (12 per cent) were the most popular forms public and active transport, followed by rail (4 per cent) and bicycle (2 per cent).

[98] http://www.scotland.gov.uk/About/Performance/scotPerforms/outcome

[99] The Purpose of the Scottish Government is to focus Government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth. http://www.scotland.gov.uk/About/Performance/scotPerforms/purpose

Figure 48: Proportion of adults usually travelling to work by public or active transport

Source: Scottish Household Survey



In 2011, 42.8 per cent of adults living in large urban areas usually travelled to work by public or active transport. As shows, this was more than twice the corresponding proportions for accessible rural and remote rural areas. There are two main reasons for the higher levels of public and active transport use in urban areas. First, public transport is more frequent in urban areas, due to higher population density. Secondly, commutes are shorter on average in large urban areas[100] so walking and cycling become more practical options.

Figure 49: Proportion of adults usually travelling to work by public or active transport, by urban/rural classification, 2011

Source: Scottish Household Survey

Urban/rural classification	*%*
Large urban areas	42.8
Other urban	23.7
Small accessible towns	22.6
Small remote towns	32.7
Accessible rural	17.3
Remote rural	20.1
All	30.8

7.2 Convenience of public transport

In 2011, 85 per cent of adults felt that public transport was very or fairly convenient to access. As shows, the proportion was considerably lower for rural residents than for urban residents.

[100] Alistair Dent & Stephen Bond, Office for National Statistics, 2008, An investigation into the location and commuting patterns of part-time and full-time workers in the United Kingdom, using information from the 2001 Census

Figure 50: Proportion of adults who felt that public transport was very or fairly convenient, 2011

Source: Scottish Household Survey

Urban/rural classification	*%*
Large urban areas	93
Other urban	90
Small accessible towns	87
Small remote towns	82
Accessible rural	63
Remote rural	55
All	85

7.3 Distance travelled by mode

Cars, vans and lorries accounted for 76 per cent of the average 7,010 miles travelled, within Great Britain, per year per Scottish resident in 2009/10. Half of the total distance was as a driver, and a further 26 per cent (1,822 miles) as a passenger. Local bus accounted for 7 per cent (489 miles) and Surface rail for 6 per cent (391 miles) of the total distance travelled respectively. Other public transport (e.g. air, ferry, non-local bus) accounted for 5 per cent (354 miles).

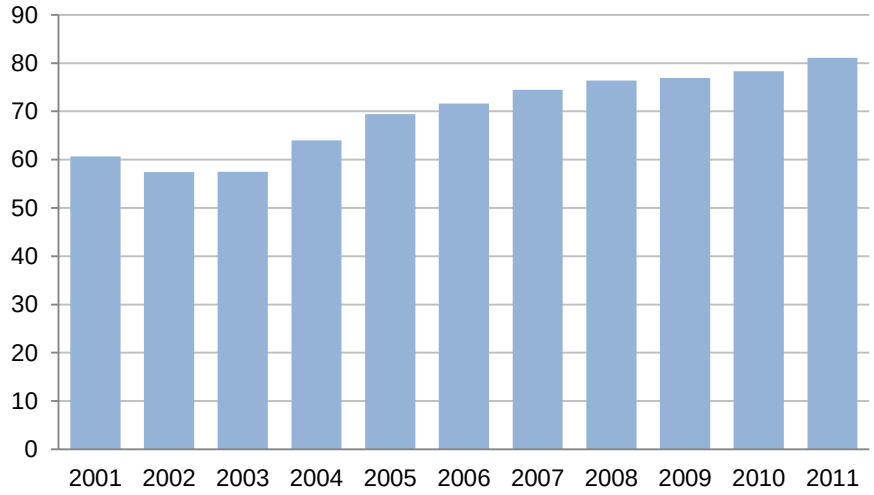
The estimated average distance travelled per person per year has decreased by 10 per cent between 1998/99 (7,713 miles) and 2009/10 (7,010 miles), with some fluctuations during the period, possibly due to sampling variability. Car journeys accounted for most of the fall, with driven journeys falling 5 per cent from 3,652 miles to 3,484 miles. Journeys on foot fell from 226 miles to 153 miles.[101]

7.4 Rail Transport

As Figure 51 shows, the number of ScotRail passenger journeys increased by 41 per cent from 57.5 million in 2003 to 81.1 million in 2011.[102]

[101] Data from the Scottish Household Survey published in Scottish Transport Statistics 2012.
http://www.transportscotland.gov.uk/strategy-and-research/publications-and-consultations/j251205-000.htm
[102] Transport Scotland, 2012, Transport and Travel in Scotland 2011.
http://www.transportscotland.gov.uk/strategy-and-research/publications-and-consultations/00925-09.htm

Figure 51: ScotRail passenger journeys, millions



In conjunction with its industry partners, Transport Scotland (the national transport agency for Scotland) is involved in a number of projects and works to provide a better rail service to Scotland. These include:

- The Edinburgh-Glasgow Improvement Project (EGIP), a comprehensive programme of improvements to Scotland's railway infrastructure, rolling stock and service provision that will provide a major boost to the wealth of Scotland and its long term economic sustainability. Significant progress with the programme has already been made which includes the delivery of key infrastructure improvements at Haymarket tunnel and new services on the Edinburgh Glasgow via Shotts Line.
- The Borders Railway, a 30 mile railway with seven new stations which will re-establish passenger railway services for the first time since 1969 from Edinburgh through Midlothian to Tweedbank in the Scottish Borders. The project will support 400 jobs during the construction phase and act as a catalyst for increased business development and housing opportunities within easy commuting distance of Edinburgh.
- The West of Scotland railway investment, which brings together three projects and a new passenger service timetable which will deliver improvements to passenger rail services between Glasgow, Paisley, Ayrshire and Inverclyde.

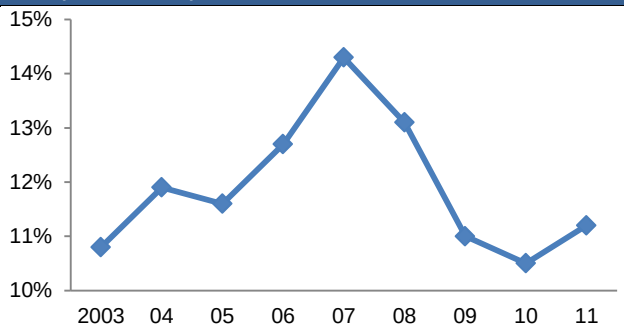
7.5 Edinburgh Trams

The 14 km tram route between Edinburgh Airport and central Edinburgh will open in summer 2014. A new Edinburgh Gateway mainline rail station station on the tram route will link passengers from the Fife line and North East Scotland to Edinburgh airport within 5 minutes. The trams will reduce congestions on the road network and provide a fast, comfortable mode of transport, with zero on-street emissions.

7.6 Traffic congestion

The proportion of driver journeys delayed due to congestion increased from 10.8 per cent in 2003 to a peak of 14.3 per cent in 2007, but has since declined (Figure 52). The most recent data shows that in 2011, 11.2 per cent of driver journeys were delayed due to congestion.

Figure 52: Percentage of driver journeys delayed due to traffic congestion
Source: Scottish Household Survey: Travel Diary



Since 1993, the volume of motor traffic on roads in Scotland has increased by 23% to some 43.1 billion vehicle kilometres in 2011. However, since 2007 there has been a reduction in motorised road traffic with 2011 levels 3% less than the peak in 2007. In 2011, major roads (motorways and 'A' roads) accounted for 66% of the volume of motor traffic in Scotland. In addition, minor roads ('B', 'C' and unclassified) accounted for 15 billion vehicle kilometres of traffic. Much of the growth in road traffic has been by light goods vehicles, which showed a 70% increase in vehicle kilometres since 1993.[103]

7.7 Car ownership

Car ownership is more prevalent in rural areas of Scotland than in urban areas. Data from the Scottish Household Survey 2011 shows that 61 per cent of households in large urban areas have a car available for private use. The proportions are substantially higher in accessible rural areas (87 per cent) and remote rural areas (86 per cent).

7.8 Teleworking

Broadband network upgrades provide increasing scope for teleworking, which can reduce traffic congestion and broaden individuals' labour market opportunities, particularly for those who live in remote locations. UK-level data from the Labour Force Survey shows that 2.0 million people were teleworkers in 2012. This was up from 1.4 million a decade previously.[104]

[103] Source: Department for Transport

[104] ONS, October 2012, Homeworkers and teleworkers aged 16 and over. Ad-hoc analysis of Labour Force Survey data. Teleworkers use both a telephone and a computer to work at home, or in different places using home as a base. http://www.ons.gov.uk/ons/about-ons/what-we-do/publication-scheme/published-ad-hoc-data/labour-market/october-2012/homeworkers-and-teleworkers-aged-16-and-over.xls

7.9 Key messages

- Evidence suggests that whilst Scotland performs well in relation to sustainable transport promotion, more could be done to encourage greater uptake amongst the population.
- The proportion of adults in Scotland usually travelling to work by public transport or active transport (such as walking or cycling) has remained broadly stable over the past decade.
- Cars, vans and lorries accounted for the vast majority of miles travelled, within Great Britain, per year per Scottish resident according to the most recently available data.
- The number of ScotRail passenger journeys increased by 41 per cent between 2003 and 2011.
- The most recent data shows that whilst showing a declining trend, a proportion of driver journeys were delayed due to congestion.

8 Summary of key challenges

In this final section of the socio-economic analysis, on the basis of the statistical evidence presented above, a summary of the key issues to be addressed in the Programmes is presented: first, an analysis of the main strengths, weaknesses, opportunities and threats for the regions' labour market; and second, a more detailed identification of the key challenges for the ERDF programme.

While the SWOT analysis drew on the baseline review, it also brought together existing knowledge of some of the key challenges known to be facing Scotland under the relevant thematic objectives. This reflects the fact that it would be disproportionate to try to capture every single indicator/factor within the baseline review and the fact that in some cases factors do not necessarily sit comfortably under one thematic objective (i.e. may be more cross-cutting). However, where possible additional sources of evidence to support issues raised in the SWOT analysis have been provided.

8.1.1 SWOT analysis

Strengths	**Weaknesses**
○ The Scotland brand: Scotland is globally recognised as a tourist destination and as a source of high-quality goods and services ○ Scotland is performing well on a number of Europe 2020 targets, in particular in relation to renewable energy and graduate levels ○ Scotland is a leading nation for higher education expenditure on R&D ○ Recent growth in new firm formation driven by growth in entrepreneurship ○ Investment in improved digital infrastructure is underway ○ Scotland has abundant natural resources ○ Scotland has a growing renewables sector – and policies aimed at furthering this ○ Scotland is already making progress towards emission reduction targets	○ Business expenditure on R&D is weak ○ Scotland is an innovation follower ○ Use of digital connectivity by Scotland's population and businesses could be improved – failing to do so could turn into a long-term threat ro both competitiveness and inclusion (e.g. via remote services) ○ Historically low business stock ○ Domination of micro and small businesses ○ Scottish SMEs have weak growth ambitions ○ Few Scottish SMEs are exporters ○ High energy consumption driven by Scottish climate and industrial structure ○ The proportion of the population using public or active transport for commuting remains stable

Opportunities	Threats
○ Opportunity to encourage greater collaboration between business and academia and boost commercialisation of our world class higher education R&D ○ Overcoming the barriers to innovation could lead to increasing numbers of innovative firms in the economy ○ Opportunity to exploit the links between innovation and internationalisation to boost economic recovery ○ Boosting digital infrastructure will deliver a number of economic and social benefits for Scotland ○ Significant financial gains to be made from adopting and exploiting digital technologies ○ Exploitation of alternative sources of financing may be the key to overcoming access to finance barriers ○ Opportunity to provide targeted support for non-exporting businesses to boost the numbers of SMEs with internationalisation ambitions ○ Significant growth opportunities in offshore wind, wave and tidal technologies ○ Switching from fossil fuels to renewables spruces of heat has the potential to reduce greenhouse gas emissions	○ Continuing poor global economic conditions ○ Dominance of large and foreign-owned firms on business R&D may continue to impact on Scotland's competitiveness ○ Stalling innovation by Scotland's businesses could stifle economic growth ○ Inability to encourage greater internationalisation may hamper economic recovery ○ Failure to address investment in poor digital infrastructure in rural areas could lead to Scotland slipping further behind its key comparators ○ Impact of poor economic environment on credit conditions for businesses may lead to access to finance barriers rising ○ Complacency about strengths of renewable capacity ○ Impact of external pressures on delivering greenhouse gas emissions and energy reduction targets

8.1.2 Key programme challenges

The SWOT analysis and the key messages from each of the thematic objectives covered in the baseline review suggests that there are a number of key challenges that the 2014-2020 ERDF programme should address.

- **Overcoming the low expenditure on business R&D amongst Scotland's businesses**. R&D undertaken by Scotland's higher education sector is considered to be amongst the best in the world. However, Scotland consistently fails to exploit this when it comes to commercialisation by business. Given the importance of R&D in driving Scotland towards its low carbon economy ambitions and delivering faster sustainable economic growth, overcoming this challenge has the potential to deliver significant gains for the economy.
- **Tackling the barriers to new firm formation.** Although Scotland has seen recent increases in business births, it continues to lag behind other countries. Tackling the barriers to entrepreneurship and starting a business – such as access to finance,

skills, innovation – will a key contributor in overcoming Scotland's historical business births.

- **Increasing the ambitions of SMEs**. Scotland's economy is dominated by micro and small businesses; many of which do not innovate, lack growth ambitions or have not taken steps towards becoming international. However, it is innovative, high growth, exporting firms that will be the key to economic success in the future.
- **Boosting digital infrastructure.** Scotland has already embarked on an ambitious programme to deliver next generation broadband across Scotland, including to the remote and rural hinterlands. By continuing to strive to become truly world class and encouraging all citizens and businesses to adopt and exploit digital technologies has the capacity to deliver a number of economic and social benefits for Scotland.
- **Exploitation of alternative sources of financing for SMEs**. Credit conditions for SMEs remain constrained and will continue to do so for the foreseeable future. The banking sector become increasing risk averse when it comes to lending to Scotland small businesses following the recent financial crisis and the following recessionary period. The new ERDF programme offers the opportunity to explore non-traditional forms of finance.
- **Continuing to investment in Scotland's renewables sector.** Scotland has significant growth opportunities in offshore wind, wave and tidal technologies. Whilst the Scottish Government has already taken a number of actions to promote the renewables sector, this should continue going forward.
- **Striving to improve energy efficiency**. The Scottish Government believes that the low carbon economy is a key driver for job creation and sustainable growth. This includes not just the renewables sector but also energy efficiency installations and technology, supply chains and encouraging innovative consumption patterns in SMEs to reduce environmental impact.