

# HIGH GROWTH AND HIGH TECHNOLOGY FIRMS IN SCOTLAND

## SCOTTISH ENTERPRISE 2012

### EXECUTIVE SUMMARY

High growth firms (HGFs) are those with 10+ employees that achieve three consecutive years of employment or turnover growth of more than 20%

The latest data suggests there are around 1,544 HGFs in Scotland, 13.5% of the 10+ employee business base. This is a higher rate than the UK and most other UK regions. The proportion of business that achieve high growth has declined slightly during the recession.

If the relative size of Scotland's business base matched the UK's, Scotland could have 20% more HGFs.

HGFs employ over 285,000 people, are relatively small, tend to be well established and are tend not to be in 'high technology' sectors.

High tech firms are more likely to achieve high growth than non-high tech sectors.

Compared to other UK regions, Scotland performs well in the proportion of its high tech business base that achieve high growth – but Scotland has a smaller proportion of its business base that is high tech than most other UK regions. This results in Scotland having a lower proportion of its HGFs that are high tech.

Factors contributing to high growth include management team skill sets, industry experience, export orientation, strong sales and marketing focus and close customer end-user engagement.

Firms often achieve high following a 'trigger point' such as a take-over, management buy-out, new capital investment or the development of a new product/service.

The research evidence raises a number of questions:

- What are the main reasons behind Scotland having a lower proportion of its business base than other UK regions that is high tech?
- What are the main drivers for Scotland's better than average performance (among UK regions) of 'converting' high tech and non-high tech firms into high growth firms?
- Given that only 12% of our HGFs are high technology, to what extent should an explicit policy focus be on high technology (as opposed to non-high tech) companies? To what extent should we focus on increasing the number of high tech businesses as opposed to converting more of our current high tech business base into HGFs?

## 1. Introduction

During the last few years there has been increased interest in high growth firms (HGFs). In this paper, **a firm is classed as being high growth if it employs more than 10 employees and achieves three consecutive years of turnover growth of more than 20% a year**<sup>1</sup>. The strong levels of public policy interest in HGFs centres upon their perceived role in driving economic growth. Recent research by NESTA highlighted that as much as 50% of all new private sector job creation is accounted for by these dynamic businesses<sup>2</sup>. Indeed, the vast majority of research on this issue has highlighted their powerful role in creating new employment which, given recent increases in unemployment across most advanced economies since 2008, is now a central policy priority for most national and regional governments. Other research has demonstrated that HGFs have above average levels of productivity, levels of internationalisation and are highly innovative<sup>3</sup>.

At local and regional levels, the development and promotion of HGFs is also increasingly becoming a key policy objective for economic development agencies across industrialised economies<sup>4</sup>. As a consequence of this, in 2009 Scottish Enterprise in conjunction with the University of Strathclyde began to examine and track HGFs in Scotland<sup>5</sup>. This was the first comprehensive analysis undertaken on the nature of HGFs in Scotland.

In 2011 Scottish Enterprise commissioned **new** analysis to:

- assess how the performance of HGFs had been affected by the recession, including comparisons with other UK regions;
- draw on alternative data sources such as the Business Structures Database held by the ONS;
- focus on high technology HGFs (the 2009 analysis highlighted that relatively few HGFs were in high technology sectors).

The data outlined in this paper provides a clearer picture of the number of HGFs in Scotland using the OECD growth-in-turnover criteria. This paper covers the following. First, it places high growth firms within the context of the overall stock of firms in Scotland which employ more than 10 employees. It then provides an overview of the aggregate stock of HGFs in Scotland. Third, it examines HGFs in high technology sectors, a key target for many of Scottish Enterprise interventions. Fourth, it briefly examines some of the key growth challenges confronting technology-based firms. Fifth, it examines some of the trigger points or growth catalysts which firms undergo prior to undertaking a period of rapid growth. The paper ends with a number of discussion questions.

The analysis in this paper refers to businesses with 10+ employees. These account for around 5% of all enterprises and around 70% of employment<sup>6</sup>.

<sup>1</sup> OECD definition – three or more years of employment growth of 20% pa has also been used in previous research

<sup>2</sup> Job growth among companies with 10+ employees - Anyadike-Danes M, Bonner K Hart, M and Mason, C. (2009) [Mapping Firm Growth in the UK: Identification of High Growth Firms and their Economic Impact](#), London: NESTA.

<sup>3</sup> Mason G, Bishop K and Robinson C (2009) [Business Growth and Innovation; The Wider Impact of Rapidly Growing Firms in UK City-Regions](#). London: NESTA. Download from

<sup>4</sup> OECD (2010) *High-Growth Enterprises: What Governments Can do to Make a Difference*, OECD Studies on SMEs and Entrepreneurship, Paris: OECD.

<sup>5</sup> Mason, C. & Brown, R. (2010) [High Growth Firms in Scotland](#): Scottish Enterprise.

<sup>6</sup> Source: <http://www.bis.gov.uk/analysis/statistics/business-population-estimates>

## 2. High Growth Firms in Context

It is important to note that firm growth is generally an uneven, discontinuous process and high growth represents a transitory phase in a firm's lifespan. A period of high growth is usually a temporary phase and therefore does not designate a permanent cohort of firms. While very important generators of employment within economies, HGFs constitute a very small proportion of the overall business population in Scotland. The OECD definition of three consecutive years of growth of 20% or above (for firms with 10+ employees) is a very exacting growth threshold.

### 2. The Number of High Growth Firms in Scotland

In order to provide a more robust picture of the level of HGFs in Scotland, ONS data has been analysed. The data produced by the ONS and held within the Business Structures Database covers every company with 10+ employees in Scotland. The latest data shows that, between 2007-2010, Scotland had **1,544 HGFs** (13.5% all firms with 10 + employees) – a rate above the UK average (12.9%)<sup>7</sup>. Using an employment definition (to be consistent with the previous NESTA work), between 2007 and 2010, 7% of Scotland's businesses with 10+ employees were HGFs, which again is just slightly above the UK average (6.9 percent).

Past research has highlighted that Scotland has a smaller business base, relative to population, than the UK as a whole and nearly all other UK regions (20% fewer businesses with 10+ employees than the UK and 25% fewer than the top quartile of UK regions).

If Scotland's business base matched the UK's and assuming the 13.5% HGF rate was maintained, Scotland would have an additional 300 HGFs, and an additional 390 HGFs if Scotland had a business base similar to the top quartile of UK regions.

In recent years Scotland has outperformed much of the UK in terms of the percentage of businesses that are HGFs. In fact, data from the most recent time period available, 2007-2010, reveals that compared to all UK regions Scotland had the second highest proportion of businesses that were high growth (see figure 1).

#### High Growth Firms in Scotland

Research findings suggest that Scotland tends to outperform the UK average for the proportion of the company base (10+ employees) that is high growth:

2002-05: 6.3% (830 firms) in Scotland, 6.3% in UK (**employment growth definition**, NESTA research<sup>8</sup>)

2005-08: 7% in Scotland (1030 firms), 5.8% in UK (**employment growth definition**, NESTA research)

2007-10: 13.5% in Scotland (1544 firms), 13.1% in UK (**turnover growth definition**, SE research)

---

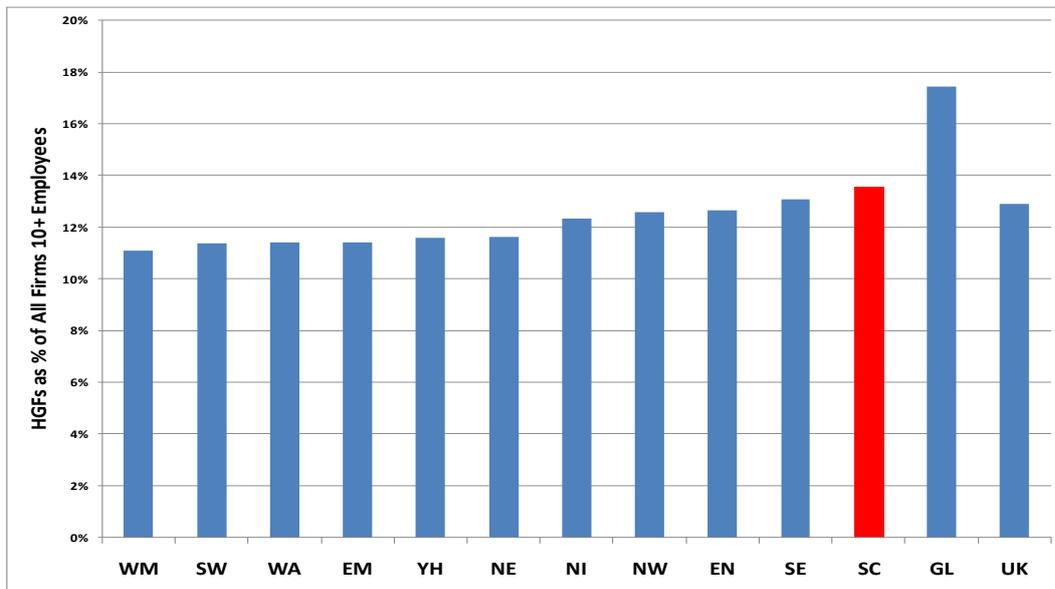
<sup>7</sup> This figure is significantly higher than the previous work on HGFs owing to the different data sources examined. FAME has a much less extensive coverage of smaller firms and therefore under-represents this part of the business base.

<sup>8</sup> NESTA '[Measuring Business Growth](#)'

2007-10: 7% in Scotland (800 firms), 6.9% in UK (employment growth definition, SE research)

In 2010, these 1,544 HGFs employed 285,146 people – an increase of 23% over the three years (54,188 jobs). The equivalent percentage increase for the UK was 39.5%. This suggests Scottish HGFs are not as prodigious employment generators as UK HGFs. We do not know the precise reasons behind this discrepancy, and further analysis is planned.

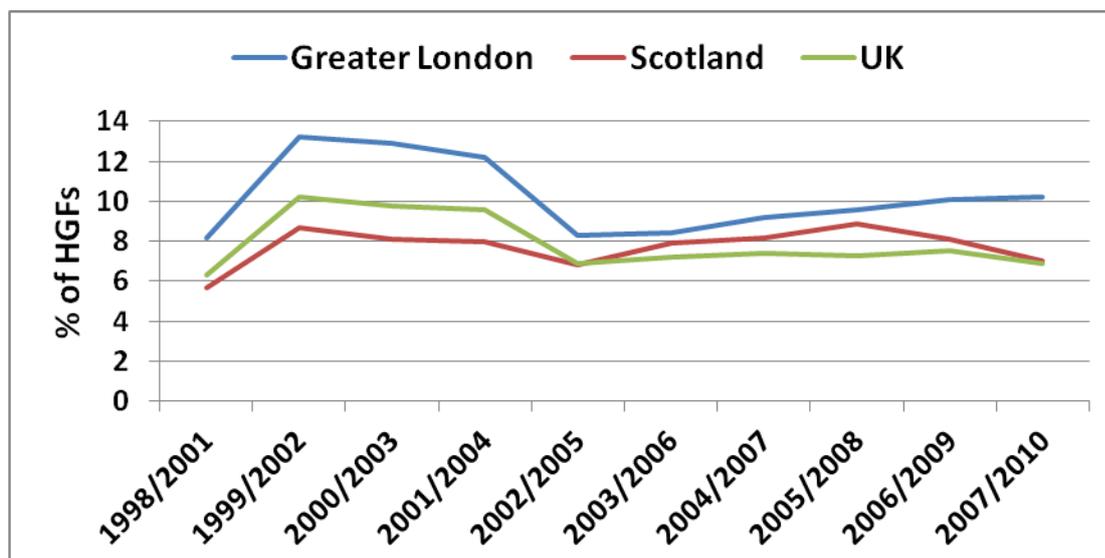
**Figure 1: High-Growth Firms in the UK Regions 2007-10 (OECD Turnover Definition): as a % of All Firms 10+ Employees.**



Source: Hart et al (2011) for Scottish Enterprise

Figure 2 shows the incidence of HGFs during the last decade. The top performing UK region was Greater London. The dominance of London has remained relatively constant over the last ten years. During the first half of the decade Scotland was below the UK average for the incidence of HGFs, but since the mid 2000s it has been above the UK average including the most recent time period covered by the data (2007-2010). The data does suggest that, for Scotland and the UK as a whole, the recent economic downturn and recession has negatively affected the number and proportion of companies that achieved high growth performance.

**Figure 2: HGFs in Scotland and London compared to the UK average**

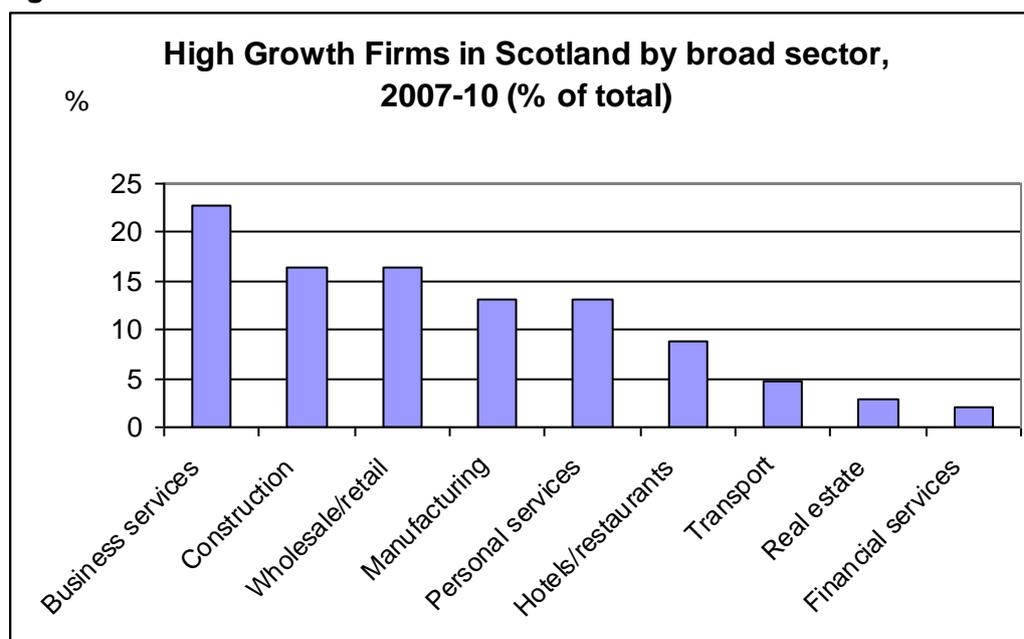


Source: Hart et al (2011) for Scottish Enterprise

It is worth highlighting some of the characteristics of the 1,544 HGFs in Scotland:

- they employed 285,150 people over the three year time period between 2007 and 2010;
- they are relatively small – 45% have 10 to 19 employees and almost 80% employ 10 to 49 people;
- they are well established - just over half (53%) have been established for 10 years or more; &
- they are found in a number of sectors (Figure 3)

**Figure 3**



Source: Hart et al (2011) for Scottish Enterprise

#### 4. High Technology, High Growth Firms

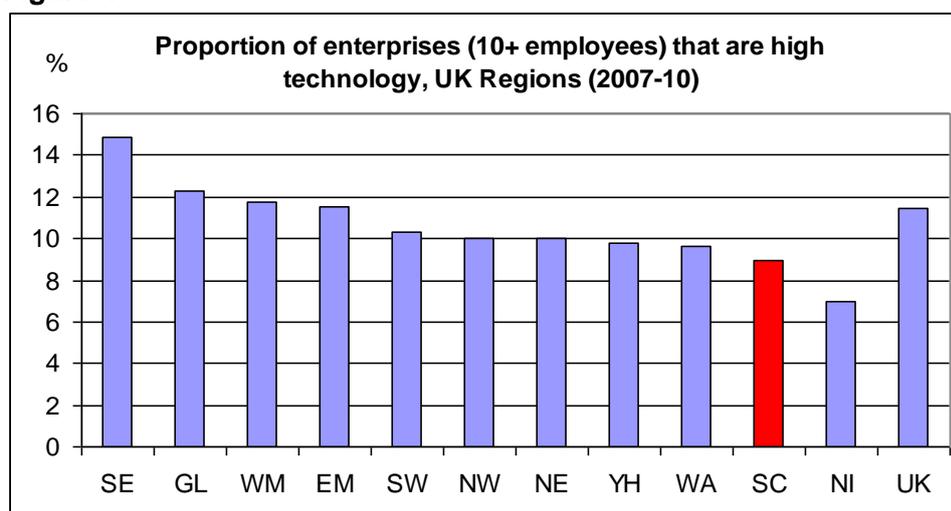
One of the most interesting findings from previous research on HGFs is that they are extremely diverse in terms of their sectoral composition. SE's 2009 research found that services were the single largest sector and that high-tech firms were not over-represented. In fact, some key high-technology sectors, such as life sciences, had very low levels of HGFs in terms of their overall aggregate number of HGFs.

The Scottish Government Economic Strategy highlights the role that (typically) high-technology sectors such as energy, life sciences and creative industries (digital media), as well as the cross cutting enabling technology sectors, play in driving economic growth. Plus, a sizeable proportion of SE's account managed portfolio fall under the high tech classification. Therefore it is important to understand the growth performance and characteristics of high technology companies.

The 2011 research specifically examined high-technology HGFs. Here we use a standard definition of high-technology based on Standard Industrial Classification (SIC) codes that includes high-tech innovation-intensive sectors such as software, design and architecture, life sciences, digital media, precision engineering, and energy<sup>9</sup>. The research shows that:

- there were 7,462 high-tech firms in Scotland (out of a total population of 59,200 over 2007-10 period)
- of which 1,021 had 10+ employees (accounting for 8.6% of all 10+ employee firms in Scotland)
- of which **188 were also HGFs**, which is 18.4% of all high tech enterprises with 10+ employees
- Scotland has a low proportion of enterprises that are high technology compared to other UK regions
- Scotland is one of the better performers within the UK for the proportion of high tech enterprises that are also high growth.

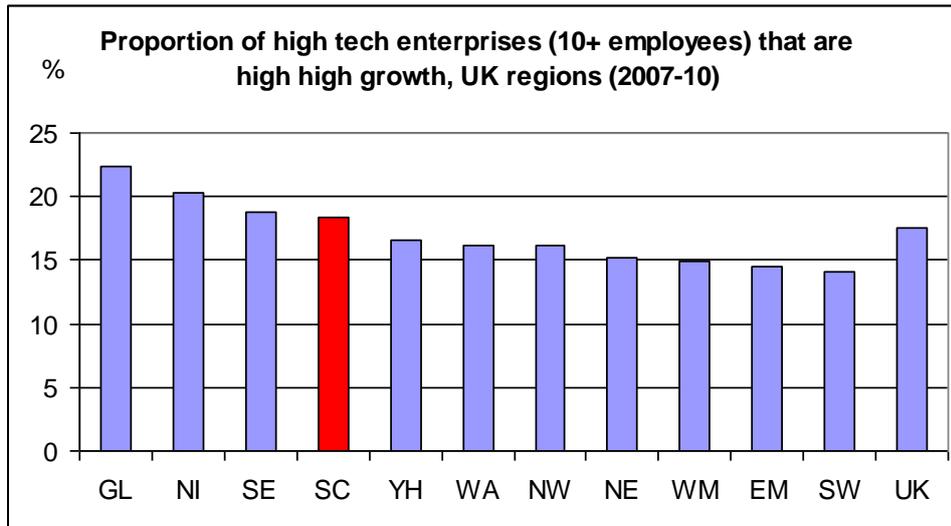
Figure 4



Source: Hart et al (2011) for Scottish Enterprise

<sup>9</sup> See Glasson et al (2006). Scottish Enterprise broadened this sectoral definition to include areas such as energy and life sciences, specialist manufacturing etc. For a full list see Appendix 1.

**Figure 5**

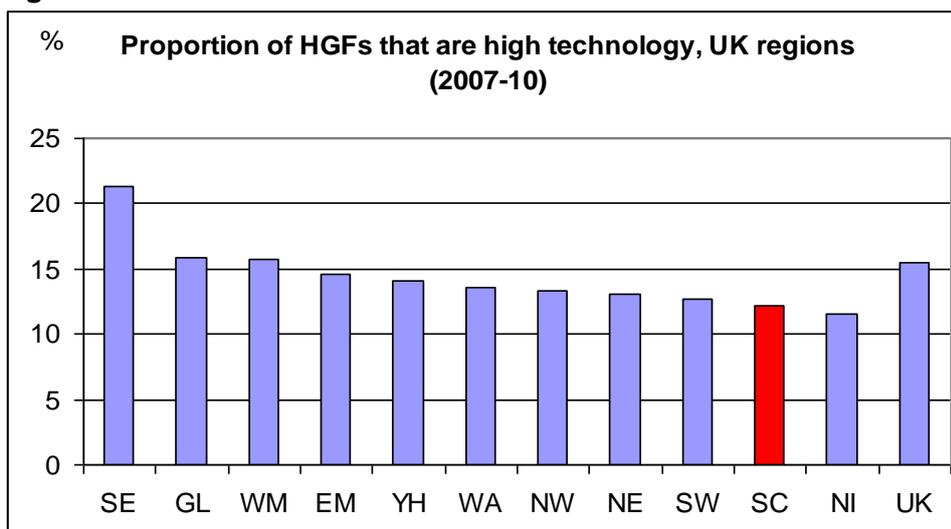


Source: Hart et al (2011) for Scottish Enterprise

For each UK region, the proportion of high tech enterprises that are also high growth is significantly higher than the proportion of non-high tech enterprises that are high growth. This suggests that high tech firms are more likely to achieve high growth than non-high tech firms. However, high tech firms are a low proportion of the HGF population. **Only 12.2% of Scotland's HGFs are high tech.** This is a lower proportion than most UK regions. This though in large part can be explained by the earlier finding that Scotland has a low proportion of high technology enterprises in the first place.

So, although **Scotland has a relatively good performance in terms of high technology enterprises that achieve high growth, Scotland does not have enough high technology companies in the first place.**

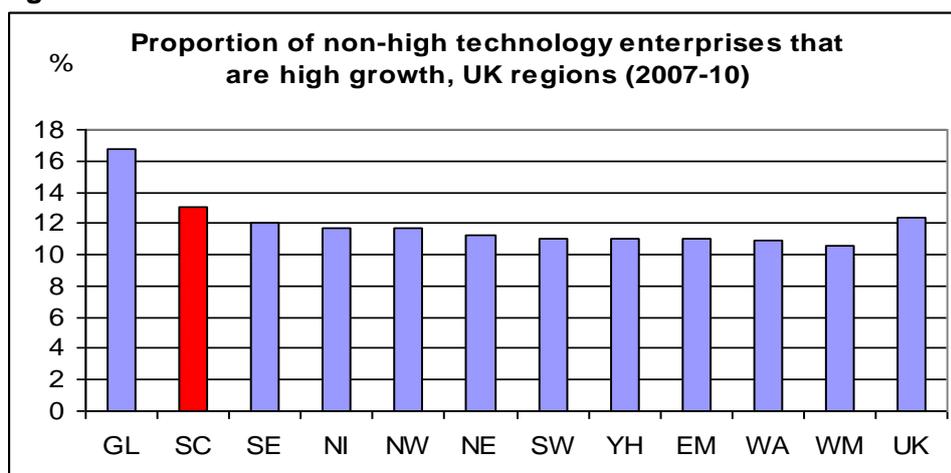
**Figure 6**



Source: Hart et al (2011) for Scottish Enterprise

Scotland also performs well compared to other UK regions for the proportion of non- high tech firms that are high growth (see Figure 7 below).

Figure 7



Source: Hart et al (2011) for Scottish Enterprise

Summary:

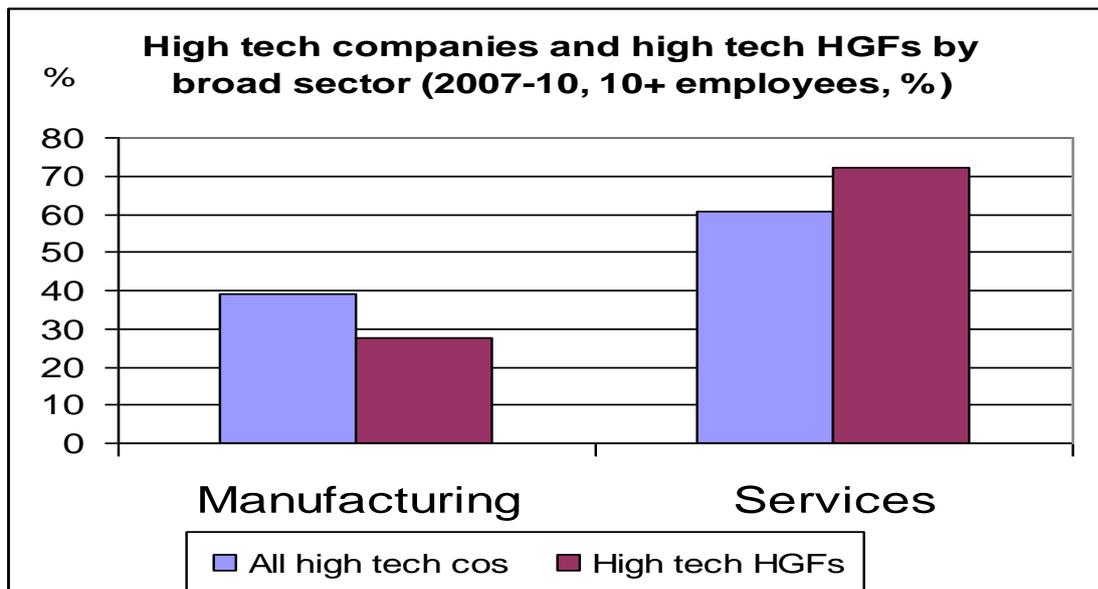
- Scotland performs well within the UK in terms of the proportion of high tech and non- high tech firms that achieve high growth status
- Although performs less well for the proportion of high growth firms that are high tech
- This is likely to be due to having a low proportion, compared to other UK regions, of its business base that is high tech

This raises the interesting question of why Scotland has relatively low proportion of its business base that is high tech.

There are a number of interesting characteristics of Scottish high-tech HGFs. For example, high-tech HGFs are younger and smaller than the overall population of Scottish HGFs. Due to disclosure factors stipulated by the ONS, the precise sectoral distribution of the Scottish high growth high-tech firms is not available.

However, we are able to make a distinction between service and manufacturing high-tech HGFs. Of the population of 1,012 high-tech firms with 10 or more employees, 39.1% of these are manufacturing firms and 60.9% are service-based firms. Of all the 188 high-tech HGFs, 27.7% are manufacturing firms and 72.3% are service firms (see figure 8 below). Service-based high tech firms are therefore more likely to achieve high growth than manufacturing high tech firms. Although service firms dominate the overall population of high-tech HGFs, by contributing nearly a third of the high-tech high growth cohort, **clearly manufacturing firms are strongly overrepresented.**

Figure 8



Source: Hart et al (2011) for Scottish Enterprise

## 5. What Promotes Success in High Tech Firms?

Our current research has examined the academic literature on technology-based entrepreneurship to examine the key success factors contributing to the success of high-tech firms. As in the case of high growth in general, there is no absolute consensus on the characteristics that drive high growth in high-tech firms. However, the following factors appear to be important:

- Founders/management teams that have:
  - high levels of human capital;
  - 'big company' and industry-relevant experience;
  - high levels of entrepreneurial orientation and ambition;
  - a strong export orientation and ambition to become internationalised
  - opportunity-driven motivation;
- Firms that have:
  - 'product-as-service' business models offering solutions (and recurring income) rather than single 'one-off' products;
  - a strong sales and marketing focus with close customer end-user engagement;
  - a large varied senior management team;
  - venture capital-backing.

From the literature, for the high-tech companies **that do seek to grow**, the key barriers to growth appear to be threefold:

- (i) an over-emphasis on R&D-led technology and lack of commercial orientation;
- (ii) financial strains associated with rapid and expensive product life cycles;
- (iii) challenges of 'crossing the chasm' from the specialist, early adopter market to the mass market.

That said, the academic literature also reveals that the majority of high tech firms do not appear to seek rapid growth and **many aim to become niche-based or specialist firms rather than upscaling to become more sizeable businesses**. In this respect they are no different to firms in other sectors. This somewhat undermines ‘barriers to growth’ arguments often advanced by policy makers when trying to promote these types of firms i.e. that many want to grow but face barriers to do so – and that they will grow when these barriers are overcome. Scottish Enterprise is currently involved in UK-wide research into the nature of, and factors affecting, business growth ambition and this is due to be completed in the Spring 2012.

While high-tech firms continue to be a key area of policy focus for public policy makers and academics alike, up until recently there has been a lack of proper in-depth research to examine the specific nature of high growth high-tech firms. At present, Scottish Enterprise are conducting research with a sample of some 20 high-tech HGFs to examine the importance of these issues within these enterprises. This research will be completed in the first quarter of 2011-2012.

## **6. Trigger Points for Growth**

Scottish Enterprise research with all types of HGFs (both high-tech and non high-tech) in Scotland has found that certain forces help propel firms towards different stages of growth which we call growth ‘trigger points’. Examples of different types of trigger points are outlined below in Table 1 below and can be grouped by three main types: endogenous, exogenous and co-determined. This list is by no means exhaustive, but outlines the main factors and are indicative of the breadth and variety.

Growth triggers can have wide-ranging impacts on a firm’s overall growth capabilities. They also place pressure on firms in terms of management, employees and company finances. These can be highly ‘disruptive’ events which play a very complex role in propelling firms towards rapid periods of growth. Quite often one trigger point will stimulate another within a company, amplifying the impact of the original trigger. For example, the acquisition of another company can enable a firm to essentially ‘piggyback’ on the acquired company’s marketing channels to help it break into new geographical markets. Therefore, the initial trigger point (the acquisition) acts as a catalyst to help internationalise the firm (a secondary trigger).

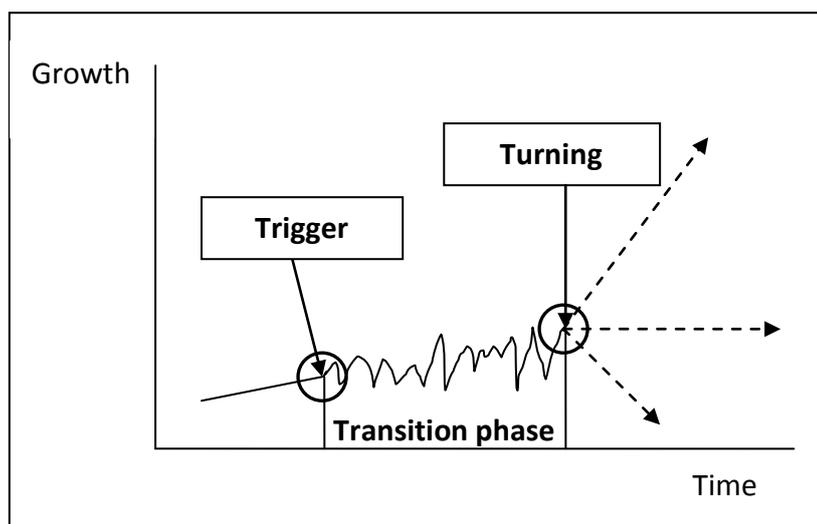
While trigger points can fundamentally reconfigure organisations, providing a catalyst for a business to undertake a period of rapid, transformative growth, these events can conversely cause severe organisational turbulence or even decline. Given that a trigger point fundamentally alters the structure and workings of a firm, these can be quite destabilising for a company. For example, if a company develops a new product, which in turn performs poorly in the marketplace, the company can experience a negative drain on resources, affecting the growth of the businesses and potentially compromising the firm’s long-term existence. Therefore, it is important to note that these growth catalysts can have negative as well as positive consequences.

**Table 1: Classification of growth trigger points**

<b>Endogenous</b>	<b>Exogenous</b>	<b>Co-Determined</b>
New product/service offering	Technological development	Entry into a joint venture
Change in company ownership (eg. MBO, MBI, employee-share ownership etc.)	Government regulatory issues	Acquisition by another firm
Acquisition of another firm	Macroeconomic changes	Major new capital investment
Change in management or Board personnel	Changes to public policy	Adoption (or adaptation) of new business models
Development of a new production process	Access to public sector assistance (e.g. R&D or capital expenditure grants)	Injection of risk capital or new bank funding
Implementation of new management systems	Product failure in the marketplace	Receipt of a major contract or obtaining a new customer

Often the critical period determining the ultimate success of the growth opportunity presented is the post-trigger 'transition phase' (see Figure 9 below). It is often at this stage that a company requires intensive forms of support. Teams within Scottish Enterprise are beginning to use the concept of growth trigger points as a method of helping shape interventions with firms undergoing rapid growth. For example, **the Companies of Scale approach within Account Management works intensively with companies to help identify growth triggers.** This helps to inform the company of the nature of the organisation's growth and the organisational requirements brought about by growth. Many account managers in Scottish Enterprise also do this when working with their portfolio.

**Figure 9: The growth 'trigger point' process**



## **7. Conclusions, Discussion Questions and Policy Issues for Scottish Enterprise**

High growth firms are small in number but they contribute disproportionately to economic growth. Owing to the disproportionate impact they have on the economy in terms of

employment and wealth creation, **the research strongly endorses a focus on HGFs**. Our research also shows that despite the recent recession, Scotland performs well in comparison with other UK regions in terms of the overall percentage of HGFs in our economy.

High technology firms appear to be more likely to achieve high growth status than non-high tech firms, providing justification for Scottish Enterprise's focus on high tech growth sectors (life sciences, energy, enabling technologies, etc).

The analysis does raise a number of research and policy questions:

**1. What are the main reasons behind Scotland having a lower proportion of its business base than other UK regions that is high tech?**

Are there specific barriers and/or market failures in Scotland? Potential reasons may include:

- there is a lack of end-users/major customers or distance from main markets (although if a characteristic of a high growth firm is having an international/export orientation, location of major customers/end-users should be less of an issue?)
- poorer funding opportunities (although evidence suggests that Scotland does not lag most other UK regions in terms of venture capital investment<sup>10</sup>)
- availability of the right management and commercial skills to drive growth in high tech firms.

**2. What are the main drivers for Scotland's better than average performance (among UK regions) of 'converting' high tech and non-high tech firms into high growth firms?**

Are there specific characteristics or factors in Scotland that drive better performance, for example sector strengths such as oil and gas? Could public sector support in Scotland be a factor, for example the success of investment funding or account management support?

**3. Given that only 12% of our HGFs are high technology, to what extent should we focus on increasing the number of high tech businesses as opposed to converting more of our current high tech business base into HGFs? And how would we do either/both?**

The evidence on the broad characteristics of HGFs should allow a focus of support on those firms that demonstrate the characteristics, or could develop them (e.g. founder characteristics, evidence of early sales, sources of recurring income etc). For example, research shows that 'early sales' is one of the strongest indicators of future growth potential in technology-based firms<sup>11</sup>.

---

<sup>10</sup> Source: BVCA <http://www.bvca.co.uk/Research>

<sup>11</sup> Gimmon, E and Levie, J. (forthcoming) 'The Key Role of Early Sales in Building High Technology New Ventures: A Panel Study'

It appears from the growth trigger points analysis, that certain factors that **'trigger'** high growth, allowing us to help firms identify, and perhaps introduce, these trigger points - and to help firms successfully exploit them. There could therefore be potential roles for policy makers to help firms instigate and help firms benefit from these key growth catalysts. There is potential for organisational learning from business units like the Companies of Scale team who currently use this concept as a support tool.

## **Appendix 1: SIC Codes for High Technology Firms**

<b>High-Tech Manufacturing Activities</b>	<b>SIC Code</b>
Electronic Publishing	22.1
Life Sciences	24.4, 33.1, 73.1
Composites and other advanced materials	26.24, 26.15, 26.82
Precision Engineering and precision components	28.52
Automated machinery & robotics	29.56
Computer equipment & office machinery	30.01, 30.02
Electrical equipment	31.1, 31.2, 31.62
Electronic equipment & components	32.1, 32.2, 32.3
Medical & surgical equipment	33.1, 33.2, 33.3, 33.4
Aerospace & related activities	35.3
Energy	11.1, 11.2
 <b>High-Tech Service Activities</b>	
Telecommunications	64.2
Software development & consultancy	72.2
Web/internet services	72.6
Other computer	72.1, 72.3, 72.4, 72.5, 72.6
R&D (natural sciences & engineering)	73.1
Architectural & engineering activities	74.2
Technical testing & analysis	74.3