

**Scottish Enterprise
Commercialisation
Programme Review**

**Working Paper 4:
Economic Impact
Appraisal (2008-2018)**

Scottish Enterprise

1 Economic Impact

This working paper summaries the key potential economic impacts arising from the Scottish Enterprise Commercialisation Programme in the future (2008-2018), with a particular focus on turnover, GVA and employment arising from the 100 surveyed companies.

1.1 Approach to Assessing Economic Impact

The economic impact calculations are based on best practice guidance in Economic Impact Assessment developed by Scottish Enterprise¹. It uses the approach as well as the standard question set² for assessing economic impact. This includes:

- collecting key impact variables
- adjusting the impact variables for additionality
- adjusting for optimism bias
- adjusting for business failure and acquisition
- conducting a cost benefit analysis of the results

1.1.1 Collecting key impact variables

The key impact variables collected to understand the impact of Scottish Enterprise intervention covers turnover, employment and GVA.

Projected turnover was collected from the companies for key periods over the next 10 years, as was employment (2008, 2009, 2011, 2013, 2018). GVA was developed by subtracting the cost of bought in goods and services (excluding employee costs) on an annual basis projected over the next 10 years from the annual turnover level in each of the key data collection years (or annual estimated cost of bought in goods and services where the company was pre turnover). In all cases the intervening years were assumed to be the same as for the last full year for which data was collected (in effect a flat profile between milestone years)³. This approach is validated by the Centre for Technology Development paper on employment growth in new firms⁴. This paper evaluated growth patterns of new firms over a 10 year period and grouped firms into four categories:

- Early growth and plateau (73% of firms)
- Continuous growth (0.3% of the firms)
- Growth setback (17%)
- Delayed growth (10%)

The implication is that most firms do not grow on a continuous basis. Our assessment works on spikes of growth rather than continual growth providing a more cautious estimate of impact and fitting the evidenced growth patterns of firms.

¹ Scottish Enterprise (2008) *Additionality and Economic Impact Assessment Guidance Note, A Summary Guide to Assessing the Additional Benefit, or Additionality of and Economic Development Project or Programme*, Appraisal and Evaluation Team

² Scottish Enterprise (2008) *Additionality & Economic Impact Assessment Guidance Note: Appendix 2: Standard Questions and Standard Reporting Outputs*, Appraisal and Evaluation

³ While the intervening years are held constant – they are adjusted for business failure and company acquisition, therefore the data in the tables vary slightly on a year to year basis

⁴ Stam,E, Gibcus,P, Telussa,J and Gamsey,E (2008) *Employment Growth of New Firms*, Centre for Technology Management, University of Cambridge

1.1.2 Gross to net adjustments (Additionality)

In order to understand the full impact of the commercialisation programme there is a need to assess the additionality of the intervention. In effect what has happened that would not have happened anyway.

The additional benefit of an intervention is the difference between the reference case (what has happened anyway) and the intervention case (the position when the intervention has been implemented).

In order to fully understand this there is a need to move all results from gross to net. This adjusts for

- deadweight – what would have happened anyway
- leakage – the extent to which the benefits are lost to Scotland
- displacement – the extent to which the benefits are coming at the expense of other Scottish based businesses
- substitution – the extent to which one activity is simply substituted for another
- multipliers – the positive downstream effects created through spending on supplies and the wider wages generated from these downstream effects

This process is illustrated in the diagram 1.1 below.

Adjusting for Additionality

Diagram 1.1



The adjustments made to each of these factors are based on information supplied by the individual companies and therefore vary on a company by company basis. However, to provide some context to these variables we have provided the average values for each for reference.

Deadweight was calculated by asking the company how different their turnover and employment would have been without the Scottish Enterprise support. This was asked for key periods over the next 10 years (2008, 2009, 2011, 2013 and 2018) providing a full 10 year impact assessment. Date for intervening years was assumed to be the same as for the last full year for which data was asked.

Displacement was applied consistently to employment, turnover and GVA based on the location of the companies direct competitors (and adjusted based on the growth of the market they operate in) at the point of survey. For the Commercialisation Programme the average displacement amounted to 4% in 2007. This means that most companies are suggesting that they have virtually no competitors in Scotland and that they are operating in markets that have been either improving moderately or strongly over the last three years. This value was held constant over the 10 years of the economic appraisal.

Leakage was estimated at 0% for turnover and GVA. At present Scottish Enterprise practice is to assume that if turnover and GVA are generated within Scotland then they are retained within Scotland. This assumption has therefore been used in the impact assessment. This value was held constant over the 10 years of the economic appraisal.

Substitution was assessed by asking the companies about the extent to which they have replaced one activity with another (or employees for another) to benefit from public sector assistance. No company suggested they did either of these things leading to average substitution values of 0% for turnover, GVA and employment. This value was held constant over the 10 years of the economic appraisal.

Multiplier values were sourced from the Scottish Input Output multiplier tables based on the full 4 digit Standard Industrial Classification code of the company. These were matched with Type 2 input output multipliers for Output (in the case of turnover), GVA and employment. These were held constant over the 10 years of the economic appraisal.

1.1.3 *Adjusting for Optimism Bias*

As the appraisal is a forward looking exercise and relies on company projections of growth – in terms of employment, turnover and cost of bought in goods and services it is appropriate to adjust the figure for over optimism.

There is a demonstrated, systematic, tendency for appraisers to be overly optimistic. This is not just a public sector phenomenon, but also applies to the private sector. As our future impact data is based on the views of the company owner, it is appropriate to adjust for over optimism. This avoids the potential for projections to over count benefits and undercount costs.

There is no standard approach to assessing optimism bias. Scottish Enterprise have however, developed an approach to adjusting company projections for over optimism using the Department of Business, Enterprise and Regulatory Reform Value Added Calculator⁵. By inputting company specific data into the calculator it is possible to assess the growth patterns in relation to the top performing UK and European companies in the same or similar sectors. If a company is projecting impacts above the sectoral average for the top performers it is fair to say that they are being over optimistic and are adjusted down accordingly.

In this appraisal we use an approach similar to the one outlined above that calculates projected GVA per head (based on GVA and employment) for each of the individual companies. Where the GVA per head is above the BERR Value Added Calculator sectoral average in any year, the figure is reduced by an appropriate amount to bring it in line with the average. Where the value lies below the average GVA per head for the sector, based on the BERR database, it is assumed to be within an acceptable standard and not adjusted down in any way. These downward adjustments are applied to turnover and GVA to develop more realistic estimates of impact.

⁵ http://www.innovation.gov.uk/value_added/default.asp?quicklink=calculator

This approach means that employment is not adjusted in any way – even where companies have shown that their turnover values are over optimistic. Our assessment of employment projections is that they are actually conservative across the company base. In effect they are predicting substantial growth, but not increasing employment in line with this. Therefore it is assumed that there is less over optimism in the employment estimates and as a result they are not adjusted down in any way.

1.1.4 Adjusting for business failure and acquisition

Once the final net impact figures are adjusted for optimism there are two further adjustments that need to be made to the figures to avoid presenting overly optimistic estimates of impact. These adjustments are made to the expected GVA, turnover and employment and cover:

- adjustment for business failure
- adjustment for potential company acquisition

Each year is adjusted for business failure. This is based on the Department for Business, Enterprise and Regulatory Reform (BERR) 1 and 3 year survival rates⁶ that suggests that each year 10% of businesses in existence at the beginning of the year will fail by the end of the year. We assume therefore that 1 business (from our 100) will fail every year over the next 10 years, with the average net value for either turnover, GVA or employment subtracted in each year to account for this.

The model also adjust for potential company acquisition. In this case companies that are successful may make themselves a target for larger companies either interested in their technology or their market. A report on High Growth Firms in the UK produced by the Department for Business, Enterprise and Regulatory Reform⁷ suggested that around 30% of the firms in their study population had been acquired. As such we assume that 33 of the 100 companies will be acquired amounting to 3 companies per annum over the 10 years of our appraisal. Further research evidence⁸ was then used to look at the status of acquired Scottish companies, which suggested that for every 3 companies acquired, one will retain some degree of status and function that could contribute to economic growth, the others remaining only as a shell company or cost centre. As such it is assumed that 2 companies per annum are acquired and do not make a further contribution to Scottish economic growth.

1.1.5 Cost Benefit Analysis

Once the results were adjusted for additionality, optimism, business failure and acquisition the results were imported into the Scottish Enterprise cost benefit calculator.

Costs were collected on the sampled companies using data supplied by Scottish Enterprise. The data covers the amount of grant awarded to companies or was proxied based on project costs each year and the number of companies receiving support.

The results were discounted as per UK HM Treasury Best practice guidance at a rate of 3.5% per annum. This is based on the view that society prefers to generate benefits sooner rather than later. For the Commercialisation programme the base year was 2004, representing year zero for the evaluation. It needs to be recognised that some of the projects within the Commercialisation programme pre date this period, but for

⁶ <http://stats.berr.gov.uk/ed/survival/>

⁷ BERR (2008) *High Growth Firms in the UK: Lessons from an Analysis of Comparative Performance*, Department for Business, Enterprise and Regulatory Reform

⁸ Training and Employment Research Unit (2005) *Corporate Headquarters in Scotland, their Nature and Contribution to Scotland's Economic Development*, Scottish Enterprise

consistency of evaluation any costs and benefits associated with activities have been excluded. All impact figures have been collected at 2007 prices.

This approach can be summarised (based on the GVA variables) in the Table below.

Appraisal Period GVA Additionality Adjustments for Milestone Years

Table 1.1

	2008 (Year 4)	2009 (Year 5)	2011 (Year 7)	2013 (Year 9)	2018 (Year 14)
	Gross value				
Optimism Bias	34%	51%	59%	60%	71%
	Optimism bias adjusted gross impact				
Deadweight	76%	77%	90%	93%	95%
Displacement	4%	4%	4%	4%	4%
Substitution	0%	0%	0%	0%	0%
Leakage	0%	0%	0%	0%	0%
Multipliers	1.68	1.68	1.68	1.68	1.68
	Net Impact				
Failures	0%	2%	13%	16%	30%
Acquisitions	0%	4%	26%	32%	61%
	Adjusted net total				
Discount 3.5%	0.8714	0.8420	0.7860	0.7337	0.6178
	Net Impact NPV				

1.2 Turnover Impacts

It is appropriate to consider the generation of company benefits. This is measured as the net increase in turnover accruing as a direct result of the programme and represents a key measure of company growth.

The potential net turnover impact accruing over the period 2008-2018, could amount to **£518.3 million** (£371.5 million NPV). This could rise to **£555.6 million** (£406.2 million NPV) if the benefits realised to date are also included.

If sunk costs are considered of £22 million (£20.1 million NPV) and matched with all realised and potential benefits this could amount to a potential benefit to cost ratio of 1: 20.22. This could amount to a £20.22 return for every £1 invested in the Commercialisation programme by Scottish Enterprise. Full details are included in Table 1.2 below.

Turnover Impacts of the Commercialisation Programme

Table 1.2

Year	Costs	Net Present Value (Discounted Costs)	Turnover Impact	Net Present Value (Discounted Turnover)
2004-2007	£13,860,385	£12,947,938	£37,233,108	£34,640,330
2008	£8,174,545	£7,123,643	£22,519,930	£19,624,818
2009	£22,341	£18,810	£38,285,931	£32,235,727
2010	n/a	n/a	£37,101,830	£30,182,363
2011	n/a	n/a	£40,458,926	£31,800,350
2012	n/a	n/a	£39,068,260	£29,668,888
2013	n/a	n/a	£53,562,517	£39,300,478
2014	n/a	n/a	£51,750,834	£36,687,140
2015	n/a	n/a	£49,939,150	£34,205,607
2016	n/a	n/a	£48,127,466	£31,849,953
2017	n/a	n/a	£46,315,782	£29,614,504
2018	n/a	n/a	£91,197,703	£56,340,281
Total (including to date)	£22,057,271	£20,090,392	£555,561,682	£406,150,437
Total (excluding to date)	£8,196,886	£7,142,453	£518,328,329	£371,510,109
Benefit to Cost Ratio (including to date)				1: 20.22

1.3 Employment impacts

While turnover captures one element of business growth, it is also appropriate to consider the generation of employment effects within the businesses. This is also measured as the net increase or maintenance of employment as a direct result of the programme and represents another key measure of company growth.

The employment impacts need to be considered on an annual basis, as they cover both safeguarded and created jobs and cannot therefore simply be aggregated. Over the period 2008-2018 the total potential number of jobs either safeguarded or created by the Commercialisation Programme amounts to:

- 444 net jobs in 2008
- 598 net jobs in 2009
- 325 net jobs in 2011
- 333 net jobs in 2013
- 337 net jobs in 2018

This indicates increasing employment to 2010 then a steady reduction as deadweight increases over time as companies become less reliant on Scottish Enterprise support. It should be noted that gross company projections continue on an upward curve. Full details are outlined in Table 1.3 below.

Employment Impacts of the Commercialisation Programme

Table 1.3

Year	Jobs
2008	444
2009	598
2010	579
2011	325
2012	314
2013	333
2014	320
2015	308
2016	296
2017	284
2018	337

1.4 GVA Impacts

An estimate of 'impact' is the ultimate effect of the project on the economy, or in this case its contribution towards economic growth. This is measured as the net increase in gross value added (GVA) accruing as a direct result of the programme.

The potential net GVA impact accruing over the period 2008-2018, could amount to **£108.5 million** (£78.9 million NPV). This could rise to **£118.9 million** (£88.6 million NPV) if the benefits realised to date are also included.

If sunk costs are considered of £21.7 million (£19.7 million NPV) and matched with all realised and potential benefits this could amount to a potential benefit to cost ratio of 1: 4.41. This could amount to a £4.41 return for every £1 invested in the Commercialisation programme by Scottish Enterprise. Full details are included in Table 1.4 below.

GVA Impacts of the Commercialisation Programme

Table 1.4

Year	Costs	Net Present Value (Discounted Costs)	GVA Impact	Net Present Value (Discounted GVA)
2004-2007	£13,860,385	£12,947,938	£10,384,159	£9,666,435
2008	£8,174,545	£7,123,643	£5,539,245	£4,827,132
2009	£22,341	£18,810	£10,158,380	£8,553,084
2010	n/a	n/a	£9,839,064	£8,004,085
2011	n/a	n/a	£8,820,557	£6,932,878
2012	n/a	n/a	£8,500,552	£6,455,417
2013	n/a	n/a	£11,091,411	£8,138,112
2014	n/a	n/a	£10,705,094	£7,589,042
2015	n/a	n/a	£10,318,777	£7,067,802
2016	n/a	n/a	£9,932,460	£6,573,136
2017	n/a	n/a	£9,546,143	£6,103,844
2018	n/a	n/a	£14,067,224	£8,690,475
Total (including to date)	£22,057,271	£20,090,392	£118,903,067	£88,601,442
Total (excluding to date)	£8,196,886	£7,142,453	£108,518,908	£78,935,007
Benefit to Cost Ratio (including to date)				1: 4.41

1.5 Conclusions

The potential net additional benefit that could be generated by the commercialisation programme over the period 2004-2018 could amount to:

- net turnover impact of **£555.6 million** (£406.1 million NPV)
- 337 net jobs in 2018
- net GVA impact of **£118.9million** (£88.6 million NPV)