

Innovation and business performance

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Abstract: Innovation is critical for business performance and is a key driver of productivity growth. Innovation can take many forms, including R&D, product and process development and elements of marketing and organisational change. This paper explores which types and combinations of innovation have the greatest impacts on business performance. Using data from the UK Innovation Survey, the paper explores the prevalence of innovation type before considering the impact on turnover, employment and productivity growth. The analysis considers size of business to assess any differential impacts at specific stages of growth. The analysis shows that product and/or process innovation are particularly effective in increasing business performance. Product and process innovation are the core of business growth and encouraging more businesses to be innovative remains a crucial policy direction, across all sizes of business.

Key words: Innovation, Innovation Active, Product Innovation, Process Innovation, Organisational Innovation, Productivity, Productivity Growth, Turnover Growth, Employment Growth

I Introduction

The link between innovation and business performance has been well documented. Innovation is a crucial factor in determining an economy's competitiveness with much of the long term rise in living standards attributed to innovation¹. Studies have shown a large and rising share of economic growth and living standards in recent decades is derived from innovation, which leads to increased productivity and the creation of new products, services, processes and industries². Evidence also shows a positive relationship between competition, innovation and productivity, with product and process innovations having the potential to lead to increased efficiency, quality and reduced costs, or to open-up new markets³. It has also been shown that more innovative businesses grow twice as fast, both in employment and sales, as businesses that do not innovate⁴. It is estimated that, on average across UK regions, a one per cent increase in the percentage of innovating firms is associated with an increase of £749 pa in GVA per person⁵.

Innovation can take a variety of forms including product, process, marketing and business organisation⁶. However, there is little published evidence on whether specific types of innovation are more effective than others in driving improved business performance. This paper examines the effects of different types, and combinations, of innovation activity on business performance in terms of turnover, employment and labour productivity growth. The aim is to help inform policy to support innovation in businesses, for example prioritising innovation interventions likely to maximise outcomes and stimulate business growth.

¹ [Innovation and Growth: Rationale for an Innovation Strategy, OECD, 2007](#)

² [Innovation and Growth: How Business Contributes to Society, Ahlstrom, D. Academy of Management Perspectives Vol 24, 3](#)

³ [Productivity and Competition: A Summary of the Evidence, Competition and Markets Authority and UK Innovation Survey 2017, Department for Business, Energy & Industrial Strategy, 2018](#)

⁴ [Business Growth and Innovation, Mason et al, NESTA 2009](#)

⁵ [Enterprise research Centre, 2019](#)

⁶ [Productivity Handbook - Office for National Statistics](#)

II Methodology

This paper presents an analysis of the UK Innovation Survey 2015, covering the period 2012 to 2014⁷.

A business is said to be *Innovation Active* if it has undertaken one or more of the activities 1-3 below, and as a *Broader Innovator* if it has engaged in one or more of 1-4:

1. Introduced a new or significantly improved product (good or service) or process.
2. Engaged in innovation projects not yet complete or abandoned.
3. New and significantly improved forms of organisation, business structures or practices and marketing concepts or strategies.
4. Investment activities in areas like internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

In practice, innovation active businesses engage in many types of innovation activity, such as introducing a new product or process alongside adapting organisational structures and/or introducing new marketing strategies

The Innovation Survey data used here are useful as they provide the only comprehensive source of data on types of innovation activity across the UK and include information on business performance such as turnover, employment and exports⁸. Innovation trends in Scotland tend to be similar to the UK overall (Figure 1), therefore, the UK-wide rather than the Scottish business responses are used as the larger sample size allows more robust and detailed analysis⁹. It is assumed, therefore, that the UK results will also apply to Scotland¹⁰.

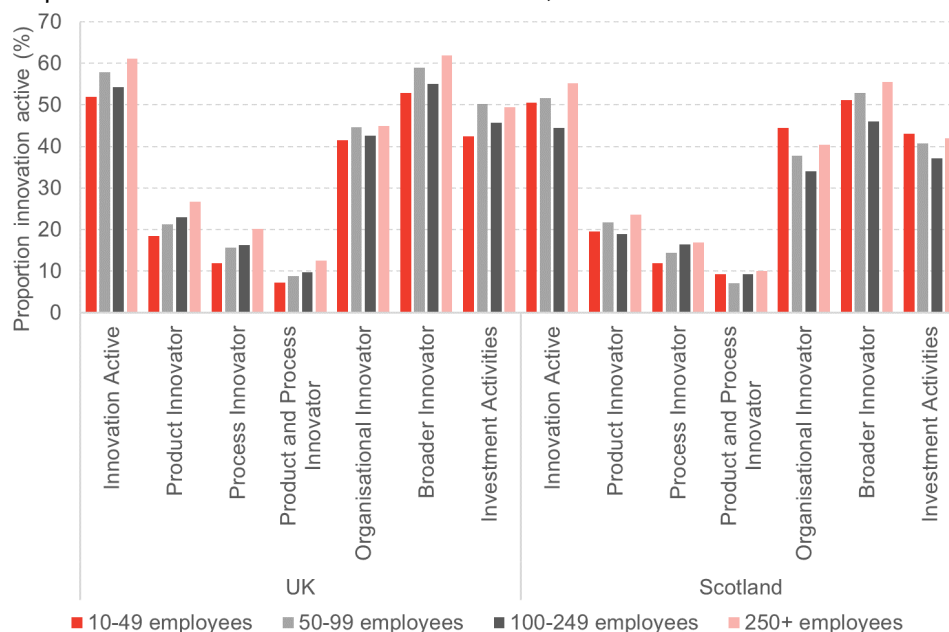
⁷ The UK Innovation Survey is conducted every two years by the Office for National Statistics (ONS) on behalf of the Department for Business, Energy and Industrial Strategy (BEIS). The information feeds into the Community Innovation Survey (CIS) covering European countries. The UK Innovation Survey enables the level of innovation activity across the UK to be measured, which helps to identify where innovation policy might be best targeted.

⁸ [UK Innovation Survey 2012 - 2014 Questionnaire](#)

⁹ The smaller sample size in Scotland does not allow for a similarly robust and detailed analysis

¹⁰ The 2015 survey results cover a UK-wide representative sample of businesses with 10 or more employees in sections B-N of the Standard Industrial Classification (SIC) 2007. Overall, roughly 15% of businesses across the UK were sampled and the responses were weighted back to the total business population. The stratified sample resulted in a higher proportion of responses from larger businesses than smaller businesses, however, the results were not weighted by factors which would give more weight to larger businesses, such as employment or turnover. From a sample of 29,732 businesses surveyed 15,091 responses were achieved (a response rate of just over 50%).

Figure 1: Proportion of Innovation Active Businesses, UK and Scotland 2012-14



This analysis assesses turnover, employment and productivity growth¹¹ for different types of innovation activity using Office for National Statistics (ONS) microdata from the Secure Research Service¹². The dataset includes variables for turnover and employment¹³.

The dataset also includes estimated turnover and employment levels from survey responses for 2012 and 2014, which were used to calculate median growth levels¹⁴.

III Survey results

Innovation activity varies by the size of the business and type of innovation activity (Figure 2). Generally, a higher proportion of large businesses are innovation active than smaller businesses for each type of innovation, except organisational-only innovators¹⁵. Regardless of size, most innovation active businesses engage in more than one type of innovation.

Other key findings are that:

- Many businesses are organisational innovators but relatively few are product or process innovators. *This is a key finding.*
- Most innovation active businesses also undertake innovation investment activities e.g. investment in internal R&D, training, acquisition of external knowledge or acquiring machinery to support innovation activities.

¹¹ Exporting businesses are investigated in terms of their overall turnover and employment growth, data on exports growth are not separately available in these data.

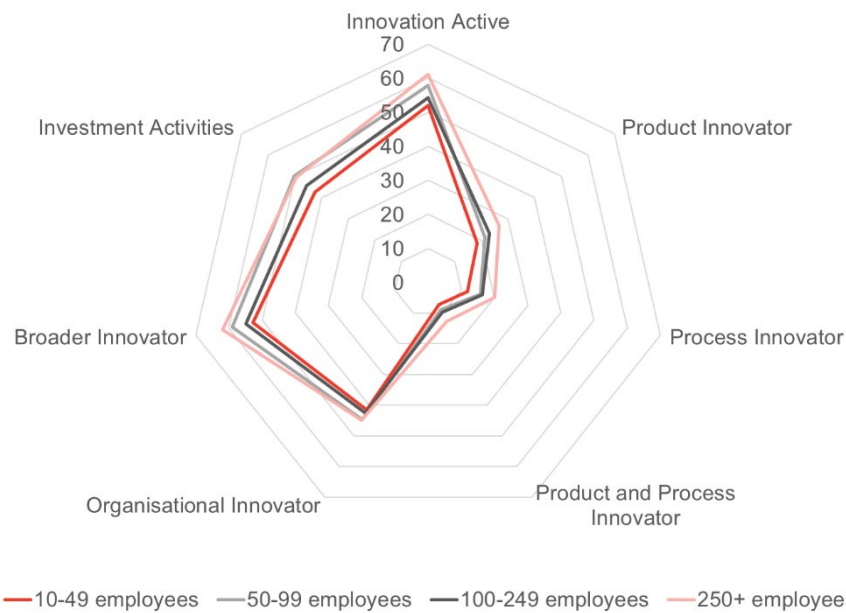
¹² The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

¹³ sourced from the IDBR

¹⁴ It should be noted that although these sample sizes were smaller, turnover and employment levels were broadly consistent with those from the larger IDBR sample.

¹⁵ Organisational innovators are also referred to as 'Wider' innovators. Wider innovators are businesses that have engaged in point 3 above: New and significantly improved forms of organisation, business structures or practices and marketing concepts or strategies.

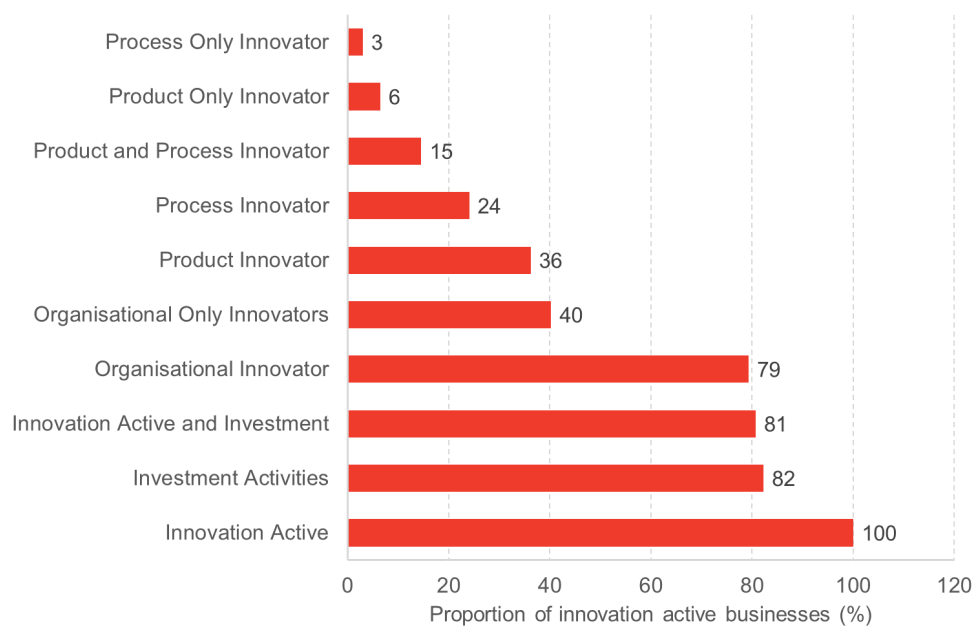
Figure 2: Proportion of Innovation Active Businesses by Business Size, UK, 2012-14



Source: Scottish Government, UK Innovation Survey 2015 – Results for Scotland

Figure 3 highlights the small proportion of innovators that undertake product and process innovation. Only 36% of UK innovators undertook product innovation only, 24% process innovation only while 15% were both product and process innovators (the equivalent figures for Scotland were 39%, 25% and 18%). Most innovation active businesses undertook wider organisational innovation in both Scotland (86% of innovation active businesses) and the UK (79%). Almost half of organisational innovators did not undertake any other type of innovation. This is shown in Figure 3, as well as the small proportions of innovators that engaged in either process or product innovation only.

Figure 3: Proportion of Innovation Active Businesses by Activity (%), UK, 2012-14

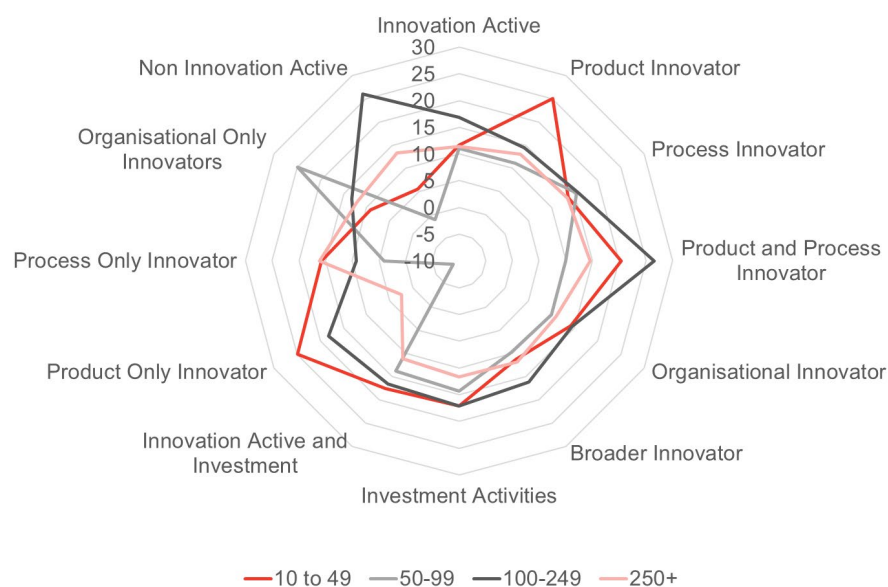


IV Turnover growth by type of innovation activity and by business size band

In large¹⁶ and medium-large¹⁷ businesses, median turnover growth rates were relatively consistent across all types of innovation, while in smaller businesses the highest median turnover growth was associated with product and organisational innovation (Figure 4). It may be that more ‘radical’ types of innovation are more generally linked to faster growth in smaller businesses¹⁸. It has also been noted, for example, that new innovations may often take some time to influence firms’ bottom line¹⁹.

In all these results, however, the importance of product and process innovation, either individually or combined can be seen.

Figure 4²⁰: Turnover Growth by Size Band and Type of Innovation (%), UK 2012-14



V Employment growth by innovation activity type and business size band (%)

Employment growth varies by type of innovation activity and by business size band (Figure 5). As with turnover growth, employment growth rates are highest for product and process innovation and their combinations. Employment growth rates are also higher in small businesses with innovation investment activities.

¹⁶ >250 employees

¹⁷ 100-249 employees

¹⁸ [SMEs' internationalisation: When does innovation matter? Journal of Business Research 96 \(2019\) Pages 250-263](#)

¹⁹ [Innovation and productivity: How strong is the connection? Economic Research Council](#)

²⁰ Note: the same business may appear more than once in the chart if they undertake organisation innovation and product innovation

Figure 5: Employment Growth by Size Band and Type of Innovation (%), UK 2012-14



Generally, large innovating businesses have lower employment growth rates than small businesses; this may be due to their greater use of capital and higher productivity levels (lower employment growth rate may be because they can, more easily, exploit economies of scale). It could also simply reflect that it is easier for small companies to have higher growth rates because they are starting from a lower employment base level. The reality is likely to be a combination of the two.

It is also worth noting that for businesses in the 50-99 size band undertaking process innovation only their employment fell in this period. This may be for a variety of reasons but could reflect a specific focus on processes that deepen capital and therefore increase efficiency and productivity²¹; this is also seen to some extent in small companies where employment growth for process only companies is flat.

VI Productivity growth by business size band and innovation activity (%)

Productivity growth rates also vary by type of innovation activity (Figure 6). In all business size bands, productivity growth rates were highest for product and/or process innovation. This is perhaps to be expected: the more radical nature of these innovation activities suggests they are more likely to translate into larger productivity returns through increased sales or efficiency (possibly a key objective of innovating for many businesses).

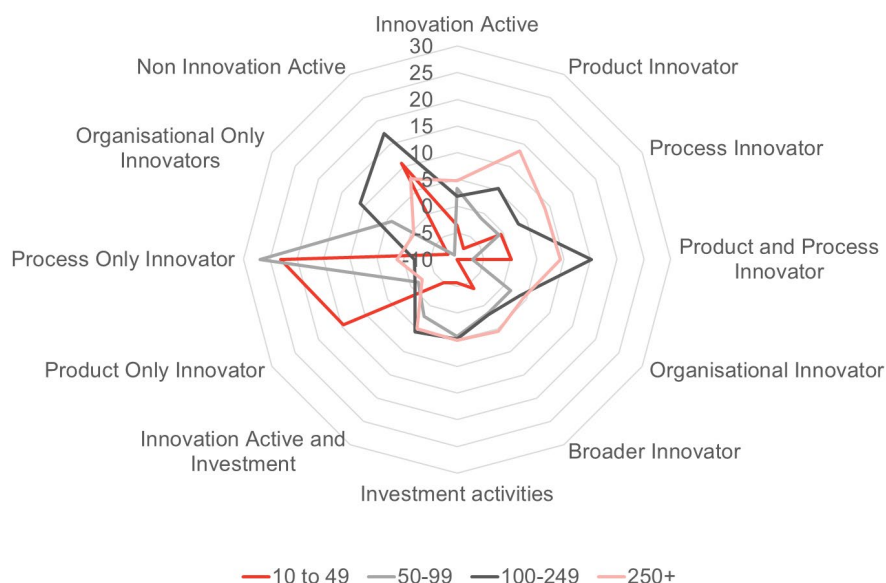
In medium-small²² and medium-large size businesses, productivity growth rates were also high for innovation investment activities and organisational-only innovation, suggesting that businesses in this size band are perhaps undergoing structural change as they grow, and such innovation is necessary to enable them to achieve ongoing growth.

Figure 6 also shows the impact of process-only innovating small and medium-small businesses where we see flat or reduced employment alongside high growth in productivity levels.

²¹ We should also note that sample sizes are smaller for the process only category

²² 50-99 employees

Figure 6: Productivity Growth by Sizeband and Type of Innovation (%), 2012-14



VII Innovation and business performance: Key points

Large businesses (250+ employees): the biggest growth in turnover and productivity comes from product and process innovation²³. Employment growth tended to be concentrated more in businesses that changed their organisational structure or just undertook process innovation. Generally-speaking, the resources available to large businesses suggests a greater ability and resources to innovate successfully.

Medium-large businesses (100-249 employees): A similar outcome is also seen for medium-large businesses. However, the role of innovation investment (in equipment, training, etc., which is not included in the innovation active definition) features heavily in productivity and turnover growth and might suggest that as they grow towards becoming large businesses, they may already have the product/service portfolio to achieve this (as discussed below) but need to invest in other activities in order to grow to become a large business.

Medium-small businesses (50-99 employees): For medium-small businesses the picture appears a little different. Productivity levels fell for product, process, and product only innovators. However, excepting product-only innovators, they did experience turnover growth. It seems that these businesses may be growing employment to support their innovation activities, which impacts negatively on productivity. The decline in turnover for product-only innovation might reflect that these businesses do not yet have the scale to simultaneously innovate *and* grow the business. Once those businesses do reach scale, their turnover may be more likely to grow.

Small businesses (10-49 employees): Small innovating businesses are, on average, growing rapidly as can be seen in the high levels of turnover growth. However, depending on the type of innovation being undertaken, they are also increasing their employment, which will have a negative impact on productivity growth if employment increases faster than turnover. It seems

²³ Those businesses also tend to have the highest levels of turnover and productivity

that small businesses able to focus on either product-only or process-only innovation are able to rapidly grow turnover and productivity. For small businesses that are changing their organisational structure there seems to be a substantial growth in employment which leads to decreased productivity. It could be that small businesses undertaking this kind of innovation only might be on a slower growth trajectory since faster growth generally comes from product and process innovation. More generally, small businesses may still be building their overall portfolio of products and services and experimenting with the best ways of developing and selling them.

Overall, the general picture that emerges across all size bands is that product and process innovation (combined with, or without, other types of innovation activity) tend to have the highest turnover and productivity levels and higher growth rates, while smaller businesses do not seem to be able to achieve the same level of gains (see appendix for detailed results). Where organisational-only innovators have higher growth rates, this tends to be from a lower initial turnover or productivity base.

The results suggest, therefore, that engaging in any type of innovation is beneficial to businesses, but the best performance is by businesses with product or process innovation combined with other innovations such as marketing and/or organisational innovation or investment activities. There may potentially be an optimal combination of innovation activities that produces the highest turnover, productivity levels and growth, however, that would require further detailed data analysis.

VIII Conclusions

The results of the analysis suggest that the best performance is in businesses with product or process innovation combined with other innovations such as marketing and/or organisational innovation or investment.

Overall, Scotland needs more not only more innovation active businesses but also more undertaking, at least, product and/or process innovation.

The fastest turnover growth rates were generally for product and process innovation and for innovation investment for most size bands. However, currently Scotland ²⁴ has relatively few innovating businesses and, of these, small proportions undertake product and/or process innovation. Therefore, in policy terms, priority should be towards having more innovating businesses overall *and* more companies undertaking product and process innovation.

Moreover, whilst it is appropriate to promote more product and process activity, this study also shows that it is important that businesses also have the right organisational structure, workforce skills and marketing strategies to support their growth. This is especially true for smaller businesses, and this may potentially lead to faster growth in this group of businesses.

There is a range of support available to businesses in Scotland to encourage innovation activity²⁵. This includes access to specialist innovation advice, financial support for R&D,

²⁴ Scotland and UK

²⁵ See, for example, [Information on R&D grants](#) and [Make it to market grants](#).

support to link businesses with research providers such as universities; and workplace development/business organisation support.

Appendix

Table 1: Turnover levels and growth by size band and type of innovation

	10 to 49		50 to 99		100 to 249		250+	
	Turnover (£000)	Growth (%)	Turnover (£000)	Growth (%)	Turnover (£000)	Growth (%)	Turnover (£000)	Growth (%)
All 10+	1,049	11.9	5,338	10.6	14,629	14	56,400	18.1
Innovation Active	1,139	11.6	5,415	11	15,568	16.9	60,072	11.4
Non-Innovation Active	1,000	5.5	5,165	-1	13,271	26	48,006	13.3
Product Innovator	1,260	25	6,641	11.1	17,049	14.5	71,044	13
Process Innovator	1,194	13.6	6,029	15.4	16,000	15.7	79,301	13.5
Product and Process	1,356	20.4	5,801	10	15,730	26.6	77,176	14.6
Organisational Innovator	1,139	14.2	5,057	10	14,666	14.4	57,068	10.9
Broader Innovator	1,139	11.3	5,415	9.7	15,568	16.2	59,778	11.8
Investment Activities	1,139	17.1	5,230	14.3	15,498	17.1	59,616	11.7
Innovation Active and Investment	1,139	17.5	5,230	13.8	15,498	16.6	60,466	11.1
Process Only	1,200	15.8	5,928	4	18,358	9.2	71,583	16.2
Organisational Only	1,139	9.2	4,504	25	12,187	13.2	40,130	12.1

Table 2: Productivity Levels and Growth by Size Band and Type of Innovation

	10 to 49		50 to 99		100 to 249		250+	
	Turnover per worker (£)	Growth (%)	Turnover per worker (£)	Growth (%)	Turnover per worker (£)	Growth (%)	Turnover per worker (£)	Growth (%)
All 10+	65,500	-5.8	82,000	4.2	101,000	6.7	125,500	10.9
Innovation Active	63,500	-3.6	83,500	3.3	109,500	1.9	134,500	4.7
Non-Innovation Active	66,500	10.8	79,500	-9.1	89,000	17.3	105,000	7.4
Product Innovator	70,000	-7.7	102,000	-1.1	120,000	5.4	155,000	13.5
Process Innovator	70,000	-0.5	94,000	-0.9	112,500	3.2	178,000	9.0
Product and Process	80,000	0.2	88,000	-7.0	111,000	15.2	173,500	9.4
Organisational Innovator	63,500	-10.0	77,500	1.5	104,000	3.5	127,000	4.4
Broader Innovator	63,500	-3.6	83,500	1.6	109,500	1.9	134,500	5.5
Investment Activities	67,000	-5.6	80,500	4.4	109,000	4.9	137,500	5.1
Innovation Active and Investment	67,000	-5.0	80,500	2.3	110,000	5.7	139,500	4.9
Process Only	66,500	23.0	94,000	27.0	114,500	-1.9	171,500	1.2
Organisational Only	67,000	-8.0	67,000	4.2	87,500	11.0	90,500	-0.7

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