



A Strategic Review of Innovation Support

2016

A STRATEGIC REVIEW OF INNOVATION SUPPORT

INTRODUCTION

Scottish Enterprise aims to continuously improve its evidence base on the performance of the Scottish economy, the drivers of economic growth and the strategic & economic impact of support provided to companies and sectors, through evaluation and research activity.

This strategic review of Scottish Enterprise (SE) and Highlands & Islands Enterprise (HIE) Innovation support is designed to inform our approach in this key area. The centrepiece of the review is a survey commissioned by SE and conducted by the market research company IFF Research, of nearly 300 companies that had received innovation support from SE & HIE at any stage over the last decade. Their research has been supplemented by SE analysis of the data and an examination of the wider context of support to companies across this period.

The overarching aims of the review are to:

- Understand attitudes to innovation amongst innovative Scottish companies, including why they innovate, the range of investments they make in innovation and how important they feel innovation is to their future growth and performance.
- Review how these companies innovate, including the range of support services they have accessed and how these interact with each other. This covers a variety of issues such as the type of innovation they are engaged in, any collaborative innovation they get involved in and the roles of internal staff and external partners in achieving their overall innovation goals.
- Evaluate the outputs, outcomes and economic impact of innovation over time. Importantly the review will not seek to establish impact for individual support products, but rather from a strategic perspective by determining the economic contribution of overall innovation support, regardless of the combination of services provided to the company.

To get a better understanding of their innovation journey over an extended time period, the review included companies who received SE/HIE innovation support as far back as 2004/05.

SUMMARY OF IFF RESEARCH SURVEY RESULTS

IFF Research carried out telephone interviews with 284 innovative businesses across Scotland between June and August 2015. These companies belong to one of three cohorts:

1. SE Account Managed companies who have received SE innovation support.
(195 companies, 69% of the total)
2. Non account managed companies who have received SE innovation support.
(79 companies, 28%)
3. Innovative companies who have not accessed SE innovation support.
(10 companies, 4%)

This review provides a summary of the key results from this survey. A full, detailed report by IFF Research is available separately

Context

It is useful to identify some yardsticks against which this review can be compared to help interpret and contextualise the findings. There are three relevant reports which may help:

- SE Evaluation of Account Management 2013
- Small Business Survey Scotland 2014 (Scottish Government)
- UK Innovation Survey 2013 (UK Department for Business, Innovation & Skills)

Using these surveys as a reference, there are three key points about this review worth noting at the outset:

1. **The size distribution of companies** interviewed in this review sits somewhere between those that are SE Account Managed and those included in the Small Business Survey Scotland. See Figure 1 for details. This profile is as expected, given the mix of cohorts that the review group was drawn from.

Figure 1

Comparison of the Employee Size Distribution for SE's Account Management Portfolio, This Review and the Small Business Survey Scotland

Employee Size band	Account Managed Companies (N = 1933)	This Review (N = 284)	Small Business Survey Scotland (N = 853)
1-9 (Micro)	21%	39%	82%
10-49 (Small)	40%	43%	16%
50-249 (Medium)	28%	15%	3%
250+ (Large)	10%	3%	0%
TOTAL	99%	100%	101%

Note:-

The Account Managed Companies data is derived from information in the 2014 Account Management database collated by the SE Appraisal & Evaluation Team. This has employment details for 1,933 of the 2,244 Account Managed companies (86%).

2. **All 284 companies in this review are active innovators.** This is unlike the UK Innovation Survey (the UK contribution to the EU Community Innovation Survey), which analyses a wider range of companies including innovators and non-innovators. As it turns out from the survey results, the companies in this review are also **particularly focussed on product innovation**. Generally product innovators invest more in innovation and R&D than other companies and make transformational rather than incremental change. Therefore the most appropriate comparator group is the specific cohort of Scottish companies defined as "broader innovators" within the UK Innovation Survey 2013. The findings of this review relative to those from this particular comparator group will be highlighted in this paper, where possible.

3. **The timescale of this review is relatively recent (June – August 2015)** and thus its findings are current. In comparison the results presented in the most recent UK Innovation Survey 2013, published in April 2014, cover the period 2010 to 2012 and those in the Small Business Survey Scotland 2014, published in March 2015, are from interviews conducted between July and October 2014.

THE MAIN FINDINGS

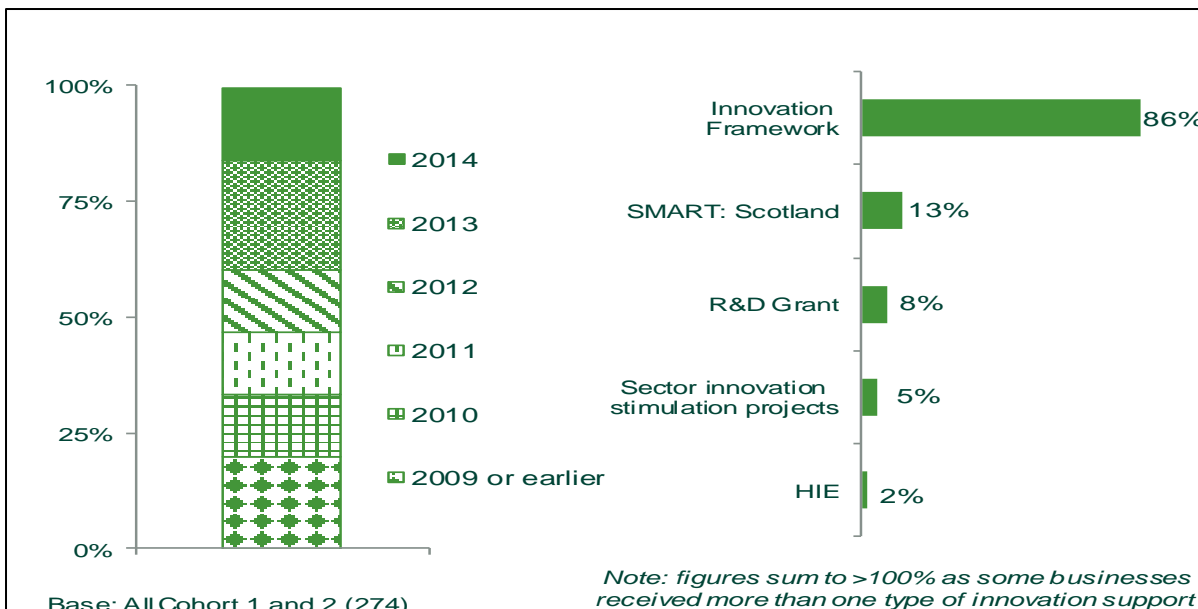
The type of innovation support these companies received and when

Cohorts 1 and 2 received SE innovation support, as defined earlier, across a number of years. By far the most common support received is Innovation Framework (86% of the businesses surveyed had received this type of support) which includes the Innovation Support Grant. See Figure 2 below for details.

The majority of companies interviewed had received an innovation support product or service on just one occasion:

- 65% of cohort 1 and 2 businesses received innovation support once;
- 18% had received innovation support twice;
- 10% had received innovation support three times;
- 7% had received innovation support four or more times.

Figure 2: The year in which companies in cohorts 1 and 2 first received innovation support and the types of innovation support received

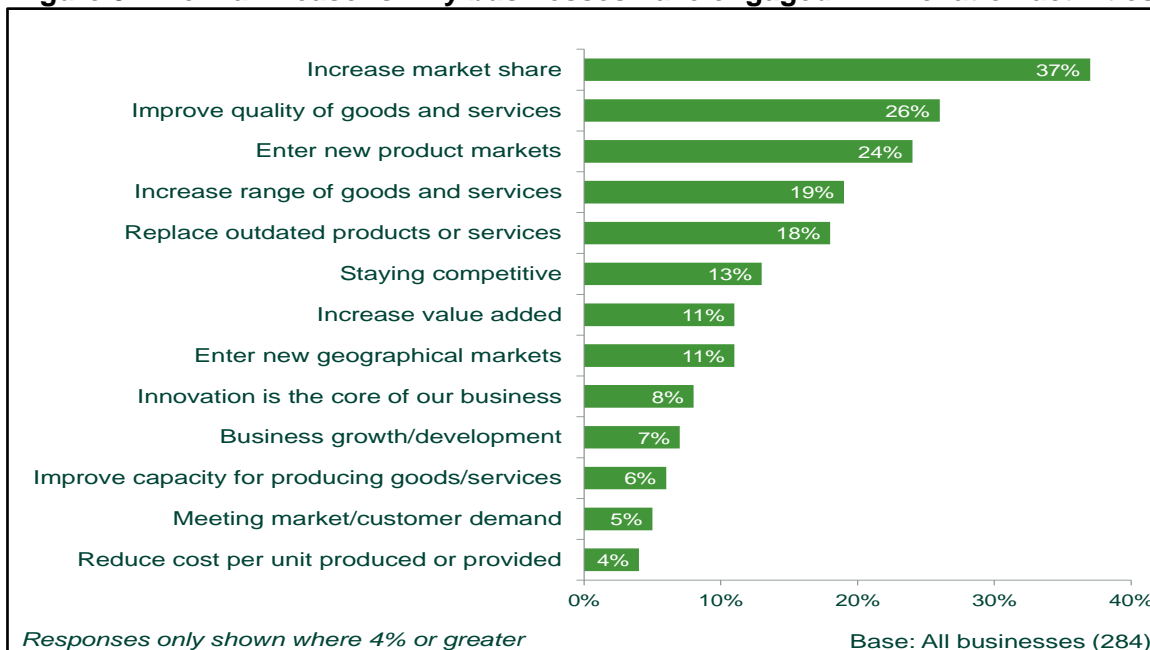


Why these companies innovate

Two of the top three reasons why these companies innovate are to **increase their market share** (37%) and to **enter new product markets** (24%). Both demonstrate a strong market focus and a high degree of growth ambition in these companies to develop and launch new products. This is a very positive result and in marked contrast to the results of the Scottish cohort of “broader innovators” in the UK Innovation Survey, who rated improving the quality of goods and services and replacing outdated products or processes as their top two drivers of innovation activity. This reflects a different emphasis on *quality enhancement* as their main motivating factor.

The full set of reasons for engaging in innovation activities is shown in Figure 3:

Figure 3: The main reasons why businesses have engaged in innovation activities



These companies believe that innovation is central to their current performance and future growth, with 96% feeling that innovation had played an important role in achieving their

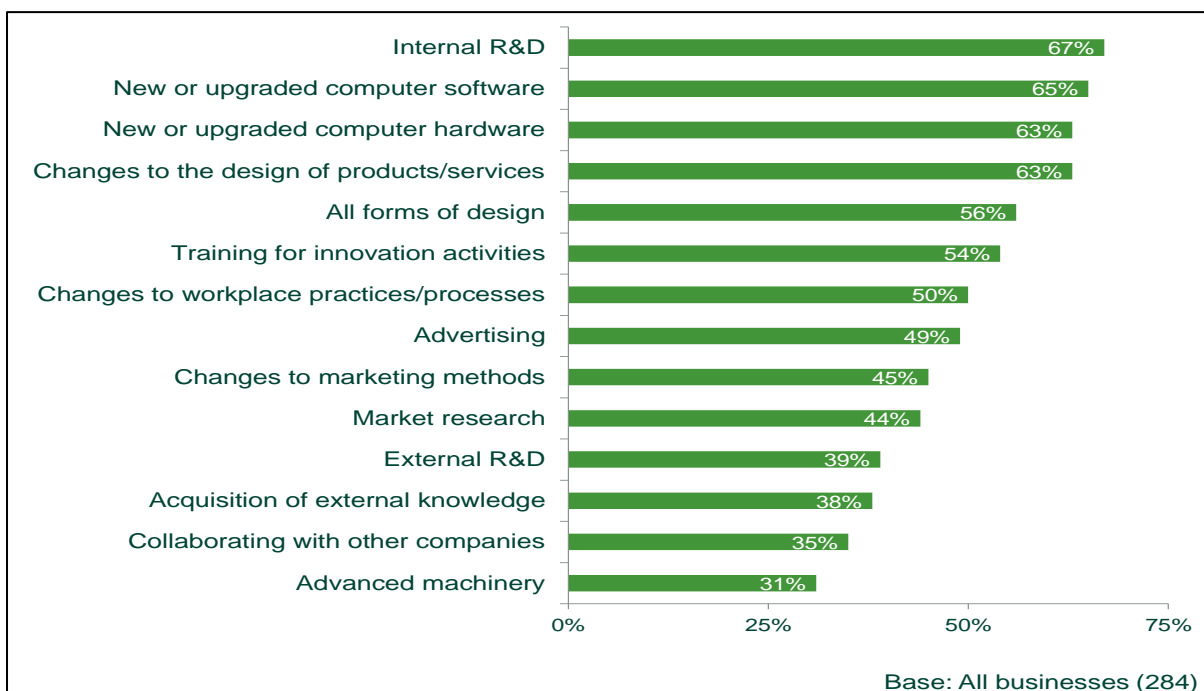
current levels of turnover and an even greater proportion (98%) feeling that innovation is important to their future growth. Two-thirds of these businesses have a business plan that formally specifies their innovation strategy.

The innovation activities that these companies are engaged in

In the survey, companies were asked to provide a detailed breakdown of the innovation activities in which they had made a financial investment over the last three years. The detail is shown in Figure 4 below.

Most commonly these companies invested in **internal R&D** (67%), though the large majority also invested in **new or upgraded computer software** (65%) and **hardware** (63%). There is also a strong level of investment in **changes to the design of products and services** (63%) and indeed **all forms of design** (56%).

Figure 4: Proportion of businesses who have made a financial investment in innovation activities in the last three years



When compared with the full set of Scottish companies in the UK Innovation Survey, this review group places more relative importance on internal and external R&D and design activities, less relative importance on training and the acquisition of advanced machinery and a similar degree of relative importance in new or upgraded computer hardware and software. However the *percentage figures* for the companies in *this review* are much higher, reflecting the very high level of active innovators in this group who are involved in many forms of innovation across the spectrum.

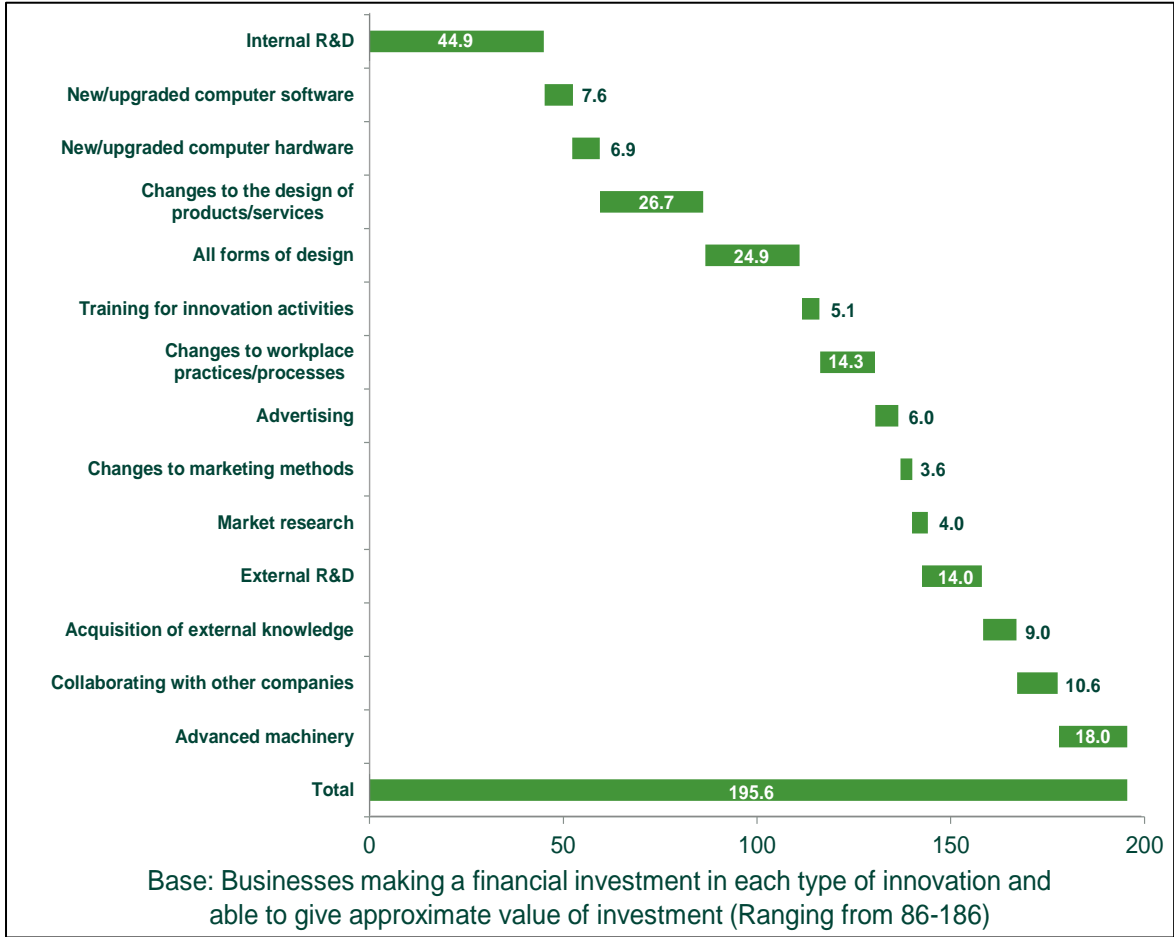
Investment in Innovation

Across all the innovation activities outlined in Figure 4 above, these businesses have invested a total of **£195.6m over the last three years**. See Figure 5 below for the details of this investment in innovation.

The largest area of investment was **internal R&D** (£44.9m). This is very interesting as consecutive UK Innovation Surveys have shown a tendency for Scottish firms to buy-in innovation solutions, usually embedded in technology, equipment and machinery, rather than invest in R&D to develop them in-house, as this group of companies are doing.

Investment was also relatively high in design, described as **changes to the design of products and services** (£26.7m) and **all forms of design** (£24.9m). Despite a relatively small number of these businesses being likely to invest in **advanced machinery**, it received the fourth highest level of investment (£18m), reflecting high individual capital investments.

Figure 5: Investment in innovation by type (£million) over the last three years



This survey has given us an unprecedented level of detail and insight into the investment in innovation made by such businesses in Scotland. There is therefore no direct comparison that can be made between these results and other surveys. The nearest would be the expenditure patterns for the overall Scottish cohort in the UK Innovation Survey which typically shows Scottish companies disproportionately over-invest in acquisition of capital relative to the UK and under-invest in almost every other area of innovation activity. The detail provided by this survey gives insight into the broad range of innovation activities and investments that are required all along the value chain from research to developing and launching new products and services. Typically we would measure the level of investment companies make in R&D and innovation as Business Enterprise R&D (BERD) – based on internal R&D expenditure by businesses. Figure 5 would show a total BERD figure for these companies of £44.9m. However this only represents about 23% of all the innovation investment being made by these businesses.

We therefore need to consider how to measure innovation investment and activity in ways that more accurately reflect the reality we are seeing here.

How these companies innovate

Questions in this section of the survey were designed to understand the extent to which companies undertook their innovation activity in-house using only internal resources, compared with a collaborative innovation approach using partners and external resources.

Over half of the businesses surveyed (58%) had used partners and external agencies to help deliver innovation projects.

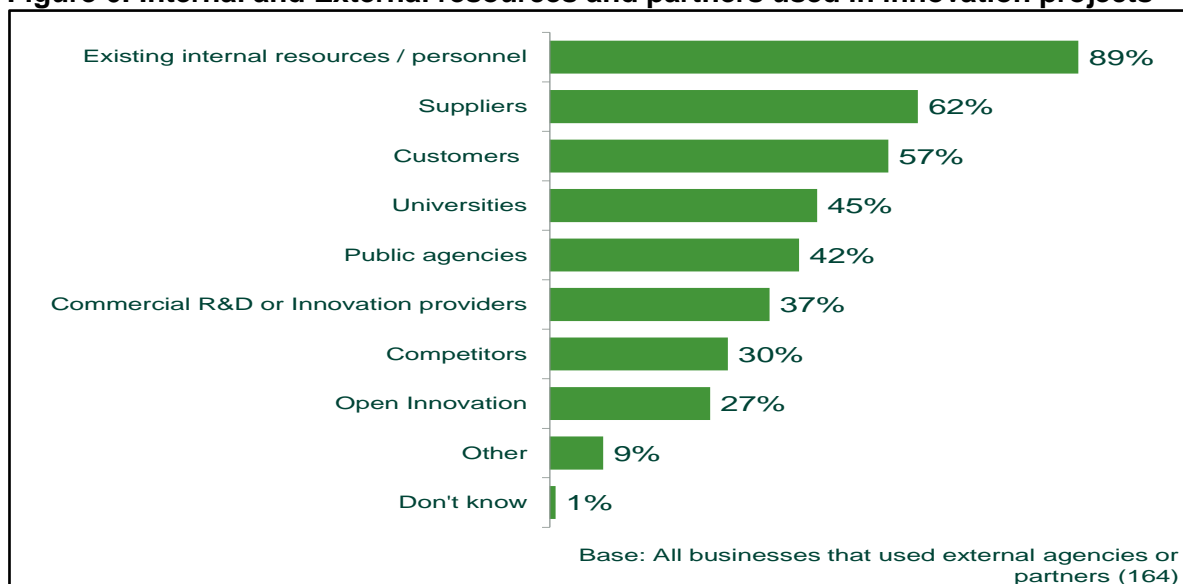
This group was then analysed in more detail as show in Figure 6 below.

The great majority (89%) of these companies still make it clear that existing internal resources, in particular their staff, are vital to delivering innovation.

In addition, their main *external* innovation partners are **suppliers** (62%) and **customers** (57%). This is broadly consistent with the comparable cohort of Scottish collaborative innovators in the UK Innovation Survey who cite customers (63%) and suppliers (48%) as their main external partners.

However what is striking is the extent to which companies in this review see **universities** (45%) as collaborative partners in delivering their innovation projects. This is around three times higher than the wider Scottish cohort in the UK Innovation Survey, who use them to a far less degree (17%).

Figure 6: Internal and External resources and partners used in innovation projects



Suppliers – are the most common external partners in innovation projects. 26% of these companies report that the majority of their suppliers are Scottish-based, 24% report that half of their suppliers are Scottish-based and 33% have a minority of the suppliers based in Scotland. The proximity of suppliers (for about half of these companies) may make it easier to engage in collaborative innovation activities.

Competitors – are used as external innovation partners by 30% of the companies in the review group. Very significantly, 31% of the companies have no competitors in Scotland and a further 38% only have a minority of competitors based in Scotland. This reinforces the highly innovative nature of the companies SE is working with here.

Outputs

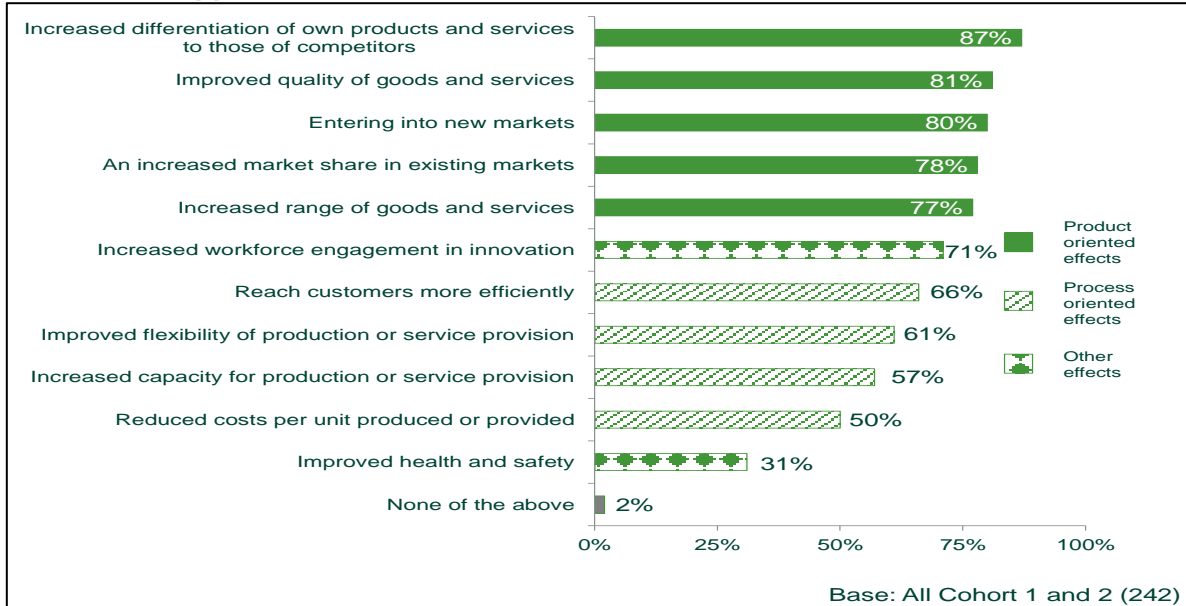
Businesses were prompted with a small number of innovation-related outputs and asked which of these, if any, they had achieved over the last three years, or since they had received innovation support, if longer than three years ago:

- 87% of the businesses had introduced at least one new or significantly improved product or service.
- 76% of the businesses had introduced new or significantly improved forms of business structures or practices, or marketing concepts and strategies.
- 55% of the businesses had introduced new or significantly improved production processes.

Outcomes

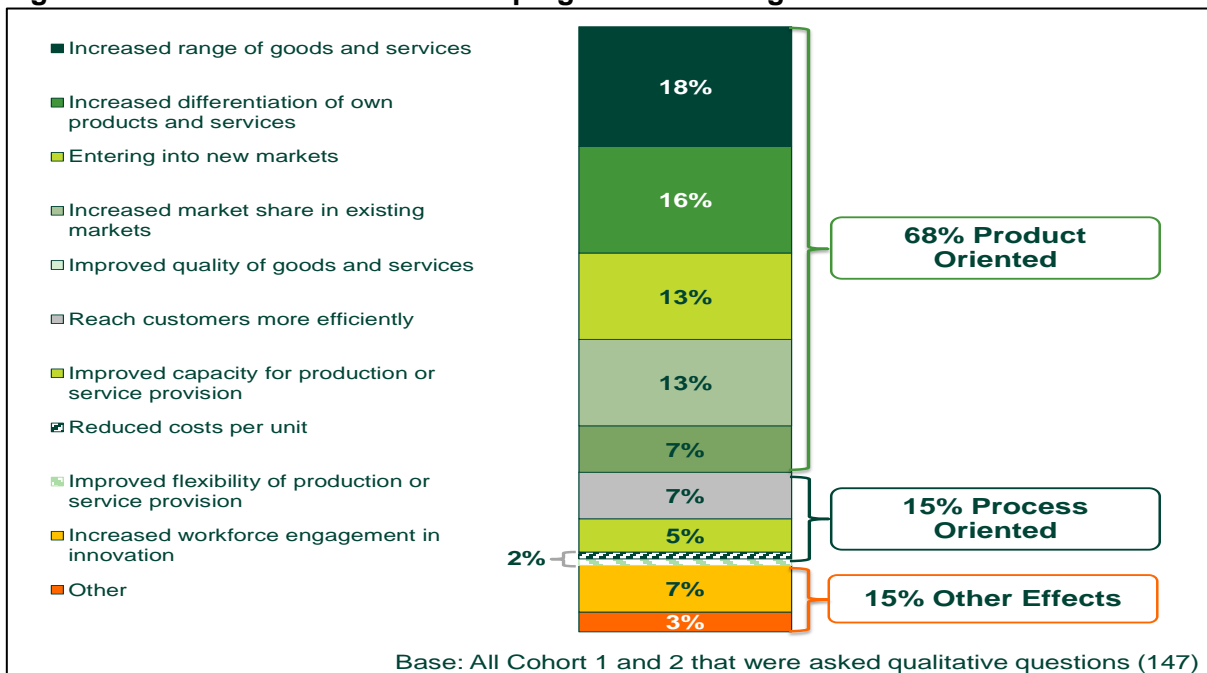
Businesses receiving innovation support have experienced, or expect to experience, a wide range of benefits. These benefits can be broadly classed as product-oriented effects, process-oriented effects and other effects. Most companies in this review cite product-oriented benefits as the main result from their innovation support, which makes sense given the extent to which SE innovation and R&D grants are geared towards product innovation. Other benefits were highlighted by many businesses, the main ones being increased workforce engagement in innovation and improved health and safety. Figure 7 below details the range of benefits described during the company interviews.

Figure 7: Benefits experienced, or expected to be experienced, as a result of innovation support



Just over half of the businesses also identified which of these benefits had proved most useful in helping to sustain or grow their business. These were ranked in much the same order as in Figure 7, with over two-thirds (68%) of them indicating that **product-oriented effects** proved to be the most useful. See Figure 8 for further detail.

Figure 8: Most useful benefits in helping to sustain or grow the business



IMPACT ANALYSIS

Impact - on turnover

Where the companies were able to provide quantitative data, the majority (63%) reported that their turnover had increased in the period since receiving innovation support, 21% of businesses reported that their turnover had stayed the same and 11% said it had decreased. Figure 9 shows the mean & median turnover figures reported for years 1 to 5 after receiving innovation support

Figure 9: Mean & median turnover for years 1 to 5 after receiving innovation support

Year	Respondents	Mean turnover	Median turnover
Year 1	182	£7,152,000	£750,000
Year 2	139	£7,048,000	£850,000
Year 3	97	£7,038,000	£670,000
Year 4	70	£7,425,000	£813,000
Year 5	38	£11,497,000	£907,000

The vast majority (88%) of businesses that saw an increase in turnover attribute this, in part, to the SE innovation support they received. Figure 10 shows the mean & median turnover **values** these businesses attribute to SE support for years 1 to 5 after receiving that support. The mean value increased year on year, from £597,000 per company in year 1 to £2,919,000 per company in year 5, suggesting that SE innovation support has had a long-lasting positive impact on turnover for these companies. Interestingly this matches their initial expectations. When asked how long they expected any resulting benefits from SE innovation support to last, most estimated 5-9 years (38%) or 1-4 years (35%) with the mean period being 5 years.

Figure 10: Mean & median turnover values attributed to SE innovation support for years 1 to 5 after receiving that support

Year	Respondents	Mean turnover	Median turnover
Year 1	143	£597,000	£50,000
Year 2	115	£801,000	£88,000
Year 3	81	£1,057,000	£76,000
Year 4	60	£1,768,000	£85,000
Year 5	32	£2,919,000	£76,000

The big differences between the **mean and median turnover** figures in both tables indicate a large spread of data, with most of the impact generated by a small minority of these businesses and then a “long tail” of much smaller-impact firms. This is a very typical impact pattern that has been observed over many different surveys and remains a perennial issue.

Detailed analysis of this survey data shows that **the bigger the innovation investment made, the greater the impact on turnover** was over a **longer time period**. Businesses that invested around £500,000 on innovation projects reported by far the highest mean value of turnover (£2.5m in Year 1) and expected benefits to extend out to 5-9 years.

Impact – on employment

Companies were asked to provide employment figures for five years after having received innovation support. Overall 62% of businesses reported an increase in employment within their establishment since they had received innovation support, with 25% reporting that their employment had stayed the same and 11% said that their employment levels had decreased.

Figure 11 below shows the mean & median number of gross employees reported by these companies for years 1 to 5 after receiving innovation support.

Figure 11: Mean & median number of employees for years 1 to 5 after receiving innovation support

Year	Respondents	Mean number of employees	Median number of employees
Year 1	213	37	9
Year 2	171	41	11
Year 3	120	46	10
Year 4	84	56	9
Year 5	49	72	8

The companies were then asked to assess to what extent these employment levels could be attributed to SE innovation support. Figure 12 shows the mean number of gross employees these businesses attribute to SE support for years 1 to 5 after receiving that support. For each of these years businesses felt that they could attribute a mean of 2-4 employees (gross) per company to SE support.

Figure 12: Mean number of employees attributed to SE innovation support for years 1 to 5 after receiving that support

Year	Respondents	Mean number of employees
Year 1	222	2
Year 2	181	4
Year 3	129	3
Year 4	91	4
Year 5	54	4

Impact – on international sales

For context, the **UK Innovation Survey 2013** shows that Scottish companies are more locally focussed than the UK average. 73% of Scottish businesses operate in their own region (within about 100 miles) compared with a UK average of 68%. Scottish companies are less likely to operate across the UK (46% compared to 56% UK average). The same trends hold for operating in international markets with 16% of Scottish firms operating in Other European countries (22% UK average) or all other countries (11% against 15%). Compared to the UK average, a smaller proportion of Scottish companies are exporters (17% against 25% UK average). However, innovative firms do have a higher propensity to export. In Scotland twice as many innovative companies export (22%) compared with non-innovators (11%).

Linking to this recognised area of underperformance, it is clear that this group of innovative businesses are contributing to closing the gap through:

- **Increasing sales in existing international markets.** More than a quarter of the companies (73) reported increased sales in existing markets. Most commonly businesses increased their sales in Europe (66%) – notably in Germany (23%) and France (22%). Nearly half of these businesses reported increased sales in the USA (47%), with lesser amounts in Asia (25%) and the Middle East (12%), while just 5% of businesses reporting increased sales in existing markets in Africa and South America.
- **Entering new international markets.** 80 companies entered new markets. Around half (51%) of these companies had entered new markets in Europe, while 46% entered the North America market for the first time and a third (33%) entered Asian markets. Smaller numbers entered the Middle East (14%), Africa (9%) and South America (8%).

GVA Impact

From the 284 companies interviewed, only 66 companies provided enough information to enable impact to be calculated. The remaining businesses were either unable (often because it was too early in the project's development) or unwilling, to articulate full quantitative results. Figure 13 (below) sets out the derived GVA impacts of innovation support totalling £676m net present value (NPV) to 2023/24 (in 2014/15 prices), separating out impact derived to date and that forecast into the future.

Figure 13: Net additional GVA

		Impact to date	Future impact	Total
Cohort 1 (n=44)	Net additional GVA	£241.4m	£341.6m	£583m (NPV)
Cohort 2 (n=22)	Net additional GVA	£36.9m	£56.1m	£93m (NPV)
Totals		£278.3m	£397.7m	£676m (NPV)

Note: The totals have not been grossed up to the level of the population (all approx 4,200 companies that received support over this time period) due to the complexity of comparing the business characteristics of the sample companies to those of the wider population.

The average impact to date for cohort 1 (SE Account Managed companies) is £5.5m per company, whilst that for cohort 2 (non account managed companies) is £1.7m per company, indicating that being Account Managed by SE brings greater benefits to these companies.

The GVA impact for this overall group of businesses amounts to £676m (NPV). Set against the cost of innovation support, this equates to an **impact investment ratio of 1:15**, with impacts driven mainly by a small number of larger companies citing both long-term benefit and high levels of additionality. From a wider perspective, considering impact across the population of supported businesses, this estimate should be considered high on account of:

- the inability to identify support costs outside R&D and SMART grants for the period 2004/5 to 2007/8 inclusive;
- the expectation that businesses will continue to draw down public sector funds to realise the impacts claimed;
- the disproportionately low drawdown of high-value grants within the sample; and
- the focus on, as yet, unrealised future impacts.

(Note: a 1:15 ratio means additional value of £15 to the economy for every £1 public sector investment made)

CONCLUSIONS

SE attempted further analysis of the data to try to identify any relationships between patterns of support delivered and company performance. Understanding these potential relationships could help SE better target and optimise innovation support delivery. The analysis focussed on companies who had received three or more innovation related assists, alongside the non-innovation support they had also received from SE, resulting in 1,032 company records,

However the complexity of innovation and non-innovation related product uptake is such that it is not possible to attribute company performance (as measured by turnover and/or jobs growth) to any specific pattern of support, with any statistical reliability

However broad analysis of the data does suggest some loose patterns of support and a few broad conclusions:

- The depth of engagement between SE and these companies seems to be beneficial to their success. More of cohort 1 companies (account managed by SE) are at the top end of the impact scales; both in terms of turnover and jobs, and more of cohort 2 companies (non account managed) are at the bottom end of these scales.

- Broadly there seem to be two separate innovation pathways. Very few companies seem to combine these:
 - *Technology development:* A small number of companies have been awarded R&D and SMART Scotland grants, often with little or no other form of SE support. When follow on support has been made it has been mainly through SIB investments – which have then drawn in further SE support to these technology based businesses.
 - *Innovation development:* A larger number of companies have been working with an Innovation advisor to apply a wide range of innovation investments (over an extended period) to support the turnover growth of these companies.
- Many companies have benefitted from a mix of innovation support (across the range of products) and wider business support most notably Market Development and Business Improvement. In an assessment of the impact ratio (turnover / investment), it is the companies receiving this broader mix of support which tend to score highest, ahead of those receiving individual, larger inputs or Sector specific support.

The broad findings of this review of the strategic and economic impact of SE's innovation support paint a positive picture of progress towards developing a "culture of innovation" within Scottish businesses and improving Scotland's innovation performance.

In particular the following points are worthy of note:

- The companies SE has supported display very positive, ambitious characteristics with a strong focus on developing new, higher quality products (and services) for new growth markets.
- They invest in a wide range of innovation (R&D, design, market research, software and hardware development and acquisition of technology and machinery) to achieve these ambitions.
- They also display much more open characteristics than other surveys have identified, with large numbers collaborating with suppliers, customers and universities to deliver their innovation projects.
- Impact studies indicate that these companies see a long-lasting positive impact on their turnover figures as a result of their investment in innovation, and almost all of them attribute this, in part, to the support they received from SE.
- They also see a related increase in their employment figures which they similarly attribute, in part to SE innovation support.
- However, in common with many other surveys, it appears that most of this impact is generated by a small minority of these companies, with a "long-tail" of much smaller-impact firms.
- There is clear evidence that the bigger the investment that companies make in innovation projects, the greater the immediate impact on net turnover and the longer that impact is sustained.
- In terms of international sales, around 40% of the companies surveyed had seen growth in existing and new international markets as a result of their investment in innovation, although these sales figures are not quantified.

This review reinforces SE's innovation policy emphasis on deeper engagement with more companies to build their capacity to innovate and deliver larger innovation projects.

It also endorses the wider approach to innovation, engaging more companies across a broader range of innovation support.

POLICY IMPLICATIONS

Whilst there is no evidence in the review of a clear relationship between any particular pattern of innovation support and economic impact, the combination of a range of grant support and softer specialist advice appears to be the best mix for most companies in this survey. Therefore this would suggest that, as far as possible, SE's innovation support should continue to be tailored to company needs, without being overly prescriptive in nature at the outset.

The Review highlights that innovation is diffused across more businesses, in more sectors and at all stages in their development. However, the impacts are still concentrated in a few companies and Sectors. Therefore SE needs to remain focused on the Wider Innovation agenda which is aimed at helping more companies to innovate, grow and internationalise.

There is also anecdotal evidence that companies find the innovation support landscape complex and difficult to navigate. Therefore there remains an ongoing requirement to simplify the innovation journey for companies from across the multiple private, public and academic players – whilst retaining the mix of products and services that best support broader business innovation.

The analysis of the range of innovation investments that these companies make has provided SE with an unprecedented level of detail and highlights that, for these companies, innovation is clearly about much more than technology and R&D. SE therefore needs to ensure that more attention and support is offered to these wider factors, in particular to enable greater workforce involvement in innovation and more emphasis on customer and market understanding.

The companies involved in this survey were largely product innovators, yet most recent global reports suggest service innovation is driving 80% of growth. SE needs to reflect on this trend, understand the role of service innovation in the Scottish economy and consider changes to the product mix, as required, to support service innovation

This review shows that innovation is much more than R&D, yet the measurement of innovation performance still relies heavily on R&D metrics (BERD). This is because they are relatively easy to collect and compare internationally. This can lead to innovation policies that overplay the importance of R&D in the wider innovation system. SE needs to rise to the challenge of measuring innovation in a way that more accurately reflects the reality of the range of innovation investments these companies make.