# Evaluation of the GTI Business Connections Project

**Final Report for**

**Scottish Enterprise**

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# Evaluation of the GTI Business Connections Project

# Final Report for Scottish Enterprise

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# Executive Summary

## Introduction and Evaluation Methodology

The GTI Business Connections project ('the Business Connections project') was set up to pioneer a new model of academic public private enterprise interaction, based on building capacity for developing academic excellence with a strong industry interface to further support and deliver innovation in new businesses and in the existing business base. A particular emphasis was on lowering barriers around corporate interaction within the academic environment.

Frontline was commissioned to carry out an evaluation of the project to date, including assessment of economic impact. The evaluation included a review of key background documentation and monitoring reports, interviews with thirteen stakeholders associated with the delivery and management of the project as well as interviews with six companies who have participated on the project.

## Rationale, Inputs and Activities

The Business Connections project was set up to address a number of market failures evident across the life sciences company base including information deficit and lack of skills availability leading to risk aversion.

The project has a clear fit with the wider policy environment and the key aims and interventions associated with the Government Economic Strategy, Scottish Enterprise (SE) Business plan, Life Sciences Strategy and Industry Demand Statement. That said, the project is not mentioned in the interventions associated with the industry demand statement and the linkages between the project and wider commercialisation activity are less clear.

SE provided £1.5m of funding to the project over five years, with the University of Edinburgh contributions (both cash and 'in kind') bringing the total investment to over £2m. This excludes wider investment in recruitment and additional resources from other funding bodies suggesting a high degree of leverage resulting from the project.

There has been progress on targets, with generally strong performance on events but slower progress on collaborative research projects and new company formation. The value of the collaborative research projects, however, amounts to around £5m if using the agreed definition with Scottish Enterprise which covers all engagement with companies, including publicly funded engagements. This suggests substantial revenue generation by the project.

## Evaluation Evidence from Stakeholders

The stakeholders consulted were very positive about the project, how it was set up, managed and delivered.

The project was well set up based on clear market failure as well as opportunities around the genomics sector – characterised as opportunity meeting need. There was regular contact between SE and the Business Connections team. The project appears to have been well managed at a strategic level, with regular progress reporting and flexible systems in place.

The project delivery was more mixed with a small number of issues arising including underachievement of particular activities. This was explained by the challenge of

engaging with big pharma and SMEs, despite the resource to rectify this, and the loss and long-term vacancy around the business development manager, which will have limited follow-up opportunities around collaborative projects.

**Evaluation Evidence from Participants**

Business engagement with the project appears to have been very positive based on the six responses received in the business survey. Businesses largely found out about the project through word-of-mouth, and were satisfied with the application/selection process, and the subsequent delivery of the activities.

Benefits of engagement cover knowledge, capacity-building as well as commercial benefits suggesting businesses have gained a great deal from engagement with the project.

The knowledge benefits cited by businesses included:

- progress on wider understanding of the sector
- progress in relation to understanding barriers to entry
- increasing skills levels of staff

The wider capacity building benefits included:

- the development of new products/processes and services (innovation)
- wider innovation, including changes to marketing concepts or strategies (improvements in how the businesses are organised and managed)
- the generation of new sales and the long term potential for substantial revenue generation

It is therefore clear that the Business Connections project has improved capacity building, generated R&D to the value of over £5 million, increased high value staff numbers within DPM and helped to attract and retain talented individuals within Scotland.

Overall, businesses were generally positive about their involvement from initial engagement to their overall view on the Business Connections project. This suggests that the department has effectively delivered a range of activities to the companies and that it has been well received.

**Impact Assessment**

While GVA is an important outcome measure of SE activity, the Business Connections project pre dated the interest in GVA. It was therefore not a target area in the approval paper. We include the analysis here as it is now a standard element of evaluation practice and a key measure of project performance but highlight that it was not a specific target for the project.

Total net additional turnover generated, amounted to £954,450 (£853,124 NPV) – a SE cost benefit ratio of 1: 0.58. However, if potential future impacts are included this rises to £16.6m (£11.7m NPV) or a cost benefit ratio of 1: 8.53.

Total net additional GVA generated amounted to £198,885 (£154,324 NPV) – a SE cost benefit ratio of 1: 0.10. However, if potential future impacts are included this rises to £11.6m (£8.3m NPV) or a cost benefit ratio of 1: 5.70.

In total, 12 net additional jobs have been created to date, as a result of the Business Connections project, potentially rising to 18, if the companies grow in line with expectations.

This highlights strong initial progress made in the commercialisation space but also the long terms nature of the project, common across other similar commercialisation interventions.

**Conclusions and Recommendations**

The key evaluation conclusions are that the Business Connections project:

- had a clear rationale for activity and fit with the policy environment
- has made mixed progress in relation to targets – but generated research income of over £5 million from collaborations
- appears to have been well managed and delivered
- has generated a range of knowledge and wider capacity-building benefits in businesses as well as the generation of R&D income, the attraction and retention of talent within Scotland and facilitated the development of international networks

The key recommendations arising are focused on wider project delivery and include:

- running a lessons learned workshop to ensure the experiences of the project are captured
- a clearer articulation of what the project is expected to achieve
- articulating the assumptions around target setting and project delivery
- use of a clear monitoring and evaluation framework to track progress and capture the full value of the project

# 1 Introduction

The centre for Genomics Technology and Informatics (GTI), now Division of Pathway Medicine (DPM) in Edinburgh, is an important contributor to scientific research and knowledge for both society and the economy. Genomics is the study of genes and their function. Technology developed to enhance the ability to read these genes and interpret the various conditions in which they flourish is important to the future health of society and our economy, and is a major part of the post-genomic revolution in Scotland.

Genomic technology can help identify genes linked to various diseases and illnesses benefiting society and healthcare. This is one simple example of the potential provided by genomic technology providing some justification for the volume of financial investment attributed to this sector.

Pathway medicine is a pioneering new discipline that takes a systems level approach to the interplay between biological pathways within cells. The importance of pathway medicine has become increasingly important in the arena of drug discovery by taking an in-depth view of disease pathways, looking at what a drug is doing in a system, up-stream, downstream and examining off-target effects.

The big picture benefits are two-fold:

- healthier societies, with diseases being prevented and cured more effectively
- wealthier societies, through the commercial potential of medical discoveries

This win-win scenario makes the area ripe for investment and development, with DPM now leading the way in this field in Scotland.

## 1.1 Overview of DPM

The Division of Pathway Medicine is a research centre within the College of Medicine and Veterinary Medicine at the University of Edinburgh, conducting pioneering research programmes in:

- pathway biology of infection and immunity – the study of host-pathogen interaction in immune cells and the modelling of molecular pathways that control immune cell function in health and disease
- biochip medicine in systemic response to disease – the development of advanced biochip techniques and platforms for translating genomic and pathway research into clinical healthcare

This Division was formed in February 2007, following the success and growth of the GTI – a centre for world class post-genomic research. The decision to change the focus (and name) to DPM from GTI reflected the increasing growth and expansion of GTI and focus on pathway biology and biochip medicine and a move from a specific technology centre to a multidisciplinary research approach.

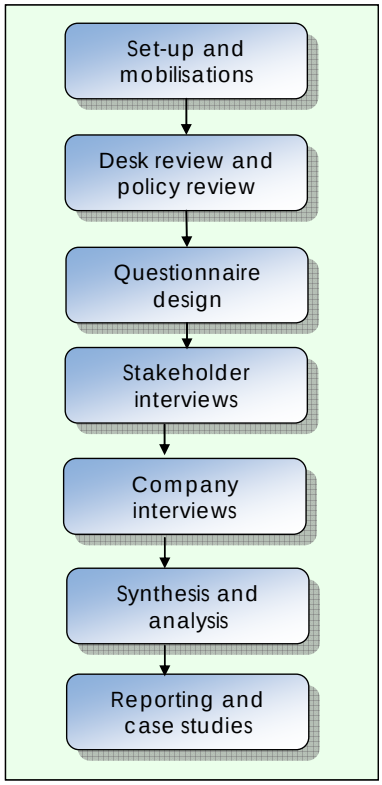
The overall aim of the GTI Business Connections project (the Business Connections project and the focus of this evaluation) is to maximise the economic impact of the "post-genomic revolution" in Scotland directly linking academic innovation with business enterprise. The Business Connections project was developed by the University of Edinburgh and SE Edinburgh and Lothian (SEEL) and was approved by SE in November 2003.

# 2 Evaluation Methodology

## 2.1 Our approach

Frontline's approach to this work has focused on developing a robust evaluation of the Business Connections project that meets best practice guidance in the Cabinet Office Magenta Book, HM Treasury Green Book, SE Economic Impact Assessment Guidance note and Department of Communities and Local Government 3R guidance.

The stages of the work are outlined below.




A wider range of background documentation was reviewed including:

- the Business Connections Business Plan
- monitoring reports
- quarterly reports
- the project approval paper and Gate 4 review papers
- filenotes and handover documents
- analysis of the impact of change report

In total, 13 key stakeholders were interviewed as part of the evaluation. This included staff within the Business Connections project, SE and the Intermediate Technology Institutes (ITIs). A full list of consultees is included in Appendix 4.

In total, 6 businesses who had engaged with the Business Connections project on collaborative research projects were interviewed as part of the evaluation. This was from an initial list of 14 companies supplied by the Business Connections team. However, further investigation of the list revealed that 4 of the companies had little involvement with the department, or were engaging on schemes funded by different

parts of the public sector. These four companies are therefore removed from the original list, giving a total available sample of 10 companies. This amounts to a survey response rate of 60%. The remaining four companies were all contacted on at least five occasions, with no response gained. Full details of companies contacted are included in Annex D.

In addition it was not possible to gather feedback from participants at events as a result of issues with data protection. Figures on the total number of attendees at events and unique companies attending events is included in Chapter 3.

The Business Connections business survey was also closely aligned with a wider review of the projects that make up the SE commercialisation programme, which includes Business Connections. This wider strategic evaluation was looking at key factors around company development, use of intellectual property, delivery of projects and economic impacts (looking at results achieved to date and potential future benefits). The Business Connections companies were asked some specific questions around the project but were also asked the wider commercialisation review questions for completeness and to avoid making two contacts to cover similar information.

# 3 Rationale, Inputs and Activities

## 3.1 Rationale for the Business Connections project

The aim of the Business Connections project was to maximise the economic impact of the 'post-genomic revolution' in Scotland, directly linking academic innovation with business enterprise. The objectives of the project were to:

- capitalise on high growth opportunities in Scotland in post-genomic markets
- address the current information deficit in the local economy
- lower barriers to entry to this new science and technology

The project approval paper[1] suggests that there were four broad market failures requiring either mitigation or removal:

- risk aversion – based on the lengthy time to market and significant level of up front investment in new high cost technology which limits company activity
- skills availability – a lack of staff with the specialist skills and knowledge to operate effectively in the field
- information deficit – based on companies wanting to increase their knowledge of the sector in Life Sciences
- scale and institutional barriers – small and medium sized enterprises not having access to the specialist equipment to operate effectively in the market

These four failures are better articulated as revolving around imperfect information, as well as scale barriers. The imperfect information, as well as a lack of knowledgeable people on the sector, leads to risk aversion amongst the company base.

Imperfect information is about more than a simple lack of understanding of the process, costs or benefits of working in the sector. They actually reflect (under each of the main drivers of the failure):

Information deficit:

- is there demand for the information?
- is the information available?
- is the information easily accessible?
- does the market supply the information?

Skills availability:

- are individuals able to process the information?

Risk aversion:

- what information is required to make decisions?
- what are the costs and benefits of supplying the information?
- is the perception of cost and benefits different from the actual costs and benefits?
- what are the costs of acquiring the information?
- what are the benefits of acquiring the information?

[1] *GTI Commercialisation Project in Biotechnology, For Approval September 2003*

Early market research with 19 Life Sciences companies in the set up of the Business Connections project suggested that there was a demand for the information with a particular interest in increasing knowledge in the post genomics (and proteomics) field. Discussions with the Business Connections team suggested that while there was demand for information, they were the only real provider of up to date intelligence and activity in the sector. Without their input, the market would not supply the information (or expertise) needed to operate effectively in the sector. Without a provider, the information would not be readily available without specialist staff skills.

Discussions with the Business Connections team suggested that companies do not have the specialist staff who would be needed to operate effectively in the field. Without appropriate people, they do not have the time to understand the science, and lack the vital understanding on the application of the technology to the market and are unaware of potential opportunities in the sector.

Survey evidence from the companies who have engaged with the Business Connections project showed:

- the companies generally understood the opportunities
- there was less of an understanding of the market and barriers to entry

The implication is that companies generally had an appreciation of the opportunities in the genomics market, but there was a lower understanding of the market itself and the barriers to entry or operation. These companies who have engaged directly with the Business Connections project may be further up the knowledge curve than other companies. This suggests that there is a degree of imperfect information and a shortage of people with the knowledge and skills to maximise opportunities in the sector. Wider research would really be needed to test this further, as the current evidence suggests there is a reasonable degree of knowledge.

The consultation also suggested a lack of knowledge and specialist staff leading to sub-optimal outcomes – in this case risk aversion. Risk aversion is therefore not the market failure, but one of the outcomes of the market failure.

The implication is that there does appear to have been an initial market failure with a general lack of knowledge on the genomics market reducing activity and limiting the potential of Scottish companies to maximise the potential of the sector.

## 3.2 Business Connections project inputs

The total SE input to the Business Connections project amounted to £1,575,000. The University of Edinburgh has provided wider contributions to a value of around £444,000. This is therefore a total level of funding of around £2.1 million over a 5 year period. This does not include the full final expenditure as the project is still running, and wider university contributions, such as office and lab space. It therefore represents the broad level of funding.

These values suggest that SE funding has levered in a further £0.28 for every £1 committed. This represents leverage of just under one third of the SE investment in the GTI business connection project but excludes wider university contributions that have not been costed. This will therefore represent an undercount of leverage.

Full details are included in table 3.1 below.

**Funding contribution** **Table 3.1**

| Contribution | Year 1 (Sep 04 – Aug 05) | Year 2 (Sep 05 – Aug 06) | Year 3 (Sep 06 – Aug 07) | Year 4 (Sep 07 – Aug 08) | Year 5 (Sep 08 – Aug 09) |
|---|---|---|---|---|---|
| Scottish Enterprise | £339,000 | £344,000 | £329,000 | £309,000 | £254,000 |
| University of Edinburgh | £38,500 | £0 | £0 | £0 | £0 |
| University of Edinburgh ('in kind') | £91,726 | £127,188 | £85,221 | £101,092 | n/a |
| **Total Funding** | **£469,226** | **£471,188** | **£414,221** | **£410,092** | **254,000** |
| Total SE Contribution | | | | | £1,575,000 |
| Total University of Edinburgh Contribution | | | | | £444,000 |
| **Total Funding** | | | | | **£2,019,000** |

Note: n/a – No data is available on 'in kind' contributions in year 5 at the time of the evaluation

## 3.3 Business Connection activities

The project is comprised of three integrated components, all aimed at raising awareness and generating specific new business opportunities in post-genomic biotechnology. These are:

- business development and training through a programme of events
- support for commercial collaborative research
- assistance in the creation and development of high-growth companies

In integrating these activities, the Business Connections project aims to act as a catalyst for innovation, bringing people together to provide the environment for generating new products, processes and enterprises for the post-genomic era.

### *3.3.1 Business development and training through a programme of events*

To raise the Scottish and UK biotechnology cluster's awareness of the opportunities in post-genomics, the following programme of activities were carried out:

- discussion dinners/workshops – the aim was to have a maximum of 18 delegates by invitation to a one day plus interactive discussion on future directions for science, technology and business
- conferences – 100 to 150 delegates. Conferences were to include a programme of invited speakers and trade standards
- seminars – 30 to 50 attendees. Seminars were to last for about 2 hours with up to 4 speakers followed by discussion
- training courses – 12 to 20 participants per course. Training is delivered by companies wanting to retrain or explain new technologies to the sector

In the first four years of operation, a total of 39 events were delivered by the Business Connections team, with most taking place in year 3. This is to be expected, given the need to generate interest and to build up a list of appropriate companies and organisations to invite or market to. A full breakdown is illustrated in Table 3.2 below.

**Events activities delivered** **Table 3.2**

| Activity | Year 1 (Sep 04 – Aug 05) | Year 2 (Sep 05 – Aug 06) | Year 3 (Sep 06 – Aug 07) | Year 4 (Sep 07 – Aug 08) |
|---|---|---|---|---|
| Discussion dinners/workshops | 1 | 2 | 4 | 2 |
| Conference | 1 | 2 | 2 | 2 |
| Seminars | 4 | 3 | 7 | 6 |
| Training courses | 0 | 2 | 1 | - |

### 3.3.2 *Commercial collaborative research*

This component focused on providing a mechanism for more specific, in-depth engagement between the Business Connections project and a collaborating company. The size of each engagement is highlighted in table 3.3 below.

**Collaborative research projects** **Table 3.3**

| Scale | Funding | Description |
|---|---|---|
| Pilot scale | £2,000 to £10,000 | Pilot scale projects, new company support and industrial studentships |
| Small Biotech | £10,000 to £100,000 | Collaborative research projects for new biotechnology collaborators |
| Major Biotech | £100,000 to £250,000 | Collaborative research projects with pharmaceutical and larger biotechnology companies |
| Strategic Bio/Pharma Deal | > £250,000 | Major Collaborative projects |

In total, 14 collaborative research projects have been delivered. This rises to 22 if 'in kind' projects are also included. In kind contributions represent projects where there was not a direct monetary transaction for project delivery, but could represent staff time or use of equipment. Progress was greatest in year 2, when 6 projects were delivered, including 1 strategic biopharma project, with a similar level of performance in year 3. Again, this pattern is to be expected given the lead-in times for companies to develop projects and then go on to deliver them in collaboration with an academic department. Progress is outlined in more detail in Table 3.4 below.

**Collaborative research projects delivered** **Table 3.4**

| Scale | Year 1 (Sep 04 – Aug 05) | Year 2 (Sep 05 – Aug 06) | Year 3 (Sep 06 – Aug 07) | Year 4 (Sep 07 – Aug 08) |
|---|---|---|---|---|
| Pilot scale (£2-10k) | 1 | 2 | 2 | 0 |
| Small Biotech (£10-100k) | 0 | 3 | 1 | 2 |
| Major Biotech (100k-250k) | 0 | 0 | 2 | 0 |
| Strategic Bio/Pharma Deal(£250k+) | 0 | 1 | 0 | 0 |

The income generated from collaborative research projects also needs to be considered to put a sense of scale on the activity generated to date. This can be drawn out in two ways:

- the agreed definition with Scottish Enterprise, which covers all engagement with companies, including publicly funded engagements
- a more narrow definition, which excludes publicly funded projects regardless of industrial involvement

Using the agreed definition of research income (which includes publically funded projects with industrial partners) the total value of collaborative research projects amounted to £5.4m. This is more than twice the total funding of the project, and suggests that the department has developed strong skills in engaging with wider public sector support to engage with businesses as well as businesses themselves.

Using a more narrow definition (excluding all publicly funded projects regardless of industrial involvement) of research income, the total value of collaborative research projects amounts to £1.1m of R&D income. This is a substantial benefit in its own right, and has been helping to incentivise R&D in the genomics area.

In addition, there has been wider activity by the Business Connections team that may lead to further project activity in the future. A review of the quarterly reports suggests that there have been discussions with around 14 additional companies around projects. These may in time become more formalised projects. The implication is that more benefit could still be realised as a result of the Business Connections project.

### *3.3.3 Creation and development of high growth companies*

The third component of the project focuses on offering specific support to high growth companies in post-genomic technologies, both by support of existing biotech or non-biotech companies and by assisting the creation of new ventures.

Two new businesses have been created through the Business Connections project. One in year 3 and the other, in year 4. This reflects the time it takes to develop a business and successfully negotiate legal issues. It also suggests that it is possible for the Business Connections project to be delivering outcomes that relate to the funding period, up to two or three years after the end of project funding. This is an area that the department will need to track to ensure all business creation is appropriately attributed to the department.

### *3.3.4 Progress towards targets*

This section has so far focused on activities delivered per annum. We now consider the extent to which the delivery of these activities has resulted in the achievement of key targets set for the Business Connections project.

Taking collaborative research projects first – it is clear there has been mixed performance, with:

- overachievement in relation to projects worth between £10-100k
- achievement of the target for projects worth over £250k
- underachievement of the target for projects worth between £2-10k
- underachievement of the target for projects worth between £100 and £250k
- overall underachievement on the total number of projects to be delivered

Again, this assessment of projects related to activity to date. The review of quarterly reports suggest that as many as 14 additional companies have been in discussion with the Business Connections team about projects, some of which may come to fruition, aiding progress towards targets.

Furthermore, the research income generated using the agreed definition amounts to as much as £5.4m. Even taking the more narrow secondary definition, the projects would still have generated around £1.1m – a substantial benefit in its own right.

**Progress towards collaborative research projects** **Table 3.5**

| Project Value | Target | Achieved | Achieved (including 'in kind') | % Achieved (including 'in kind') |
|---|---|---|---|---|
| £2-10k | 18 | 5 | 8 | 44% |
| £10-100k | 7 | 6 | 10 | 143% |
| £100-250k | 5 | 2 | 2 | 40% |
| £250k+ | 2 | 1 | 2 | 100% |
| **Total** | **32** | **14** | **22** | **69%** |

Moving on to look at progress towards targets in relation to events, it is clear that there has been better performance, with:

- overachievement on the target to deliver seminars
- overachievement on the target to deliver conferences (though this actually represents 1 more conference delivered than the target)
- underachievement on the delivery of workshops
- overall overachievement in relation to the total number of events delivered (excluding training events)

**Progress towards event targets** **Table 3.6**

| Event | Target | Achieved | % Achievement |
|---|---|---|---|
| Seminars | 15 | 20 | 133% |
| Workshops | 14 | 9 | 64% |
| *Training* | 17 | 3 | 18% |
| Conferences | 6 | 7 | 11% |
| **Total** | 35 | 36 | 103% |

Note: training is not included in overall progress towards targets as this was removed from the target list for the Business Connections project after discussions with SEEL

Progress towards event targets have generally been strong. This is further highlighted when the scale of participation is assessed, as outlined in Table 3.7 overleaf. Overall there have been 713 attendees at the events ran (which includes seminars, workshops, training and conferences) as part of the Business Connections project amounting to 230 unique companies (there were frequently multiple attendees from the same company). This highlights substantial engagement and reach through the project.

**Attendance at Events** **Table 3.7**

| | Total |
|---|---|
| Attendees at events | 713 |
| Unique companies | 230 |

The final target area centres on new business creation. Overall progress towards this target has been slower than anticipated, though the stakeholders all agreed that the initial target set was unrealistic. However, in total two new companies were created from a target of seven, representing 29% achievement of the target.

There has been some mixed progress in relation to progress towards targets, with generally solid performance in relation to events, but weaker than anticipated progress in new firm creation and collaborative research projects (even when 'in kind' contributions are counted). There is a file note outlining the potential for slippage in targets due to the loss of the business development manager and progress to date appears to reflect this. In addition, the progress figures do not include the data for the final year of this project, which may bring some areas more in line with expectations.

It is therefore challenging to understand what the Business Connections project has achieved based on targets, with a need for a wider review of progress on areas such as business satisfaction, improved knowledge amongst the business base, improved practice and more traditional economic impact and value for money measures.

## 3.4 Fit with strategy

The key Business Connections objectives at the time of approval include:

- growing the number of new high growth businesses
- increasing the competitiveness and calibre of established businesses
- enhancing the skill base within the Biotechnology sector in Scotland

The development of this integrated approach fits in well with the aim of increasing the profile of the Scottish Life Sciences sector as well as increasing the scope of activities within the Life Sciences community in Scotland. Below we look at how the Business Connections project fits with the innovation priorities of both the Scottish Government and Scottish Enterprise.

### *3.4.1 Fit with the Government Economic Strategy*

At project inception, the approval paper suggested that there was a strong degree of fit with the key policy priorities at the time, including compliance with:

- SE Biotech Framework for Action 2000
- A strategy for Scottish Science 2001
- Smart Successful Scotland
- SE Edinburgh and Lothian Biotech Action Plan 2003/2004

Looking at the present time, the Business Connections projects fit with the Government Economic Strategy is clearly strongest in relation to innovation given its focus on increasing the commercialisation of research and innovation by providing more links between Universities and businesses. The strategy states that:

> *"Innovation – developing new processes, products and markets, often through incremental change – is vital across all sectors. Increasing the level of research & development (R&D) activity and knowledge transfer between the research community and industry are key drivers of innovative activity, particularly in science and technology related sectors, helping to boost productivity and sustainable growth."*[2]

The Business Connections project lowers the barriers to commercialisation of research from the science base. It brings academic and industrial researchers together, thus addressing the deficiencies in the appreciation of the commercial opportunities of post genomics and high throughput technologies. This therefore creates a strong environment for innovation.

[2] Scottish Executive (2007), The Government Economic Strategy

The Government economic strategy also makes clear the importance of key sectors to the economy:

> *"To expand Scotland's areas of international comparative advantage, we will give particular attention to building a critical mass of activity in the following key sectors, with government helping to create the right environment for their competitiveness and growth."*[3]

The Life Sciences sector (including biotechnology and translational medicine) is one of the sectors highlighted, further reinforcing the fit with strategy. The Business Connections project therefore operates in a key government priority sector and facilitates and drives innovation in line with key government priorities.

### 3.4.2 Fit with the SE Business Plan

Innovation is a key theme in SE's remit as Scotland's main enterprise, innovation and investment agency. One of the main areas of focus within the SE Business Plan is to develop closer links between the research base and companies.

> "*We will work with growth businesses to stimulate greater demand for knowledge, technology and people from our academic institutions and facilitate greater 'knowledge transfer' between academia and industry. Our emphasis will be on promoting increased commercialisation opportunities that will contribute directly to increased sustainable economic growth.*"[4]

As this is also the main focus of the Business Connections project, it is therefore closely aligned with the SE Business Plan.

### 3.4.3 Fit with Life Sciences Strategy

The Life Sciences Strategy 2008 focuses on five key result areas for delivering the 2020 vision for life sciences in Scotland:

- people – having the right skill mix, calibre and numbers to meet sectoral employment requirements, based on attracting, retaining and developing talent
- technology – an environment conducive to developing the knowledge base and exploiting the transfer of technology between academia and business
- capital – access to funding appropriate to organisational needs throughout their growth cycle
- infrastructure – having the right facilities and assets to meet the needs of a growing sector
- collaboration – working effectively to connect across organisational boundaries and align resources behind priority areas

The Business Connections project focuses on correcting the information deficiency by raising awareness of post genomic technologies and creating an environment for innovation. The business development and training objective of the project fits with areas of 'people' and 'technology' by focusing on improving the understanding of the Scottish biotechnology cluster of the opportunities in post genomics and high throughput technology. In addition, there has been the recruitment of a number of DPM staff from abroad highlighting the people attraction and retention element of the strategy.

[3] Scottish Executive (2007), The Government Economic Strategy

[4] SE(2008), SE Business Plan 2008-11

The collaborative research objective also fits with both the 'capital' and 'collaboration' areas of the strategy as the Business Connections project engages in a range of collaborative research projects with industry, with the anticipation these will be funded by industrial partners who will provide support from £2,000 to over £250,000 depending on the activity.

### 3.4.4 Fit with Life Sciences Industry Demand Statement

The Business Connections project also has a degree of crossover with the Life Sciences Industry Demand Statement[5]. This statement articulates the key issues and opportunities for Scotland, SE's focus and key outcome measures.

There is closest fit with the project in relation to the key areas of focus outlined by Scottish Enterprise:

- working to anchor and grow existing companies of scale while attracting new companies to Scotland
- stimulating the attraction and creation of new SMEs and supporting the growth of existing SMEs

This is best encapsulated in the concept of smarter working with the research base to capitalise on deriving economic benefit and impact from IP through the creation of high value sustainable companies. The Business Connections focus on academic industry collaboration and new business creation suggests a degree of linkage between the activities of the project and the focus of the Industry Demand Statement. However, despite clear crossover the Business Connections project is not identified in the intervention element of the statement.

### 3.4.5 Contribution to other SE activities

The Business Connections project is not a stand alone project within SE. It represents one of a number of interventions in the commercialisation space.

At a strategic level the Business Connections project has played an important part in developing a wider context for investment in commercialisation activity within Edinburgh University. It has contributed to developing a culture shift and appetite for change and laid the ground for further investment including the Prospekt project and large scale investment in the BioQuarter.

At an operational level there did not appear to be any formal mechanism for linking companies who engage with the Business Connections project to wider commercialisation support, though DPM staff did try to encourage wider linkages informally through events and seminars. For example, the Business Connection project hosted 'Commercialising Life Sciences and the Edinburgh Bioquarter', which highlighted SE offerings.

This may have helped contribute to four of the Business Connections companies engaging with wider projects delivered by SE and Scottish Government including:

- SMART and SPUR delivered by Scottish Government (now transferring to Scottish Enterprise)
- Scottish Co Investment Fund, R&D Plus, Edinburgh Stamford Link and the Venture Fund delivered by SE

[5] SE(2008) *Life Sciences: Industry Demand Statement – Latest Version – 21/11/08*

The remainder were larger global companies who would be ineligible for support or unable to access support as they are based outside of Scotland.

The lack of direct formal linkages between commercialisation projects is a common finding across the whole commercialisation programme[6], with little evidence of flows between or across projects. The Business Connections project has therefore generated some success in this area despite the lack of a formal mechanism.

### *3.4.6 Contribution to the Intermediate Technology Institutes Agenda*

The Business Connection project has also made a contribution to the ITI agenda (now also transferred to SE).

The ITIs were set up to drive Scotland's ambitious plans to identify and commercialise valuable technology based intellectual assets across three global market sectors:

- life sciences
- digital media and communications
- energy

The Business Connections team has worked with both the Techmedia and Life Sciences ITIs though their engagement has been strongest with Techmedia, where they collaborated with Axis Shield, Haptogen and Lab 901 on the Biosensors R&D programme. Specifically the discussions with Techmedia highlighted that if the Business Connections project had not had an understanding of the fundamental research, the likelihood of this project happening in Scotland would have been dramatically reduced.

Techmedia also indicated that they were currently looking at the potential to license a platform technology to be used in a potential spin out company directly form the outputs of the project. At the time of the interview with the ITI consultee no commercialisation plan had been submitted. Wider consultation with the Business Connections team suggests that a commercialisation plan is currently in development (as at April 2009). This plan will build on the unique strengths of DPM and the identification of a large market with unmet critical needs. There have also been discussions with the BioQuarter team around space for the company to be located and wider discussions with the University of Edinburgh and lawyers around licensing technology, company structure and strategy.

There has also been some wider engagement with the Life Sciences ITI. This has focused on areas of mutual interest around events, seminars as learning from each other as well as the creation of increased networks of contacts for the ITI.

While this shows a high degree of alignment of activity, the research programmes are contractual programmes that can be delivered by a range of private sector and university based research departments. Engagement therefore appears to represent commercial opportunity as well as Business Connections objectives. This does show that the Business Connections team have developed the ability to win commercial contracts that require collaboration with businesses suggesting that the SE investment has helped to build capacity in line with initial expectations. The joint activity on events also appears to be a further good example of looking at wider company engagement.

[6] Frontline Consultants (2008) *Scottish Enterprise Commercialisation Programme Evaluation: Working Paper 1, Company Engagement with the Commercialisation Programme*, Scottish Enterprise

# 4 Evaluation Evidence from Stakeholders

## 4.1 Project set up

The Business Connections project arose out of a desire to enable the development of an integrated, interlinked commercialisation model in the biotechnology sector. The project was a key component of the SE Edinburgh and Lothian 2003/2004 action plan and looked to build on the:

- expertise of the GTI research centre, located within the medical school at the University of Edinburgh
- the emerging commercial opportunities in the genomic market

The project was therefore set up to build on a key intellectual asset within the Scottish university sector, overcome a series of market failures around the genomics market and in doing so, to capitalise on the significant and emerging market in the genomic and proteomics sector. It can therefore be described as a project where opportunity met need, where these was scope to not only correct market failure, but also to improve company (and by definition economic) performance as well.

There was a clear options appraisal associated with the funding supported by market research in the sector looking at the issues and demand amongst the Scottish company base. It could be argued that a more detailed market failure assessment should have been conducted, though the assessment for the evaluation suggests the broad assessment was right. The evidence presented in the approval paper didn't cite much evidence around failures, but presented a series of statements with no source to back up the claims. By developing a more detailed and evidence based market failure it would help to drive up standards in project approval and ensure that funding was allocated based on clear and robust evidence.

The project set up included scope for regular contact between SE and the Business Connections team. This included quarterly reporting on project progress, issues and spend, linked with key invoicing points. In addition, the Business Connections project was being monitored within the university through monthly management meetings (of which the Business Connections project was part) and weekly internal Business Connections project meetings. The Business Connection team also appointed a chief operating officer who ensured management and reporting mechanisms were being followed up and used effectively.

At an operational level, activities were defined in a business plan submitted to SE with full activity targets and expected spend. The business plan articulated what the activities were likely to include and set clear and transparent targets for each of the activity strands.

The consultations and review of key documentation therefore suggested that appropriate systems were put in place at project set up to ensure regular monitoring of activities, spend and progress towards targets.

## 4.2 Project management

The management of the project was perceived positively by all key stakeholders and there is a clear trail of monitoring and review documentation.

The formal reporting process appeared to work well with the Business Connections

team submitting quarterly reports and then meeting with Scottish Enterprise to discuss these reports.

As the project progressed, it was clear though, that the existing monitoring arrangements were not fully capturing the 'in kind' contributions and wider value being generated by the department. This meant that key activity was not being fully measured and later reports started to articulate the scale and frequency of these 'in kind' contributions. This suggests that while there was a clear system in place it was being monitored and reviewed over time to ensure it remained fit for purpose. There were also attempts made to try to capture some of the softer engagements with companies, either at the start up or existing business stage. Much of this work involved ad hoc advice and support which was not being fully captured in the formal reporting of progress towards targets. There were also issues in gaining access to company details as a result of data protection issues, even though full records were kept by the Business Connections team.

The consultations suggested that there was some confusion over the engagement with companies, with a number of companies stating that they had no real relationship with the Business Connections project – even when prompted for GTI, DPM, University of Edinburgh and even Peter Ghazal. Some companies were also engaging on other publicly funded interventions and therefore any issues or benefits could not be attributed to the SE investment. This is a limitation in monitoring that doesn't appear to have been picked up by either the Business Connections team or SE until the point of evaluation.

There is an implication that while the systems and project management arrangements were set up well, and were flexible enough to be updated and refined over time there were some gaps. This suggests that there was a need for a more formal project monitoring and evaluation framework that would have ensured these systems were in place and that key feedback and value was not lost.

## 4.3 Project delivery

Consultations with stakeholders and the Business Connections team suggested that the project was well delivered, though there was mixed progress against targets. In particular:

- progress on events has been solid
- delivery of collaborative research projects has been lower than expected
- delivery on start ups has been lower than expected

In addition, companies were largely satisfied with their engagement with the Business Connections project and rated the initial contact, project management, quality of advice and guidance and overall satisfaction well. This is the acid test of the delivery and no company reported any problems, but instead were generally positive about the engagement.

There has therefore been mixed progress on achieving the targets set but positive feedback in relation to the businesses who have engaged with the project. However, there are five important issues that came out of the consultations around the delivery of the project:

- the importance of Peter Ghazal in driving activity
- the challenges of engaging with SMEs

- the challenge of engaging with Big Pharma
- the lost opportunity around staff turnover

Taking the most important issues first, it was apparent from the consultations that Peter Ghazal, the founding director of GTI (and now DPM), is the key to the successful operation of the project. This is not to belittle the achievement of the whole Business Connections team, who have delivered a range of activities and generated positive feedback from businesses and stakeholders. All consultees suggested that Peter has been the real driving force behind the Business Connections project. His academic expertise combined with a strong entrepreneurial focus and desire to grow the department has seen him personally engage in new business creation at Lab 901 (before the Business Connection Project in 2002), Arrayjet and Fios Genomics. The strong implication is that the Business Connections project would not be the same without Peter.

Given that the traditional academic focus has been on research rather than commercial potential the funding has ensured that the team can be developed along more commercial lines in line with Scottish Government and SE priorities. The key issue is that funding another department on a similar basis may not generate the same results as the department head may not share the same enthusiasm for blending the science with a commercial focus.

Consultations with key stakeholders, and the Business Connections team, suggested that there are a number of delivery challenges that have been faced in engaging with SMEs. The consultees suggested that:

- the limited budget of SMEs limits their potential to engage with academic departments
- there is a need to carry out a wide range of activities and commit a significant amount of effort to generate modest benefits

While the Business Connections project is about overcoming these scale barriers, it is not as simple as inviting them to attend events and then following up with proposals for further activity. Spending on university delivered research is not an impulse purchase, it takes time. The Business Connections team, in particular, noted that this is a slow process and how it has limited their potential to deliver more activity. There was also a suggestion from some stakeholders that while strong networks were being built these were not always leading to more structured follow up activity. This is neither a criticism of the Business Connections project, nor the staff within it. It is a recognition of the long lead-in times to engaging businesses and the challenges faced in doing so.

In addition to the challenges of engaging with SMEs, there has been the challenge of engaging with big pharma. The Business Connections team suggested that companies didn't always understand why they would have a day to day interaction with the department and then a contractual relationship with Edinburgh Research and Innovation Ltd (the University of Edinburgh's wholly owned knowledge transfer company – ERI). This had caused some confusion, and added a layer of complexity to the engagements.

There was also the ongoing difficulty of speaking with the right people in industry and getting them to commit to real projects rather than just potential activities.

These latter two points represent structural issues to the Business Connections. The project was funded to try to overcome these issues, but even with resourcing and a focus on addressing these challenges, the issues still remain. They therefore represent

key lessons that need to be learned when delivering activity in this area.

The consultations also suggested that there were delivery issues caused by the staff turnover within the project, notably though the loss and long term vacancy arising around the Business Development manager post – predominately due to the need for a change in focus required of the role as the project has developed. This lack of staff resources meant there was a loss of momentum and relationship building at the mid point of the project. This resulted in the strong network developed by the business development manager being partially disrupted in the transition to a new staff member, which ultimately took the best part of a year. This has clearly been a brake on activity and may help to explain some of the areas where progress towards targets has not been as rapid as had been expected.

While these represent some issues, and potential learning points, around the delivery of the project, the overall view was one of good progress in a challenging area. Stakeholders were generally positive that the project delivered most of what it was set up to do and was a useful asset in the process of encouraging engagement between the company base and academia.

# 5 Evaluation Evidence from Participants

A survey was carried out with six of the ten companies who had engaged with the department on collaborative research projects. As stated earlier this analysis only covers those who participated in the survey, with a small number of companies not taking part. It also excluded the companies who had attended the large number of events hosted by the Business Connections team. As stated earlier, no direct contact details were shared for these companies due to data protection issues and therefore it was not possible to include them in the evaluation.

The survey of the six companies looked at the characteristics of those companies, engagement with the Business Connections project, business benefits and impacts.

## 5.1 Company characteristics

A key part of the survey was understanding the nature and types of businesses who were working with the department, looking at their size, sector, technology focus (or areas), age and business stage.

The companies were all private limited and generally fell within the medium to large category in terms of size with:

- 2 being large (250+ employees)
- 2 being medium sized (50-249 employees)
- 1 being a micro business (less than 10 staff) and 1 a small business (between 10 and 49 staff)

The businesses were generally operating in more than one genomics sector area with:

- 3 companies working in diagnostics
- 3 companies working in profiling equipment
- 2 companies working in drug discovery
- 2 companies working in bioinformatics

The businesses were also operating in SE priority industries, largely covering life sciences, with one firm having an enabling technology focus.

There is a strong implication that the businesses are focused on the Life Sciences sector with a strong engagement with some of the specific sub sectors of the Genomics market. The crossover in sector and technology focus suggests that the Business Connections project has engaged with businesses looking at developing in the Life Sciences field or in using life sciences processes across other product/process or service areas.

The companies were all incorporated businesses and all but one has been trading for at least three years, the exception being less than a year old. While this gives an indication of the age of the company it doesn't say much about what stage of company development the businesses are at.

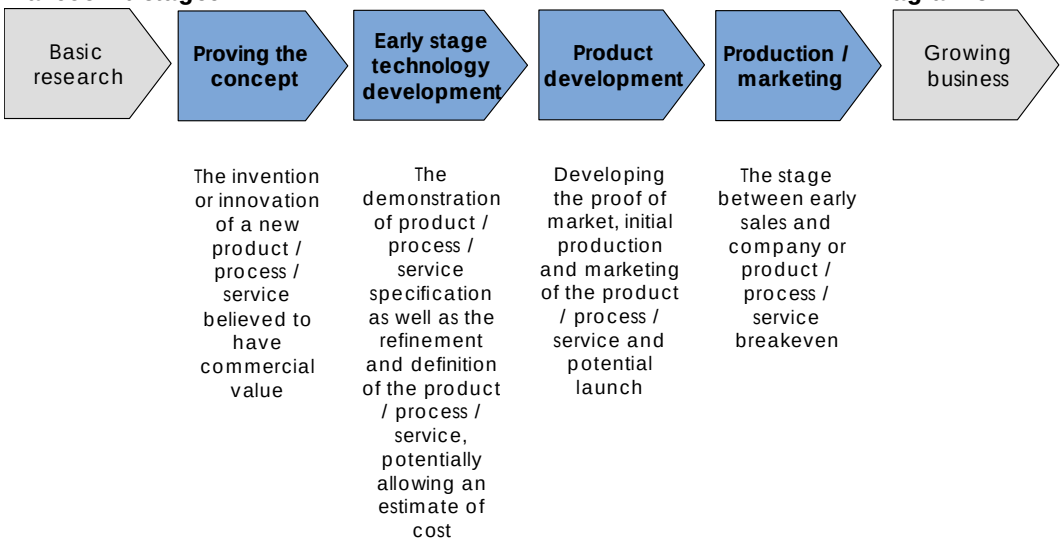
We can understand the stage of growth using the Branscomb model for company development. This model suggests that there are five broad stages of company growth from the generation of an idea with commercial potential to a growing business maximising sales, past breakeven and generating profit. While this model is not perfect, with the definitions between different stages being blurred and

companies frequently working on different elements of different stages simultaneously it does provide useful information on progress to market and highlights the differences in the businesses. It has also been the preferred model for the wider review of commercialisation projects and has therefore been used here for consistency. Using this model:

- 4 of the businesses are early stage technology development companies. This means that they are at the stage of demonstrating product/process/service specification as well as the refinement and definition of the product/process/service potentially allowing for an estimate of cost
- 1 is in the production marketing stage. This means that the company has launched its product/process/service and is in the stage between early company sales and financial breakeven
- 1 is in the growing business stage. This means that the company is maximising sales revenue, has reached breakeven and is generating profit

The Branscomb model is outlined in Diagram 5.1 below.

**Branscomb Stages** **Diagram 5.1**




## 5.2 Business Connections engagement

### *5.2.1 Engagement with the Business Connections project*

All six companies found out about the Business Connections support through word-of-mouth – in some cases, as a result of Business Connections staff being involved in company formation, or through more general engagement in the Genomics market (where the GTI/DPM was a customer, potential customer or collaborator).

The informal nature of the early engagement with the Business Connections project was not viewed as being a problem, 4 companies rated the promotion of the project as very good. One company felt the promotion was neither good nor bad, and just one suggested the promotion was poor.

The early engagement was also viewed positively in terms of ease of engagement. Two companies rated the process as very straightforward; with a further rating it is straightforward. Only one company felt the process was bureaucratic while another

felt it was neither straightforward nor bureaucratic.

All but one company stated that they were working with the Business Connections project because the support was appropriate to their needs with one company suggesting the quality of service was the main reason for engagement. The particular expertise offered by the department was perceived as being a major attraction.

The six surveyed companies had engaged with a range of the core activities delivered through the Business Connections project. The core activities included:

- business development and training through a programme of events
- commercial collaborative research
- creation and development of high growth companies

The main business development and training activities attended by the surveyed companies included:

- discussion dinner/workshops, attended by two companies
- seminars, attended by two companies
- 1 company each either attending conferences, training or receiving the newsletter

The commercial collaborative research carried out was split by scale of the interaction. The activities involved:

- 4 companies participating in a pilot scale project
- 2 companies participating in a small biotech project
- 1 company participating in a major biotech project

The creation and development of high growth company support was also being used by the companies who were engaging with the Business Connections project. This included:

- 3 companies who were receiving support to existing companies
- 3 companies who were receiving start up support

There is a clear implication that the companies are engaging with the Business Connections project in a range of ways, with all taking part in the collaborative research projects but also attending the business development programme and engaging on the wider start up or existing company support. This would suggest that there is a depth to the engagement that is more than simply attending events or doing a project. It is a broader engagement with academia in company development around the genomics market which fits closely with what the Business Connections project was looking to achieve.

### *5.2.2 Company views on support*

Companies seemed to value the ongoing engagement with the Business Connections project, anchored by the commercial collaborative research when asked what the most valuable support offered was. This implies the package and ongoing relationship building offered by the Business Connections project is valued most by the companies.

The support received was generally perceived to be good. All but one company rated the project management as being good, with one suggesting it was neither

good nor weak.

The quality of support was also seen to be good with 1 company rating the quality of advice as very good, while four other companies rated it as good. Again, one company was ambivalent, suggesting the advice was neither good nor weak.

Overall satisfaction with the Business Connections project was relatively high, with four companies suggesting they were fairly satisfied, while two stated that they were very satisfied.

The companies were generally positive about their engagement from initial engagement to their overall view on the Business Connections project. This suggests that the department has effectively delivered a range of activities to the companies and that it has been well received.

## 5.3 Benefits of engagement

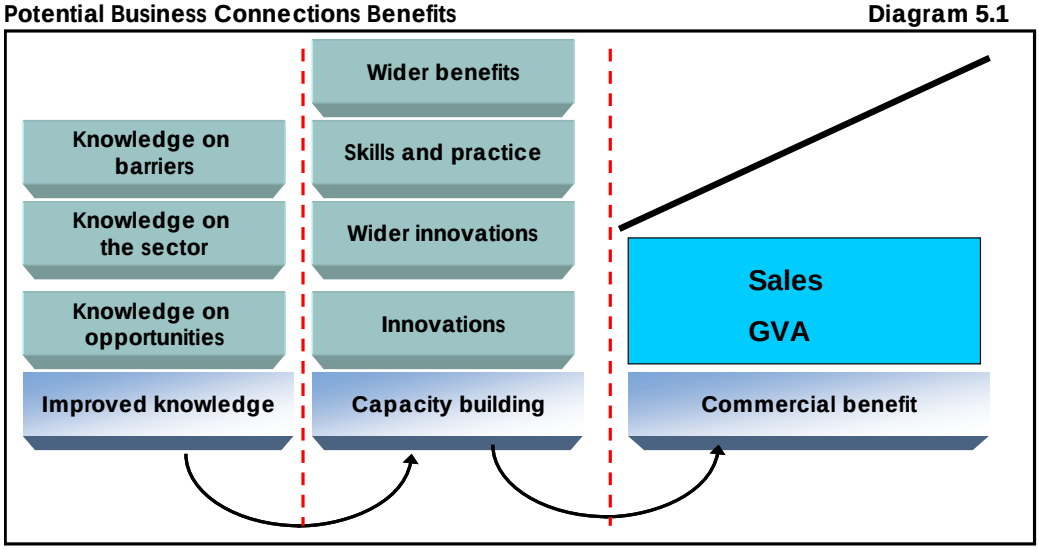
There have been a number of business benefits from engagement with the Business Connections project. They cover three main benefit areas:

- improved knowledge on the sector
- capacity building benefits
- real sales benefits

This model essentially suggests that the Business Connections project can impact on three levels, outlined in Diagram 5.1 below:

- the knowledge needed for improved activity
- the processes needed for companies to generate benefits
- the generation of direct benefits within companies

**Potential Business Connections Benefits** **Diagram 5.1**




### 5.3.1 *Improved knowledge on the sector*

A key rationale for the Business Connections project centred on the market failures evident in the Genomics sector focused around imperfect information. A key benefit from a company point of view is therefore around improvement in sectoral knowledge

in this area as a result of engagement.

The survey assessed the companies' views on their knowledge around the opportunities in the genomics market before they engaged with the Business Connections project and after. The survey found that:

- there was a generally high degree of knowledge on the opportunities in the sector before engagement with the Business Connections project
- one company increased their knowledge around the opportunities in the genomics market

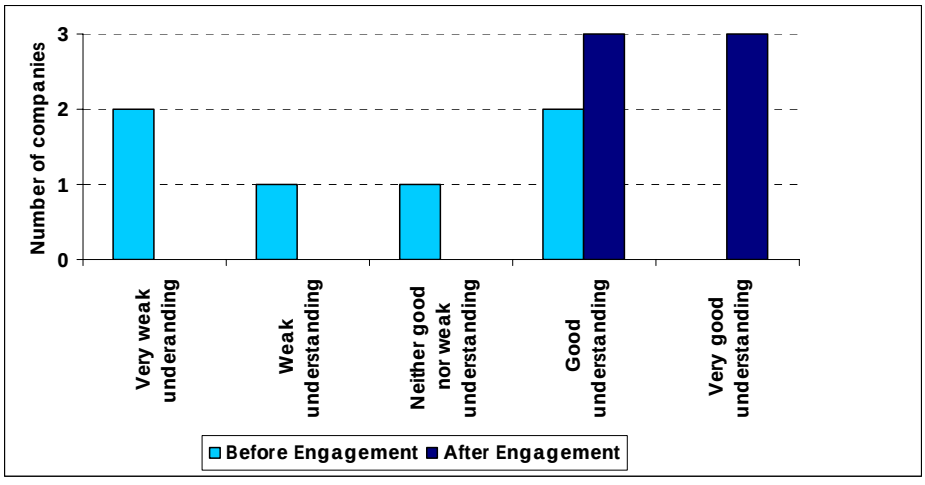
In addition, the survey assessed the companies' views on their knowledge of the genomics market before they engaged with the Business Connection project and after. In this case, the survey found that:

- there was a generally good understanding of the sector before engagement, with two companies suggesting their knowledge was in need of improvement
- there was a shift up the knowledge curve by the two companies who had either a weak understanding or a neutral understanding of the market before engagement

Chart 5.1 outlines the surveyed companies' views on their knowledge around barriers to accessing the genomics market. Again, a similar picture emerges:

- companies generally had a neutral to weak understanding of the barriers to operating in the genomics market, with 2 companies citing a very weak understanding
- after engagement with the Business Connections project all the companies suggested they either now had a good or very good understanding of the barriers in the sector

**Change in knowledge of barriers to the Genomics Market** **Chart 5.1**




The companies' knowledge around the genomics market was clearly patchy, but not actually that weak. Despite this there has been a clear shift towards companies knowing more about the opportunities, the market and the barriers to operating in the sector. This suggests that participation on the Business Connections project has helped to improve company understanding of the sector and suggests there has been progress around correcting imperfect information on the sector with those companies

engaging directly with the project.

### 5.3.2 Capacity building benefits

Companies were also asked about the capacity building benefits of engaging with the project. In total, 5 companies suggested that engagement with academia was the main benefit of working with the Business Connections project. Other key benefits included:

- improved research expertise of staff, better company positioning on accessing emerging opportunities and a greater ability to exploit enabling technology, mentioned by three companies each
- extended research resources, in effect wider R&D or innovation spend cited by two companies
- developing new products and IP were mentioned by 1 firm each

**Business Connection Project Capacity Building Benefits** **Table 5.1**

| Capacity Building Benefits | Number of firms citing benefit |
|---|---|
| Improved engagement with academia | 5 |
| Extended research expertise of staff | 3 |
| Better positioned to access new opportunities | 3 |
| Better able to exploit enabling technologies | 3 |
| Extended research resources (R&D and innovation spend) | 2 |
| Developed Intellectual Property | 1 |
| Developed new products, processes or services faster | 1 |

This suggests that the companies are more knowledgeable and better positioned to identify and exploit new technologies, with some actually committing new or increased resources as a result.

All companies suggested that they had introduced new or improved products, processes or services to the company or the market. The main innovation benefits centred on:

- new products to the company, cited by 3 companies
- new product to the market, cited by 3 companies

While there have been benefits across a number of key innovations – the development of new products, especially those new to the market are the ones with the greatest potential contribution to make to the economy.

**Business Connections Project Innovation Benefits** **Table 5.2**

| Innovation Benefits | Number of firms citing benefit |
|---|---|
| New products to the company | 3 |
| New products to the market | 3 |
| New processes to the company | 1 |
| New processes to the market | 1 |
| New services to the company | 2 |
| New services to the market | 2 |
| Improved products to the company | 2 |
| Improved products to the market | 2 |
| Improved processes to the company | 1 |
| Improved processes to the market | 1 |
| Improved services to the company | 2 |
| Improved services to the market | 2 |

There have also been wider innovation improvements among firms as a result of engaging with the Business Connections project. The key benefits cited by firms included:

- implementation of changes to marketing concepts or strategies, cited by three firms
- implementation of a new or significantly improved corporate strategy, cited by 1 firm
- implementation of new management techniques within the business, cited by 1 firm

This suggests that engagement with the project has led to wider innovation as well as more traditional innovation benefits associated with new and/or improved products, processes and services.

The companies who had engaged with the project also cited a range of wider benefits including:

- improved skills of staff, cited by 4 firms
- increase in the value of the company and improved technological knowledge, cited by 3 firms each
- protection of intellectual property, cited by 2 firms

There was also a wider series of benefits cited by at least 1 firm each. These benefits included:

- improved ability to attract highly skilled staff
- improved delivery times
- increase in the value of assets

**Wider Benefits of Engagement with the Business Connections Project** **Table 5.3**

| Wider Benefits | Number of firms citing benefit |
|---|---|
| Improved skills of staff | 4 |
| Improved technological knowledge | 3 |
| Increase in the overall value of the company | 3 |
| Protection of Intellectual Property | 2 |
| Increase in the value f assets | 1 |
| Improved delivery times | 1 |
| Improved ability to attract highly skilled staff | 1 |

### 5.3.3 Sales benefits

The benefits cited so far focus on capacity-building benefits. This means they are about improvements in knowledge, behaviour and product potential. However, they do not in themselves lead to sales. Understanding sales benefits helps to understand the first steps in the more tangible impacts of support.

Companies were generally positive around sales benefits with:

- 2 companies citing improved export sales, with 1 company also citing new export sales
- 2 companies citing improved domestic sales, with 1 company also citing new domestic sales

In addition, three companies cited some level of turnover impact as a direct result of Business Connections support. The implication is that there are wider benefits as well as more direct sales benefits.

### 5.3.4 Summary impacts

These findings suggest that the Business Connections project has helped to improve the operation and delivery of R&D and innovation in the companies that have engaged with the department as well as helping to generate new and improved sales. Summing this up, the benefits represent:

- improved knowledge (both in the genomics subject area and in the more general application and operation of enabling technologies)
- innovation, largely through new products to the company and market, but also new and improved processes and services, both to the company and the market
- wider innovation, focused on improved marketing, but covering more general innovative management practices
- wider benefits, such as talent attraction, increased company values and improved asset bases
- improved sales, covering improved and new domestic sales as well as improved and new export sales

This suggests that impact follows a potential series of benefits around improved knowledge, improved practice, wider benefits and harder economic impacts. The full economic impacts are considered in the next chapter.

There have also been wider impacts that were envisaged at project inception and outlined in the approval paper around high value jobs, as well as the attraction and

retention of talent. There has been progress in developing high value employment within the department (and the attraction of talent) with growth in researchers from 20 to 40 – several of whom were recruited internationally. The Business Connections project has therefore built capacity and attracted researchers from outside Scotland all of whom acted as a catalyst for more employment (the researchers working for them), increased research infrastructure and increased the reputation of the department and Edinburgh University.

A further milestone of the project has been the involvement of the Business Connections team as a founding member of the RNAi Global Consortium (an industry led academic consortium). This was a major industry led initiative with the Business Connections project anchoring industrial partner interactions in Scotland at a very early stage. The Business Connections team were the second founding members and there are now 36 members worldwide. This industry led programme of activity has helped leverage significant support and capability for the Business Connections project and led to wider benefits throughout Scotland. In addition, it has also increased the reputation of the department on the global change, with wider positive reputational benefits for Edinburgh University.

These examples highlight the range of wider, non monetary benefits, arising as a direct result of the Business Connections project.

# 6 Impact Assessment

The Business Connections project is about improving economic performance. There is a strong link between scientific research and economic development. There is now a greater focus on how academic research can be used as a key route to developing growing businesses. Growing businesses means more GVA and this implies improved economic performance.

GVA is defined as the difference between output (what is produced) and intermediate consumption (the costs of inputs to products/services/processes) in a given sector. Put simply, it is the value of sales less the cost of the inputs needed to make those sales.

Why is it important? GVA is important, not because it is a preferred measure of economic performance, but because it matters to businesses and the people who work in them. For the business it represents the profits being generated, while for the employees it represents their wages & salaries. GVA is not just another economic measure, it is **the** economic measure.

While GVA is an important outcome measure of SE activity, the Business Connections project pre dated the interest in GVA. It was therefore not a target area in the approval paper. We include the analysis here as it is now a standard element of evaluation practice and a key measure of project performance but highlight that it was not a specific target for the project.

This section draws out the GVA impacts of the Business Connections project along with wider turnover and employment impacts.

## 6.1 Approach

The economic impact calculations are based on best practice guidance in the HM Treasury Green Book and the recently refreshed SE Economic Impact Assessment Guidance Note.

It takes company level results (gross results) and adjusts for:

- deadweight – what would have happened anyway
- leakage – the extent to which the benefits are retained within Scotland
- displacement – the extent to which the benefits are coming at the expense of other Scottish 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

Turnover was collected from the companies on an annual basis over the last three years as was employment. GVA was developed by subtracting the costs of bought in goods and services from turnover. This is the standard approach to the assessment of GVA outlined in the SE GVA paper[7] and BERR Value Added Calculator.

The impact results represent the values provided by the six companies surveyed. They are not grossed up to reflect the wider population, nor do they cover any impacts generated in firms attending events, who could not be contacted as part of this evaluation for the reasons outlined earlier.

[7] SE(2005) *Measuring Gross Value Add and the Impact of Activities, Strategy Directorate*, 7th November, Scottish Enterprise

The results are also discounted as per HM Treasury Best practice at a rate of 3.5% per annum (the base year being 2004 or the first year of funding for the Business Connection project) and represent 2007 prices. Results are collated on an annual basis and collected for the last four years. These results are then imported into a cost benefit calculator to assess the ratio of costs to benefits.

## 6.2 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 net turnover impact accruing over the period 2004-2008, amounts to **£954,450** (NPV £853,124). This is a return of £0.58 for every £1 invested in the Business Connections Project. This is a low return but reflects the early stage of some of the companies citing impact. The stage the businesses are at means that there are years where they have generated little or no revenue and this feeds into the figures outlined below. The limited number of companies with direct engagement with the Business Connections project also limits the scope for impact in this area.

**Turnover Impacts of the Business Connections Project** **Table 6.1**

| Year | Costs | Net Present Value (Discounted Costs) | Turnover Impact | Net Present Value (Discounted Turnover) |
|---|---|---|---|---|
| 2004 | £339,000 | £339,000 | £30,375 | £30,375 |
| 2005 | £344,000 | £332,367 | £60,750 | £58,696 |
| 2006 | £329,000 | £307,125 | £78,300 | £73,094 |
| 2007 | £309,000 | £278,700 | £224,775 | £202,734 |
| 2008 | £254,000 | £221,346 | £560,250 | £488,226 |
| **Total** | **£1,575,000** | **£1,478,539** | **£954,450** | **£853,124** |
| **Cost to Benefit Ratio** | | | | **1: 0.58** |

## 6.3 GVA impacts

An estimate of 'impact' is the ultimate effect of the project on the economy, or in this case its contribution towards Scottish economic growth. This is measured as the net increase in gross value added (GVA or regional economic productivity) accruing as a direct result of the programme. As stated earlier GVA was not included in the target set for the Business Connections project, as it predated Scottish Enterprises focus on this measure. However, as this is now a key outcome measure of SE activity we outline the impacts generated to date.

The GVA impact accruing over the period 2004-2008, amounts to **£198,885** (NPV £154,324). This is a return of £0.10 for every £1 invested in the project. This is a low return for a major initial investment but does reflect more closely than previous evaluation studies the position where start up companies and those looking to develop new products/processes/services do not generate revenue but use significant amounts of financial resource (known as 'cash burn') to get to a position where they can sell, then move to break even before arriving at profit. The real value comes in the long term, which is considered more fully in Section 7.

**GVA Impacts of the Business Connections Project** **Table 6.2**

| Year | Costs | Net Present Value (Discounted Costs) | GVA Impact | Net Present Value (Discounted GVA) |
|---|---|---|---|---|
| 2004 | £339,000 | £339,000 | -£39,181 | -£39,181 |
| 2005 | £344,000 | £332,367 | -£198,362 | -£191,654 |
| 2006 | £329,000 | £307,125 | £41,894 | £39,108 |
| 2007 | £309,000 | £278,700 | £73,359 | £66,166 |
| 2008 | £254,000 | £221,346 | £321,175 | £279,885 |
| **Total** | **£1,575,000** | **£1,478,539** | **£198,885** | **£154,324** |
| **Cost to Benefit Ratio** | | | | **1: 0.10** |

*Note negative figures represent a position where losses made by companies exceed employee costs, depreciation and amortisation*

Putting these figures in some context, the net additional GVA value amounts to £12,227 per company (from the six on which the assessment is based in 2007). The net additional GVA arising from the Scottish Enterprise commercialisation programme, based on the same year (2007), question set and definition of GVA, amounted to an average of £9,734 per company[8]. The implication is that while the Business Connections project has generated a relatively low level of net additional GVA, it actually outperforms the average from the SE Commercialisation project. This again highlights the long term nature of these investments and the slow build in terms of economic return.

## 6.4 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 2004-2008 the total number of jobs either safeguarded or created by the Business Connections project amounts to:

- 4 net jobs in 2004
- 6 net jobs in 2005
- 6 net jobs in 2006
- 8 net jobs in 2007
- 12 net jobs in 2008

As the employment figures were collected on an annual basis, it is not possible to simply sum the values, as the 8 jobs in 2007 will include the 6 jobs in 2006. However, we can tell from the figures in 2008 that 12 net jobs in total have been created as a direct result of the Business Connections project.

This is a positive impact with increasing numbers of either safeguarded or newly created jobs over time. This is likely to reflect the jobs being generated as the new business starts develop over the life of the project.

These figures do not include people employed directly on the Business Connections Project nor the increase in the number of researchers employed within the department as a result of the collaborations achieved by the Business Connections project (20 new researchers during the project, increasing the size of the department to 40).

[8] Frontline Consultants (2009) *Scottish Enterprise Commercialisation Programme Review: Working Paper 2: Economic Impact to Date (2004-2007),* Scottish Enterprise

# 7 The Future

## 7.1 The potential for future economic benefits

The economic impact chapter outlined what had been achieved to date (in effect between 2004 and 2008). Data was collected from the companies on what they believe their turnover, GVA and employment will be over the next 10 years. This provides an assessment of the potential future economic benefit arising from the project. We have assessed optimism bias by reviewing growth against actual performance over the past four years and adjusting based on sectoral averages for GVA for the appropriate sector based on data from the Department of Innovation, Universities and Skills (DIUS) Value Added calculator[9]. This also follows standard practice in the appraisal of R&D economic impacts and the same methodology developed in the Commercialisation programme review fro Scottish Enterprise.

Taking these estimates, and adjusting for over optimism in companies, it is possible to outline the expected benefits over the next 10 years:

- £16.6m of net additional turnover by 2018 (£11.7m NPV)
- £11.6m of net additional GVA by 2018 (£8.3m NPV)
- 15 net additional jobs in 2018

This would amount to a cost benefit ratio for turnover of 1: 8.53 and 1: 5.70 for GVA. These would represent a substantial return on the initial investment, but are based on the assumptions that SE can still claim some responsibility for the generation of impacts over time, that the companies develop at least half as fast as they have currently projected and do not fail or get acquired.

**Potential Future Impacts of the Business Connections Project** **Table 7.1**

| Year | Turnover Impact | Net Present Value (Discounted Turnover) | Employment | GVA Impact | Net Present Value (Discounted GVA) |
|---|---|---|---|---|---|
| 2009 | £533,250 | £448,982 | 12 | £418,650 | £352,492 |
| 2010 | £1,053,000 | £856,616 | 12 | £820,363 | £667,366 |
| 2011 | £1,572,750 | £1,236,167 | 14 | £1,222,075 | £960,540 |
| 2012 | £1,744,875 | £1,325,078 | 14 | £1,261,788 | £958,216 |
| 2013 | £1,917,000 | £1,406,562 | 15 | £1,301,500 | £954,951 |
| 2014 | £1,930,500 | £1,368,568 | 15 | £1,312,975 | £930,793 |
| 2015 | £1,944,000 | £1,331,534 | 15 | £1,324,450 | £907,176 |
| 2016 | £1,957,500 | £1,295,441 | 15 | £1,335,925 | £884,093 |
| 2017 | £1,971,000 | £1,260,266 | 15 | £1,278,550 | £817,510 |
| 2018 | £1,984,500 | £1,225,988 | 15 | £1,358,875 | £839,488 |
| **Total** | **£16,608,375** | **£11,755,203** | **n/a** | **£11,635,151** | **£8,272,625** |
| **Cost Benefit Ratio: Turnover** | | | | | **1: 8.53** |
| **Cost Benefit Ratio: GVA** | | | | | **1: 5.70** |

## 7.2 Business Connections teams view on the future

The Business Connections team were questioned on what the future holds for the department. It was clear that there were two main thoughts on the future covering:

- the potential for the Business Connections project to develop

[9] http://www.innovation.gov.uk/value_added/

- the potential risks around a loss of funding

Taking the potential for the Business Connections team to develop first it was apparent that the staff feel that there is still much that the department can deliver. There was a firm belief that there was demand from companies for the services delivered under the Business Connections project, including more focused seminars that keeps companies up to date with the fast pace of change in the sector.

There was also a view that any development would need to ensure that they enhance what they already offer, but ensure that any enhancements do not result in a loss of focus. The focus was seen as maintaining the commercial model developed by the department and on continuing to develop win win relationships with industry (in effect the department benefits and the business benefits). There was also a view that further development of the department would help to change attitudes to entrepreneurship within an academic setting more broadly by proving that it is possible to be commercially focused but still maintain high academic standards.

The staff also believed that they needed to continue to stay fresh by continuing to join up disciplines and move with the market which would ensure they stay relevant to businesses but also ensure they could access emerging scientific and industry collaboration activities.

Moving on to cover the potential loss of funding it was also apparent that the lack of any future guarantee meant that there is a high degree of uncertainty around the Business Connections project. There was little clarity on the extent to which the university would continue to commit resources to the department to continue the Business Connections element of departmental activity. There was also a lack of clarity around the potential for other funding sources to be used to support Business Connections activity.

The bigger implication around the future uncertainty was on the potential for staff to leave to take up more permanent or secure jobs. The loss of the business development manager highlighted the loss of momentum that arises with staff changes. Uncertainty around sustainability of employment is therefore likely to increase turnover and lead to further loss of momentum built up over the last four years of the project.

Overall, there are clear opportunities for the Business Connections project to develop and enhance the model they have developed and delivered over the past four years. However, there are also risks that could undermine the work done to date.

## 7.3 The BioQuarter Commercialisation Strategy

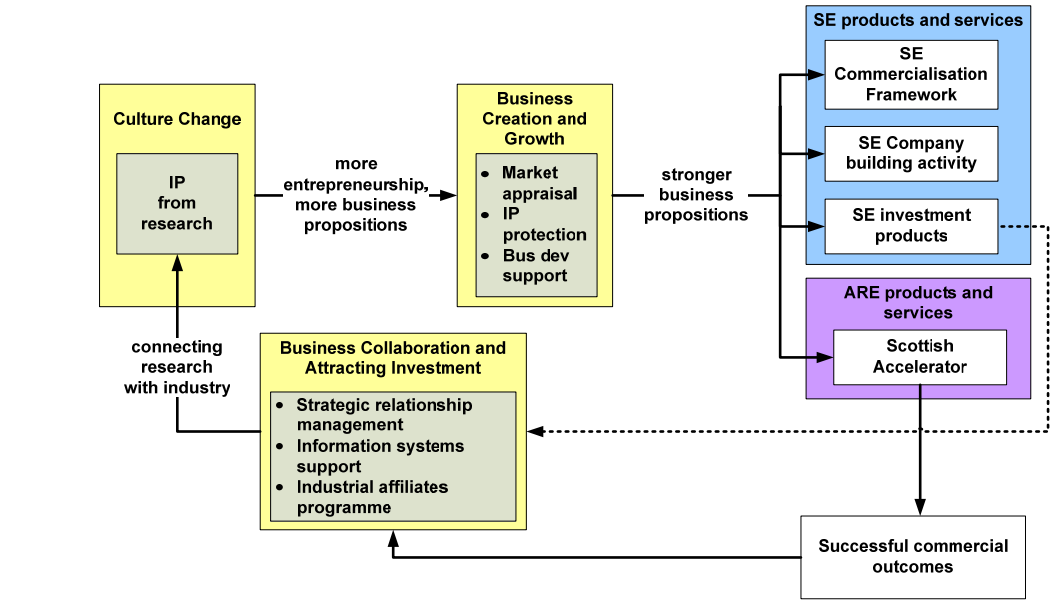
### *7.3.1 The BioQuarter Plan*

One of the key future drivers for the activity within the Business Connections project will be the BioQuarter, and in particular the commercialisation plan.

The BioQuarter commercialisation plan is ultimately focused on how Intellectual property from the university can be developed and promoted into new products, processes and services that can be taken on produced and sold by Scottish industry. There is funding to the value of £12m (£6m from SE and £6m from the University of Edinburgh) with an additional £5.5m extra funding through the increased use of SE products, focused on developing this model and maximising the intellectual assets

within the university academic and science base. The basic model is outlined in the diagram below.

**BioQuarter Commercialisation Strategy** **Diagram 7.1**




### 7.3.2 *Implications for the Business Connections project of the commercialisation strategy*

There were three key issues around the Business Connections project and the BioQuarter commercialisation strategy, including:

- potential for the department to lever funding from the plan to develop IP to be used in the Scottish business base
- the potential for key members of staff to join the BioQuarter project to continue the work done within the department
- the potential for the department to be left behind as wider commercialisation is given more focus than the department led approach that currently exists

There would be scope under the plan for the Business Connections project to develop new products/processes or services by contracting directly with the BioQuarter commercialisation team for the delivery of services. Equally, any department within the university could operate in this way – the Business Connections project would not be treated as a special case. However, it provides scope for some of the activity delivered as part of the Business Connections project to continue and to contribute to the key targets set for the BioQuarter. This would therefore enable the Business Connections team to build on existing strengths and work in this area, while also adding value to the BioQuarter commercialisation plan.

The second area for interaction focused on the scope for Business Connections staff to move from the department to join the team tasked with delivering the BioQuarter strategy. The recruitment of the director of the BioQuarter project is ongoing with a global search for the best talent. There will also be demand for staff to head up and

deliver the different areas of focus of the plan. This therefore creates potential opportunities for staff to move from the department to take up a new role.

The final area is around the potential for the Business Connections project to be left behind as the commercialisation strategy is rolled out and activity takes place across the university. As stated earlier the Business Connections project would not be accorded any special status in the plan but can choose to work with the plan, work alongside it or focus solely on the research activities of the department, rather than the mixed academic commercial approach it has at present.

The Bioquarter Commercialisation Plan will firm up as a director is recruited to the post and the potential role of the Business Connections project may change as this happens. At present though there appears to be opportunities for the department as well as a risks.

# 8 Project Learning and Development

## 8.1 Overcoming market failure?

The Business Connections project was set up to address market failure. The failure essentially represents imperfect information and scale barriers amongst the Scottish company base.

The imperfect information represents a lack of knowledge on the genomics sector, a lack of people with skills to understand and operate in the sector and this lack of knowledge leads to risk aversion. It could be argued that the market failure is self reinforcing, with lack of knowledge exacerbating a lack of people with skills which means businesses are less likely to take risks either in R&D or innovation in the sector. The implication is that some of the elements of the market failure can be removed to limit the negative effects of the failure, but ultimately all need to be removed for the failure to be addressed.

The evaluation has presented information that suggests there has been progress in improving knowledge of the sector, though the companies who engaged with the project had a good starting knowledge. There have also been signs this improved knowledge has helped increase the competency of staff to engage in this area. Finally there has also been progress in getting companies to take the risk, carry out the R&D and develop innovations to gain the benefits the genomics market offers.

However, the progress mentioned so far only considers a small group of companies who have engaged with the project. It was not possible to directly survey companies who had engaged with events due to data protection issues. This means we can only conclude that there has been improvement in a small number of firms, where the market failure is being addressed, but this doesn't necessarily mean that the failure has been corrected at the economy level. Until further evidence comes to light, this will remain unknown.

## 8.2 Attainment of targets

There were a range of targets set for the Business Connections project. Some of these have proven to be problematic with the removal of targets to deliver training to the sector, agreed by SE Edinburgh and Lothian at the time, and the wider belief among stakeholders that the company creation targets were too optimistic.

Taking these aside, it is apparent that there has been mixed progress in relation to targets. The events targets have largely been met, with only the delivery of workshops falling below target. However, the collaborative research projects are some way behind target, especially amongst small firms, where less than half the target has been achieved and in projects with a value between £100 and £250k where again less than half the target has been achieved. This still represent collaborative research to the value of £5.4m on the agreed definition of research income (which includes other public sector funding for engagement with industry) and represents a major benefit in its own right.

The mitigating factor around progress to targets is the recognition of the time taken to replace the initial business development manager. Slow recruitment has meant that there was a vacancy for around a year, in which time some activities were clearly not being pushed as much as they would have been had someone been in post. This vacancy period was not the fault of the Business Connections team, but reflected

wider recruitment issues at the University.

It is also important to note that the final year figures have not been collated to date and this may bring achievements more in line with expectations. Again, this represents an unknown around the project as it is still in progress.

## 8.3 Management and delivery of the Business Connections project

It is clear from the consultations that the set up, management and delivery of the Business Connections project has been handled well. There was a clear rationale for intervention, a clear set of targets and highly cohesive plan for achieving those targets, and correcting the market failure in the sector. Systems were put in place both by SE and the Business Connections team that ensured adequate supervision of the project was possible.

However, despite a good set of systems and management arrangements there have been a small number of issues associated with management and delivery of the project.

The main area focuses on the confusion around which companies have been supported by SE money and which have been supported in other ways – such as through the DTI (now Department of Business, Enterprise and Regulatory Reform) or wider departmental activity. In some cases there were links between the Business Connections project and companies where the managing director wasn't aware of activity (even when prompted with GTI, DPM, University of Edinburgh and even Peter Ghazal). This may simply be a lack of communication between staff within these companies, but this covered three of the nine planned company interviews and suggests clearer monitoring of who was involved from the company side was needed.

Despite these flaws, stakeholders, and crucially businesses, were generally positive about their engagement with the Business Connections project. This suggests that while there were issues they were on the periphery of the project rather than at the centre.

Overall, the project appears to have been well managed and delivery has been done to a high standard, though there are areas to learn from.

## 8.4 Benefits and impacts

The targets set for the Business Connection project reflect the delivery of activities. These activities were designed to raise awareness and help grow (and sustain) businesses in post genomic biotechnology. It is interesting to note that there is no link between the capacity building benefits (around academic industry collaboration, improving knowledge and competitiveness) and the potential for economic benefit (turnover, employment or GVA) to be realised. This reflects the timing of the project, which essentially pre dated the focus on GVA.

In this evaluation, the benefits to businesses have therefore been separated out into three areas:

- improved knowledge
- capacity building benefits, around innovation, wider innovation, improved skills and wider benefits
- sales benefits

It is apparent that most companies report improved knowledge, though many already appeared to have a good understanding of the genomics sector. Most also cite the introduction of new or improved products, processes and services, while most also report some wider innovation benefits around management practices and structures. There is also evidence of sales benefits arising to companies, covering new domestic sales, improved domestic sales as well as new markets. This suggests that engagement with the Business Connections project has made a contribution to improved competitiveness in the business base.

While there will always be exceptions to the rule, it seems that for companies to access opportunities in the post genomic marketplace they need to increase their knowledge in the area, develop staff skills and then use this to develop new or improved products, processes or services which helps them realise sales benefits (and hence generate economic impacts). The Business Connections activities have clearly focused on improving these key areas and while there was little focus on turnover or GVA, they are clearly a good basis for realising future economic benefits.

## 8.5 Value for money

In order to understand value for money there is a need to understand three broad factors around the delivery of the project:

- economy
- efficiency
- effectiveness

The first cover the **economy** of the intervention. Economy is concerned with the overall cost of the inputs (in effect the project) and if this is reasonable. There are not direct comparisons for the Business Connections project. However, the funding associated with projects that have been set up to do similar activities amounts to:

- £523,000 over three years to fund the University to SME technology transfer in opto and micro electronics (TTOM)[10]
- £8.25m over five years to fund the Prospekt partnership at the school of informatics in the University of Edinburgh[11]
- Annual running costs of £8.3m for Edinburgh Research and Innovation Ltd[12]

SE funding for the project amounted to around £1.5m, with an estimated total funding (including University of Edinburgh contributions) of around £2m over four years. The comparators show that good knowledge transfer and commercialisation support requires significant resources. It is quite often based on large scale investments over long time periods. This means it is difficult to directly comment on the economy of the intervention, but based on these comparators the funding sits within an acceptable range, suggesting a reasonable level of economy.

The second covers the **efficiency** of the intervention. This covers the extent to which the inputs have led to the desired outputs. The best way to measure this is to compare the SE funding for the project with the generation of research income from collaborative research projects. As outlined earlier the research projects have generated £5.4 m on the agreed definition of income from a SE investment of £1.5m,

[10] EkosGen *(2008) Evaluation of University to SME Technology Transfer in the Optoelectronics Sector (TTOM), Scottish Enterprise*

[11] SE(2005) *Maximising the Economic and Commercial Benefits of the School of Informatics* approval paper

[12] Edinburgh Research & Innovation Ltd (2008) *Edinburgh Research and Innovation Limited Report and Financial Statements, 31 July 2008*

amounting to a research investment leverage ratio of 1: 3.4. This suggests that every pound invested by SE has led to wider research spend of £3.40. This suggests a high degree of efficiency.

The final measure covers the **effectiveness** of the intervention. This covers the extent to which the outputs have led to the desired outcomes, in this case turnover leading to GVA. The cost benefit ratio for net additional GVA of 1: 0.10 suggests a low level of effectiveness. Even if sales are considered as a key output of the intervention the cost benefit ratio amounts to 1: 0.58. However, if future benefits are considered there is potential to for the return to increase to 1: 5.70 for GVA and 1: 8.53 for sales which suggests given time the desired outcomes could be realised.

These findings reflect the long time lag between intervention and benefit generation associated with commercialisation projects. The wider commercialisation programme, commissioned by Scottish Enterprise, also shows that making a return in the early (years 1-4) of a project is a major challenge and therefore the achievement to date of the Business Connections project is a good sign future benefits will be realised.

Overall, it can be argued it is too early to assess the value for money of the intervention with a suggestion that the project has a reasonable level of economy, strong efficiency but low effectiveness to date. However, over time there is potential to further increase the efficiency of the project and improve the effectiveness measure.

# 9 Conclusions and Recommendations

## 9.1 Conclusions

The GTI Business Connections project was set up to overcome market failures in the genomics and informatics market as well as accessing the wider opportunities in the sector.

The project has a clear fit with the current policy environment contributing to key priorities in the Scottish Government economic strategy, SE business plan and the life sciences sector strategy for Scotland. This suggests a clear rationale for action and fit with the policy environment, though there are implications that the project was not tightly linked in with wider activity, despite the best efforts of the Business Connections staff to facilitate links.

The project has delivered a number of events and collaborative research projects as well as aiding in the creation of two new business starts. While this represents the key activities planned for the project progress on the achievement of targets has been slower than anticipated, though this is likely to have been driven by the business development manager vacancy. However, the additional funding by Edinburgh University and the income from collaborative research projects suggests that a high degree of wider leverage has been achieved.

The project appears to have been well managed as a strategic level, with clear targets and management arrangements in place. However, at an operational level there have been some issues around accessing details on companies engaging with the Business Connections project. This aside the ongoing delivery of the project appears to have been good, with high satisfaction levels reported by businesses and a positive view from stakeholders.

The businesses who have engaged with the project have experienced a number of benefits covering:

- improved knowledge around the genomics market
- improved staff skills and abilities to deal with technology and access emerging opportunities
- the introduction of new and improved products, processes and services as well as wider innovations focused on management structures and models
- a small number of companies reporting sales benefits

The economic impact of the project has been calculated even through this was not set as a target area for the project. The impacts include **turnover to date of £954,450 (£853,124 NPV**) against SE costs of £1,575,000 (£1,478,539 NPV). This amounts to a turnover cost benefit ratio of 1: 0.58. If future impacts are considered the total impact by 2018 could amount to £17,562,825 (£12,608,327 NPV). This would therefore amounts to a potential cost benefit ratio of 1: 8.53.

At the economy level the **GVA impact of the intervention to date was £198,885 (£154,324 NPV**). This amounts to a GVA cost benefit ratio of 1: 0.10, though represents the early stage of the companies and the limited contribution made by companies before they breakeven and move beyond the cash burn stage. If future impacts are considered the total impact by 2018 could amount to £11,834,036 (£8,426,950 NPV). This would amount to a potential cost benefit ratio of 1: 5.70.

The key achievements of the project therefore include:

- pioneering a new academic industry interface model
- establishing an industry led academic consortium
- raised the profile of the department and by definition the university internationally
- provided examples of commercialisation within academia
- established an innovative interface to industry
- recruitment and retention of excellence in research capabilities
- the potential to generate long term benefits for the Scottish economy, building on some early successes

Overall progress on the GTI Business Connections project has been mixed, with some clear successes, such as the achievements outlined above, mixed with lower progress than planned. There are also lessons to be learned, but these represent good practice as much as learning from weaknesses.

## 9.2 Recommendations

The nature of the GTI business connections project, with no continuation of SE funding and only limited delivery time remaining means it is not appropriate to look at direct recommendations for delivery.

However, we have synthesised the findings and made a number of suggestions for action around learning lessons that can be fed into the BioQuarter Commercialisation or wider academic industry engagement. These recommendations have been separated out into strategic and operational areas.

### *9.2.1 Strategic recommendations*

The Business Connections project has been running for over four years, developing further specialist knowledge on business engagement, managing this within an academic setting and building a broad range of contacts across the life sciences company base. It has pioneered a new model of academic industry engagement and laid the foundations for further investment in commercialisation at Edinburgh University, such as Prospekt and major planned investment in the BioQuarter. This is a powerful resource that can be utilised in developing more detailed activities around the BioQuarter commercialisation strategy or wider academic industry collaborations. As such we would recommend:

- a workshop between the new project manager and the Business Connections team to learn lessons that can be fed into the BioQuarter commercialisation plan and wider activity around academic engagement with business
- a handover of details on companies engaged who may still develop project activity or base companies within Scotland e.g. the current links with big pharma that have taken considerable time to develop. This could be developed should the university continue the business connections project or could be fed into the Bioquarter plan for some early wins, though this may need to be handled carefully to comply with data protection legislation

Linked to this point there is a need for greater clarity on what projects such as this are set up to deliver While net GVA is a key measure of SE activity, this was not included in the project approval paper as a key outcome. In this case it represents the timing of the project before GVA was a big focus for Scottish Enterprise. However, this may be the right approach.
The evidence from the evaluation suggests that the project has had greatest benefit in improving knowledge and practice in companies around researching and developing new products/processes/services, rather than on actual commercialisation. As such we would recommend that:

- a clear set of objectives should be developed to look at what projects are set up to deliver – either capacity building benefits (such as knowledge, investment or changes in practice) that could lead to longer term economic benefit, or direct economic impact through commercialisation as measured by GVA (or some combination of the two measured at appropriate timescales)

### *9.2.2 Operational*

There are also a number of other areas for action that refer more to the direct operation of the Business Connections project.

The first area covers the setting of targets. This is a known area of difficulty, with targets frequently set that are too straightforward to achieve or so ambitious that they will never be realised. The Business Connections project appears to have fallen into the trap of setting targets that are very challenging to achieve. The start up target in particular was always going to be a major challenge in light of the small number of genuine spin outs across all Scottish universities.

If the assumptions around this were made clear it would be possible to identify reasons for non achievement (or overachievement) which could be fed back into wider project planning driving up the standard of target setting. As such we would recommend:

- the assumptions and evidence underpinning the development of targets should be recorded and stored with ongoing monitoring information enabling greater explanation of non achievement (or over achievement)

The evaluation has been hampered to an extent by access to company details as a result of Data Protection legislation. There have also been challenges in drawing out just what the SE funding has been directly responsible for. As such we would recommend:

- a development of a clear and well defined monitoring and evaluation framework, outlining the information needed for ongoing monitoring and review as well as evaluation requirements (an example framework is included in Appendix 5)

It would also be useful if the assumptions around staffing and project delivery were to be made clearer. The loss of the Business Development Manager and subsequent vacancy within the Business Connections team has clearly had an impact on the achievement of targets. However, there was little recognition of this as a potential risk for the project in the approval paper, which focused on the potential loss of the director rather than wider staff. As such we would recommend:

- the need to adequately record the key risks around staff turnover associated with all key delivery personnel and development of appropriate reduction strategies
- linked to this is could be appropriate to link the resourcing with delivery of activity and attainment of key goals, by doing this it would be clear what the implication would be if a certain individual were to leave, enabling appropriate plans to be put in place to mitigate risk

## Frontline Consultants

**June 2009**

# Appendix 1

## References

**References**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# Appendix 2

## Questionnaires

**Annex B1: Business Questionnaire**

## Scottish Enterprise: Innovation Questionnaire

Good morning/afternoon my name is (YOUR NAME) and I'm calling from (COMPANY NAME). We are currently carrying out a survey on behalf of Scottish Enterprise.

The purpose of this research is to provide an overview of the benefits to customers from Scottish Enterprise services. The survey aims to help Scottish Enterprise and the Scottish Government meet the needs of businesses. Your co-operation will ensure that the views expressed are representative of all Scottish Enterprise customers.

Participation in the study is entirely voluntary and responses will not be attributed to any individual or company. The interview will take around XX minutes to conduct.

## SECTION A: COMPANY BACKGROUND – CAN BE USED FOR GTI

*This section of the survey asks for background information on the establishment, what you do, where you are in your companies development and industry.*

### Question 1: Company name?

| |
|---|
| |

### Question 2: Company contact?

| |
|---|
| |

### Question 3: Company Type?

Pre incorporated entities ☐
Proprietorship/sole trader ☐
Private limited company ☐
Private unlimited company ☐
Partnership ☐
Cooperative ☐

### Question 4: What does you company mainly make or do? [15 SECOND SUMMARY]

| |
|---|
| |

### Question 5: Which of the following best describes the main area in which you work?

Enabling Technologies ☐

Informatics and computing ☐
Photonics ☐
Devices (chips, lasers, sensors) ☐
Software ☐
Communications (wireless, fixed, mobile) ☐
Games ☐
Advanced materials ☐

| | | | |
|---|---|---|---|
| Life Sciences | ☐ | Medical devices | ☐ |
| | | Stem cell sciences | ☐ |
| | | Regenerative medicine | ☐ |
| | | Translational medicine | ☐ |
| Energy | ☐ | Power generation | ☐ |
| | | Biofuels | ☐ |
| | | Fuel cells | ☐ |
| None of these | ☐ | | |

**Question 6: How long have you been trading?**

| | |
|---|---|
| Pre-trading | ☐ |
| Less than 1 year | ☐ |
| Up to 1 year | ☐ |
| Up to 2 years | ☐ |
| Up to 3 years | ☐ |
| 3 years+ | ☐ |

**Question 7: Which of the following categories best describes your current business stage?**

Proving the Concept Phase – *the invention or innovation of a new product/process/service believed to have commercial value* **[ONLY ASK SECTION B THEN SKIP TO SECTION G]** ☐

Early Stage Technology Development – *the demonstration of product/process/service specification as well as the refinement and definition of the product/process/service, potentially allowing for an estimate of cost* **[ASK SECTION B AND C THEN SKIP TO SECTION G]** ☐

Product Development – *developing the proof of market, initial production and marketing of the product/process/service and potential launch* **[ASK SECTION B, C AND D THEN SKIP TO SECTION G]** ☐

Production/Marketing Phase – *the stage between early sales and company or product/process/service line breakeven* **[ASK SECTION B, C, D AND E THEN SKIP TO SECTION G]** ☐

Growing Business Phase **–** *the stage where the product/process/service is exploited to the full generating increasing revenue and profits* **[ASK SECTION B, C, D, E AND F THEN GO TO SECTION G]** ☐

**Question 8: What experience has the company management team had in growing a business? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**BUSINESS EXPERIENCE**

| | |
|---|---|
| Have started up other businesses in the past | ☐ |
| Have produced inventions or innovations in another company (companies) | ☐ |
| Have developed prototypes for other products/processes/services | ☐ |
| Have developed a market for a new product/process/service | ☐ |
| Have experience of protecting intellectual assets | ☐ |
| Have generated sales for a new product/process/service | ☐ |
| Have managed other businesses in the past | ☐ |

**TRAINING**

| | |
|---|---|
| Have received training/advice in company start up | ☐ |
| Have received training in developing prototypes for new products/processes/services | ☐ |
| Have received training in marketing and market research | ☐ |
| Have received training in intellectual property protection | ☐ |
| Have received training in sales | ☐ |
| Have received training in business management | ☐ |
| Other (please specify) | ☐ |

**Question 9: Company Sizeband?**

1-9 ☐
10-49 ☐
50-249 ☐
250+ ☐

## GTI SECTION

**GTI 1: What GTI/DPM activities have you engaged in?**

- Business development and training ☐
- Discussion dinners/workshops ☐
- Conferences ☐
- Seminars ☐
- Training ☐
- Receipt of newsletter ☐
- Collaborative research ☐
- Pilot scale ☐
- Small biotech ☐
- Major biotech ☐
- Strategic Biopharma deal ☐
- New Ventures & High Growth ☐
- Support existing companies ☐
- Spin out/start up support ☐
- Access hotel facilities ☐

**GTI 2: Which of the services that you accessed were the most valuable to your business and why?**

| |
|---|
| |

**GTI 3: How would you rate your overall understanding of the Genomics market before and after engaging with GTI**

| | Before engagement | Post engagement |
|---|---|---|
| Very good understanding | ☐ | ☐ |
| Good understanding | ☐ | ☐ |
| Neither Good nor weak understanding | ☐ | ☐ |
| Weak understanding | ☐ | ☐ |
| Very weak understanding | ☐ | ☐ |

**GTI 4: How would you rate your understanding of the opportunities in the Genomics market before and after engaging with GTI**

| | Before engagement | Post engagement |
|---|---|---|
| Very good understanding | ☐ | ☐ |
| Good understanding | ☐ | ☐ |
| Neither Good nor weak understanding | ☐ | ☐ |
| Weak understanding | ☐ | ☐ |
| Very weak understanding | ☐ | ☐ |

**GTI 5: How would you rate your understanding of the barriers to accessing the Genomics market before and after engaging with GTI**

| | Before engagement | Post engagement |
|---|---|---|
| Very good understanding | ☐ | ☐ |
| Good understanding | ☐ | ☐ |
| Neither Good nor weak understanding | ☐ | ☐ |
| Weak understanding | ☐ | ☐ |
| Very weak understanding | ☐ | ☐ |

**GTI 6: Are you now working in the genomics market?**

Yes [**IF YES TO GO Q7 AND Q8 THEN SKIP TO Q10**] ☐
No [**IF NO GO TO Q9**] ☐

**GTI 7: In what areas do you operate in?**

Drug Discovery (Therapeutics) ☐
Diagnostics ☐
Profiling equipment ☐
Bioinformatics ☐

**GTI 8: What would have happened without GTI/DPM support?**

We would have ended up working in the sector anyway ☐
We would have worked in the sector, but it would have taken us longer (I<6months to access) ☐
We would worked in the sector, but it would have taken us longer (>6 months to access) ☐
We would have worked in the sector, but it would have been a smaller part of our business ☐
We would have worked in the sector, but it would have been a much smaller part of our business ☐
We would not have worked in the sector at all ☐

**GTI 9: If you are not working in the genomics market, why not?**

Equipment needed to access the market was too expensive ☐
Equipment needed to access the market couldn't be sourced ☐
Staff needed to access the market were not available ☐
Company did not have sufficient awareness of opportunities ☐
Company did not have sufficient understanding of opportunities ☐
Company couldn't access finance needed to enter the market ☐
Company not suited to emerging opportunities ☐
Company decided to focus on other areas ☐
Plan to access the market in the future ☐

**GTI 10: Have you experienced any of the following benefits as a result of engagement with GTI/DPM?**

Better able to exploit enabling technology ☐
Better positioned to access emerging opportunities ☐
Develop new products cheaper or faster ☐
Extended research resources (R&D/innovation spend) ☐
Extended research expertise (staff) ☐
Develop new intellectual property (Patents) ☐
Improved engagement with Academia ☐

**GTI 11: What improvements could be made to the support delivered by GTI/DPM?**

## SECTION B: INNOVATION SYSTEM – PROVING THE CONCEPT PHASE

*This section of the survey looks for key information on the proving the concept stage of company development. By proving the concept we mean the invention or innovation of a new product/process/service believed to have commercial value.*

***All answers relate only to this particular stage – re-iterate the definition if needed for clarity.***

**Question 10: Who do you work with, or have you worked with in relation to the proving the concept phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**INTERNAL**

Done internally ☐

**OTHER BUSINESSES**

Work with suppliers ☐
Work with other Scottish businesses ☐
Work with customers ☐

**PUBLIC SECTOR**

Scottish Government ☐
Scottish Enterprise ☐
ITIs ☐
UK public sector organisations ☐
EU departments ☐

**UNIVERSITIES/COLLEGES**

Scottish Universities ☐
Non Scottish Universities ☐
Scottish Colleges ☐
Non Scottish Colleges ☐

**PRIVATE SECTOR**

Private research & development companies ☐
Private sector consultants ☐
Other (please specify) ☐

**Question 11: If you have not worked with Scottish Enterprise at this phase, why have you not worked with them? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**SIGNPOSTED TO APPROPRIATE SUPPORT**

Scottish Enterprise signposted us to appropriate support ☐
Other adviser signposted us to appropriate support ☐

**DIDN'T KNOW SE PROVIDED SUPPORT**

Did not know Scottish Enterprise provided support in this area ☐

**SE DIDN'T OFFER SUPPORT IN THE AREA WE NEEDED**

Scottish Enterprise did not offer support in the areas we needed ☐

**ALREADY HAD ACCESS TO SUPPORT**

| | |
|---|---|
| Had access to suitable external expertise – academic | ☐ |
| Had access to suitable external expertise – private consultants/other business support | ☐ |
| Had access to suitable internal expertise | ☐ |
| Other (please specify) | ☐ |

**Question 12: What were your main objectives at this phase (These could be business or technological objectives)? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**RESEARCH AND DEVELOPMENT**

| | |
|---|---|
| Test feasibility of idea(s) | ☐ |
| Informal and iterative development and research | ☐ |
| Overcome technical problem(s) | ☐ |
| Develop research findings | ☐ |
| Development of a prototype | ☐ |

**IMPROVE PRODUCT/PROCESS/SERVICE**

| | |
|---|---|
| Improve existing product(s) | ☐ |
| Improve existing process(es) | ☐ |
| Improve existing service(s) | ☐ |

**DEVELOP NEW PRODUCT/PROCESS/SERVICE**

| | |
|---|---|
| Develop new product(s) | ☐ |
| Develop new process(es) | ☐ |
| Develop new service(s) | ☐ |

**ACCESS ASSISTANCE**

| | |
|---|---|
| Gain access to new technology | ☐ |
| Obtain external technical assistance | ☐ |

**UNDERSTAND THE MARKET**

| | |
|---|---|
| Wanted to understand the size of the market – domestic | ☐ |
| Wanted to understand the size of the market – export | ☐ |
| Wanted to investigate routes to market | ☐ |
| Wanted to understand market risk | ☐ |

**ACCESS FUNDING**

| | |
|---|---|
| Access venture capital funding/angel investment | ☐ |
| Access public sector assistance – Scottish Enterprise | ☐ |
| Access public sector assistance – Scottish Government | ☐ |
| Access public sector assistance – other | ☐ |

**DEVELOP SALES**

| | |
|---|---|
| Wanted to develop sales | ☐ |
| Other (please specify) | ☐ |

**Question 13: What were the timescales for the proving the concept phase?**

0-5 months ☐
6-12 months ☐
13-18 months ☐
19-24 months ☐
2 years plus ☐

**Question 14: What was the total cost associated with proving the concept phase?**

£0-50,000 ☐
£50,001-£100,000 ☐
£100,001-£200,000 ☐
£200,001-£300,000 ☐
£300,001-£400,000 ☐
£400,001-£500,000 ☐
£500,001-£1,000,000 ☐
£1,000,000+ ☐

**Question 15: What finance sources did you use to fund the proving the concept phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PRIVATE SECTOR**
Venture Capital ☐
Angel investors ☐
Bank loan ☐
**PUBLIC SECTOR**
Scottish Government support ☐
Scottish Enterprise support ☐
Other public sector support ☐
**COMPANY LINKED FINANCE**
Firms profits/cash flow ☐
Trade credit ☐
Bank overdraft ☐
**OWN MONEY**
Funded from 'back pocket'/own money ☐
Other (please specify) ☐

**Question 16: What did you use the money for? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PERSONNEL**
To pay personnel costs ☐
To pay for training ☐
**EQUIPMENT**
To purchase instruments and equipment ☐
To pay for lab costs ☐
**PURCHASE EXTRNAL SUPPORT**
To purchase external business support ☐
To purchase external technical support ☐
**OVERHEADS**
To pay for overheads ☐

**INTELLECTUAL PROPERTY**

To pay for intellectual property protection ☐
Other (please specify) ☐

| |
|---|
| |

**Question 17: What made it difficult for you to get through this phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**ACCESS TO KEY VARIABLES**

Difficulty finding appropriate academic expertise ☐
Difficulty finding appropriate private sector expertise ☐
Lack of critical equipment ☐
Lack of finance ☐
Limited public sector support ☐

**MARKET FACTORS**

Competitors have developed similar products, processes, services ☐
Changes in the market ☐

**LACK OF SKILLS**

Lack of skills – finance ☐
Lack of skills – intellectual property ☐
Lack of skills – project management ☐
Lack of skills – technology ☐

**INTELLECTUAL PROPERTY**

Difficulty of protecting Intellectual property ☐
Difficulty negotiating intellectual property with a third party – public sector ☐
Difficulty negotiating intellectual property with a third party – private sector ☐

**UNCERTAINTIES**

Technical uncertainties ☐
Other internal activities more of a priority ☐
Length of stage too long ☐
Difficulty meeting regulatory standards ☐
Other (please specify) ☐

| |
|---|
| |

**Question 18: Please provide further details about the main difficulties?**

[PROMPT - what was the main difficulty
how long did the difficulty last
how were they resolved (if they were resolved)

| |
|---|
| |

**Question 19: What support do you feel would have been useful for you to achieve your objectives for the proving the concept phase?**

## SECTION C: INNOVATION SYSTEM – EARLY STAGE TECHNOLOGY DEVELOPMENT PHASE

*This section of the survey looks for key information on the early stage technology development phase of company development. By this we mean the demonstration of product/process/service specification as well as the refinement and definition of the product/process/service, potentially allowing estimates of cost.*

***All answers relate only to this particular stage – re-iterate the definition if needed for clarity.***

**Question 20: Who do you work with, or have you worked with in relation to the early stage technology development phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**INTERNAL**

Done internally ☐

**OTHER BUSINESSES**

Work with suppliers ☐
Work with other Scottish businesses ☐
Work with customers ☐

**PUBLIC SECTOR**

Scottish Government ☐
Scottish Enterprise ☐
ITIs ☐
UK public sector organisations ☐
EU departments ☐

**UNIVERSITIES/COLLEGES**

Scottish Universities ☐
Non Scottish Universities ☐
Scottish Colleges ☐
Non Scottish Colleges ☐

**PRIVATE SECTOR**

Private research & development companies ☐
Private sector consultants ☐
Other (please specify) ☐

| |
|---|
| |

**Question 21: If you have not worked with Scottish Enterprise at this phase, why have you not worked with them? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**SIGNPOSTED TO APPROPRIATE SUPPORT**

Scottish Enterprise signposted us to appropriate support ☐
Other adviser signposted us to appropriate support ☐

**DIDN'T KNOW SE PROVIDED SUPPORT**

Did not know Scottish Enterprise provided support in this area ☐

**SE DIDN'T OFFER SUPPORT IN THE AREA WE NEEDED**

Scottish Enterprise did not offer support in the areas we needed ☐

**ALREADY HAD ACCESS TO SUPPORT**

Had access to suitable external expertise – academic ☐
Had access to suitable external expertise – private consultants/other business support ☐
Had access to suitable internal expertise ☐
Other (please specify) ☐

| |
|---|
| |

**Question 22: What were your main objectives at this phase (These could be business or technological objectives)? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**PROTOPTYE DEVELOPMENT**

Prove that the prototype can be produced on a large scale ☐
Prove the prototype works in the real world ☐

**TESTING PRODUCT/PROCESS/SERVICE**

Test margins on the product/process/service ☐
Development a full scale demonstration of the technology ☐

**MEET REGULATORY REQUIREMENTS**

Meet regulatory requirements ☐

**DEVELOP INTELLECTUAL PROPERTY PROTECTION**

Develop intellectual property protection ☐
Prove that intellectual property protection works ☐

**UNDERSTAND COSTS**

Wanted to develop production/delivery costs ☐
Wanted to develop estimates of production/delivery costs ☐

**UNDERSTAND MARKET**

Wanted to understand what end users would pay ☐
Wanted to understand the size of the market – domestic ☐
Wanted to understand the size of the market – export ☐
Wanted to investigate routes to market ☐
Wanted to understand market risk ☐

**ACCESS FUNDING**

Access venture capital funding/angel investment ☐
Access public sector assistance – Scottish Enterprise ☐
Access public sector assistance – Scottish Government ☐
Access public sector assistance – other ☐

**DEVELOP SALES**

Wanted to develop sales ☐
Other (please specify)

| |
|---|
| |

**Question 23: What were the timescales for the early stage technology development phase?**

0-5 months ☐
6-12 months ☐
13-18 months ☐
19-24 months ☐
2 years plus ☐

**Question 24: What was the total cost associated with the early stage technology development phase?**

£0-50,000 ☐
£50,001-£100,000 ☐
£100,001-£200,000 ☐
£200,001-£300,000 ☐
£300,001-£400,000 ☐
£400,001-£500,000 ☐
£500,001-£1,000,000 ☐
£1,000,001-£2,000,000 ☐
£2,000,000+ ☐

**Question 25: What finance sources did you use to fund the early stage technology development phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PRIVATE SECTOR**
Venture Capital ☐
Angel investors ☐
Bank loan ☐
**PUBLIC SECTOR**
Scottish Government support ☐
Scottish Enterprise support ☐
Other public sector support ☐
**COMPANY LINKED FINANCE**
Firms profits/cash flow ☐
Trade credit ☐
Bank overdraft ☐
**OWN MONEY**
Funded from 'back pocket'/own money ☐
Other (please specify) ☐

**Question 26: What did you use the money for? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PERSONNEL**
To pay personnel costs ☐
To pay for training ☐
**EQUIPMENT**
To purchase instruments and equipment ☐
To pay for lab costs ☐
**PURCHASE EXTRNAL SUPPORT**
To purchase external business support ☐
To purchase external technical support ☐
**OVERHEADS**
To pay for overheads ☐

**INTELLECTUAL PROPERTY**

To pay for intellectual property protection ☐
Other (please specify) ☐

| |
|---|
| |

**Question 27: What made it difficult for you to get through this phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**ACCESS TO KEY VARIABLES**

Lack of finance ☐
Lack of critical equipment ☐
Difficulty engaging with academic expertise ☐
Lack of access to private sector assistance ☐
Limited public sector support ☐

**MARKET FACTORS**

Changes in the market ☐
Competitors have developed similar products, processes, services ☐

**LACK OF SKILLS**

Lack of skills – finance ☐
Lack of skills – intellectual property ☐
Lack of skills – project management ☐
Lack of skills – technology ☐

**INTELLECTUAL PROPERTY**

Difficulty of protecting Intellectual property ☐

**UNCERTAINTIES**

Other internal activities more of a priority ☐
Product/process/service uncertainty ☐
Technical uncertainty ☐
Length of stage ☐
Difficulty meeting regulatory standards ☐
Other (please specify) ☐

| |
|---|
| |

**Question 28: Please provide further details about the main difficulty?**

[PROMPT - what was the main difficulty
how long did the difficulty last
how were they resolved (if they were resolved)

| |
|---|
| |

**Question 29: What support do you feel would have been useful for you to achieve your objectives for the early stage technology development phase?**

| |
|---|
| |

## SECTION D: INNOVATION SYSTEM – PRODUCT DEVELOPMENT PHASE

*This section of the survey looks for key information on the product development phase of company development. By this we mean developing the proof of market, initial production and marketing of the product/process/service and potential launch.*

***All answers relate only to this particular stage – re-iterate the definition if needed for clarity.***

**Question 30: Who do you work with, or have you worked with in relation to the product development phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**INTERNAL**

Done internally ☐

**OTHER BUSINESSES**

Work with suppliers ☐
Work with other Scottish businesses ☐
Work with customers ☐

**PUBLIC SECTOR**

Scottish Government ☐
Scottish Enterprise ☐
ITIs ☐
UK public sector organisations ☐
EU departments ☐

**UNIVERSITIES/COLLEGES**

Scottish Universities ☐
Non Scottish Universities ☐
Scottish Colleges ☐
Non Scottish Colleges ☐

**PRIVATE SECTOR**

Private research & development companies ☐
Private sector consultants ☐
Other (please specify) ☐

| |
|---|
| |

**Question 31: If you have not worked with Scottish Enterprise at this phase, why have you not worked with them? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**SIGNPOSTED TO APPROPRIATE SUPPORT**

Scottish Enterprise signposted us to appropriate support ☐
Other adviser signposted us to appropriate support ☐

**DIDN'T KNOW SE PROVIDED SUPPORT**

Did not know Scottish Enterprise provided support in this area ☐

**SE DIDN'T OFFER SUPPORT IN THE AREA WE NEEDED**

Scottish Enterprise did not offer support in the areas we needed ☐

**ALREADY HAD ACCESS TO SUPPORT**

Had access to suitable external expertise – academic ☐
Had access to suitable external expertise – private consultants/other business support ☐
Had access to suitable internal expertise ☐
Other (please specify) ☐

**Question 32: What were your main objectives at this phase (These could be business or technological objectives)? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**DEVELOP APPROPRIATE PRICING**

Wanted to understand what end users would pay ☐
Wanted to develop appropriate pricing structures ☐
Wanted to develop appropriate margin structures ☐

**MARKET FACTORS**

Wanted to understand the size of the market – domestic ☐
Wanted to understand the size of the market – export ☐
Wanted to understand market risk ☐
Wanted to investigate routes to market ☐
Wanted to investigate alternative revenue streams ☐

**DEVELOP SALES**

Wanted to develop sales ☐

**BRANDING/MARKETING**

Wanted to develop the brand ☐
Wanted to market the product/process/service ☐

**EXTRNAL ANALYSIS**

Wanted to understand competitors ☐
Wanted to investigate suppliers ☐

**FURTHER TECHNOLOGY VALIDATION/REFINEMENT**

Wanted to refine/tweak the product/process/service ☐
Wanted to enhance the product to meet market need/want ☐

**ACCESS FUNDING**

Access venture capital funding/angel investment ☐
Access public sector assistance – Scottish Enterprise ☐
Access public sector assistance – Scottish Government ☐
Access public sector assistance – other ☐
Other (please specify)

**Question 33: What were the timescales for the product development phase?**

0-5 months ☐
6-12 months ☐
13-18 months ☐
19-24 months ☐
2-3 years ☐
3 years + ☐

**Question 34: What was the total cost associated with the product development phase?**

£0-50,000 ☐
£50,001-£100,000 ☐
£100,001-£200,000 ☐
£200,001-£300,000 ☐
£300,001-£400,000 ☐
£400,001-£500,000 ☐
£500,001-£1,000,000 ☐
£1,000,001-£2,000,000 ☐
£2,000,001-£3,000,000 ☐
£3,000,001+ ☐

**Question 35: What finance sources did you use to fund the product development phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PRIVATE SECTOR**
Venture Capital ☐
Angel investors ☐
Bank loan ☐
**PUBLIC SECTOR**
Scottish Government support ☐
Scottish Enterprise support ☐
Other public sector support ☐
**COMPANY LINKED FINANCE**
Firms profits/cash flow ☐
Trade credit ☐
Bank overdraft ☐
**OWN MONEY**
Funded from 'back pocket'/own money ☐
Other (please specify) ☐

**Question 36: What did you use the money for? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PERSONNEL**
To pay personnel costs ☐
To pay for training ☐
**EQUIPMENT**
To purchase instruments and equipment ☐
To pay for lab costs ☐
**PURCHASE EXTRNAL SUPPORT**
To purchase external business support ☐
To purchase external technical support ☐
**OVERHEADS**
To pay for overheads ☐

**INTELLECTUAL PROPERTY**

To pay for intellectual property protection ☐
Other (please specify) ☐

**Question 37: What made it difficult for you to get through this phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**ACCESS TO KEY VARIABLES**

Lack of finance ☐
Couldn't source appropriate market research ☐
Difficulty engaging with academic expertise ☐
Lack of access to external expertise ☐
Limited public sector support ☐

**MARKET FACTORS**

Changes in the market ☐
Market not ready to apply the product/process/service ☐
Competitors have developed similar products, processes, services ☐

**LACK OF SKILLS**

Lack of skills – finance ☐
Lack of skills – intellectual property ☐
Lack of skills – project management ☐
Lack of skills – technology ☐
Lack of skills – marketing ☐
Lack of skills – sales ☐

**INTELLECTUAL PROPERTY**

Difficulty of protecting Intellectual property ☐

**UNCERTANTIES**

Other internal activities more of a priority ☐
Length of stage ☐
Other (please specify)

**Question 38: Please provide further details about the main difficulty?**

[PROMPT - what was the main difficulty
how long did the difficulty last
how were they resolved (if they were resolved)

**Question 39: What support do you feel would have been useful for you to achieve your objectives for the product development phase?**

## SECTION E: INNOVATION SYSTEM – PRODUCTION/MARKETING PHASE

*This section of the survey looks for key information on the production marketing phase of company development. By this we mean the stage between early sales and company or product/process/service line breakeven.*

***All answers relate only to this particular stage – re-iterate the definition if needed for clarity.***

**Question 40: Who do you work with, or have you worked with in the production/marketing phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**INTERNAL**

Done internally ☐

**OTHER BUSINESSES**

Work with suppliers ☐
Work with other Scottish businesses ☐
Work with customers ☐

**PUBLIC SECTOR**

Scottish Government ☐
Scottish Enterprise ☐
ITIs ☐
UK public sector organisations ☐
EU departments ☐

**UNIVERSITIES/COLLEGES**

Scottish Universities ☐
Non Scottish Universities ☐
Scottish Colleges ☐
Non Scottish Colleges ☐

**PRIVATE SECTOR**

Private research & development companies ☐
Private sector consultants ☐
Other (please specify) ☐

| |
|---|
| |

**Question 41: If you have not worked with Scottish Enterprise at this phase, why have you not worked with them? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**SIGNPOSTED TO APPROPRIATE SUPPORT**

Scottish Enterprise signposted us to appropriate support ☐
Other adviser signposted us to appropriate support ☐

**DIDN'T KNOW SE PROVIDED SUPPORT**

Did not know Scottish Enterprise provided support in this area ☐

**SE DIDN'T OFFER SUPPORT IN THE AREA WE NEEDED**

Scottish Enterprise did not offer support in the areas we needed ☐

**ALREADY HAD ACCESS TO SUPPORT**

Had access to suitable external expertise – academic ☐
Had access to suitable external expertise – private consultants/other business support ☐
Had access to suitable internal expertise ☐
Other (please specify) ☐

| |
|---|
| |

**Question 42: What were your main objectives at this phase (These could be business or technological objectives)? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**MARKET POSITION**

Move ahead of competitors ☐
Help the business to remain competitive ☐
Become market leader in your sector ☐
Improve the image of the firm ☐
Keep up with competitors ☐

**SALES**

Maximise product potential – existing domestic market ☐
Maximise product potential – new domestic market ☐
Maximise product potential – existing export market ☐
Maximise product potential – new export market ☐
Maximise licensing revenues ☐
Maximise other revenue streams ☐
Wanted to develop sales pipeline ☐

**BUSINESS IMPROVEMENT**

Help the business to grow/expand ☐
Develop internal capacity ☐

**PRODUCT/PROCESS/SERVICE IMPROVEMENT**

Wanted to refine/tweak the product/process/service ☐
Wanted to enhance the product to meet market need/want ☐
Other (please specify) ☐

| |
|---|
| |

**Question 43: What were the timescales for the production/marketing phase?**

0-5 months ☐
6-12 months ☐
13-18 months ☐
19-24 months ☐
2-3 years ☐
3-4 years ☐
4-5 years ☐
5 years+ ☐

**Question 44: What was the total cost associated with the production/marketing phase?**

£0-50,000 ☐
£50,001-£100,000 ☐
£100,001-£200,000 ☐
£200,001-£300,000 ☐
£300,001-£400,000 ☐
£400,001-£500,000 ☐
£500,001-£1,000,000 ☐
£1,000,001-£2,000,000 ☐
£2,000,001-£3,000,000 ☐
£3,000,001+ ☐

**Question 45: What finance sources did you use to fund the production/marketing phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PRIVATE SECTOR**

Venture Capital ☐
Angel investors ☐
Bank loan ☐

**PUBLIC SECTOR**

Scottish Government support ☐
Scottish Enterprise support ☐
Other public sector support ☐

**COMPANY LINKED FINANCE**

Firms profits/cash flow ☐
Trade credit ☐
Bank overdraft ☐

**OWN MONEY**

Funded from 'back pocket'/own money ☐
Other (please specify) ☐

| |
|---|
| |

**Question 46: What did you use the money for? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PERSONNEL**

To pay personnel costs ☐
To pay for training ☐

**EQUIPMENT**

To purchase instruments and equipment ☐
To pay for lab costs ☐

**PURCHASE EXTRNAL SUPPORT**

To purchase external business support ☐
To purchase external technical support ☐

**OVERHEADS**

To pay for overheads ☐

**INTELLECTUAL PROPERTY**

To pay for intellectual property protection ☐
Other (please specify) ☐

| |
|---|
| |

**Question 47: What made it difficult for you to get through this phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**LACK OF ACCESS TO KEY VARIABLES**

Lack of finance ☐
Cash flow problems ☐
Lack of access to external expertise ☐
Limited public sector support ☐

**MARKET FACTORS**

Difficulty selling the product ☐
Market no ready to apply the product/process/service ☐
Lack of demand for the product/process/service ☐
Changes in the market ☐
Competitors have developed similar products, processes, services ☐

**LACK OF SKILLS**

Lack of skills – finance ☐
Lack of skills – intellectual property ☐
Lack of skills – project management ☐
Lack of skills – technology ☐
Lack of skills – marketing ☐
Lack of skills – sales ☐

**INTELLECTUAL PROPERTY**

Difficulty of protecting Intellectual property ☐

**UNCERTAINTY**

Length of stage ☐
Other internal activities more of a priority ☐
Other (please specify) ☐

| |
|---|
| |

**Question 48: Please provide further details about the main difficulty?**

[PROMPT - what was the main difficulty
how long did the difficulty last
how were they resolved (if they were resolved)

| |
|---|
| |

**Question 49: What support do you feel would have been useful for you to achieve your objectives for the production/marketing phase?**

## SECTION F: INNOVATION SYSTEM – GROWING BUSINESS PHASE

*This section of the survey looks for key information on growing business phase of company development. By this we mean the stage where the product/process/service is exploited to the full generating increasing revenue and profits.*

***All answers relate only to this particular stage – re-iterate the definition if needed for clarity.***

**Question 50: Who do you work with, or have you worked with in the growing business phase?**
**IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**INTERNAL**
Done internally ☐

**OTHER BUSINESSES**
Work with suppliers ☐
Work with other Scottish businesses ☐
Work with customers ☐

**PUBLIC SECTOR**
Scottish Government ☐
Scottish Enterprise ☐
ITIs ☐
UK public sector organisations ☐
EU departments ☐

**UNIVERSITIES/COLLEGES**
Scottish Universities ☐
Non Scottish Universities ☐
Scottish Colleges ☐
Non Scottish Colleges ☐

**PRIVATE SECTOR**
Private research & development companies ☐
Private sector consultants ☐
Other (please specify) ☐

**Question 51: If you have not worked with Scottish Enterprise at this phase, why have you not worked with them? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**SIGNPOSTED TO APPROPRIATE SUPPORT**
Scottish Enterprise signposted us to appropriate support ☐
Other adviser signposted us to appropriate support ☐

**DIDN'T KNOW SE PROVIDED SUPPORT**
Did not know Scottish Enterprise provided support in this area ☐

**SE DIDN'T OFFER SUPPORT IN THE AREA WE NEEDED**
Scottish Enterprise did not offer support in the areas we needed ☐

**ALREADY HAD ACCESS TO SUPPORT**

Had access to suitable external expertise – academic ☐
Had access to suitable external expertise – private consultants/other business support ☐
Had access to suitable internal expertise ☐
Other (please specify) ☐

| |
|---|
| |

**Question 52: What were your main objectives at this phase (These could be business or technological objectives)? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**SALES**

Wanted to significantly ramp up sales – existing domestic markets ☐
Wanted to significantly ramp up sales – new domestic markets ☐
Wanted to significantly ramp up sales – existing export markets ☐
Wanted to significantly ramp up sales – new export markets ☐

**ALTERNATIVE INCOME STREAMS**

Wanted to exploit intellectual property – licensing ☐
Development of other revenue streams – contract research ☐
Development of other revenue streams – delivering consultancy ☐
Wanted to develop joint ventures ☐

**PRODUCT DEVELOPMENT**

Wanted to refine/tweak the product/process/service ☐
Wanted to enhance the product to meet market need/want ☐
Other (please specify) ☐

| |
|---|
| |

**Question 53: What is the annual cost of the growing business phase?**

£0-50,000 ☐
£50,001-£100,000 ☐
£100,001-£200,000 ☐
£200,001-£300,000 ☐
£300,001-£400,000 ☐
£400,001-£500,000 ☐
£500,001-£1,000,000 ☐
£1,000,001-£2,000,000 ☐
£2,000,001-£3,000,000 ☐
£3,000,001+ ☐

**Question 54: What finance sources do you use to exploit your product/process/service? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PRIVATE SECTOR**

Venture Capital ☐
Angel investors ☐
Bank loan ☐

**PUBLIC SECTOR**

Scottish Government support ☐
Scottish Enterprise support ☐
Other public sector support ☐

**COMPANY LINKED FINANCE**

Firms profits/cash flow ☐
Trade credit ☐
Bank overdraft ☐

**OWN MONEY**

Funded from 'back pocket'/own money ☐
Other (please specify) ☐

| |
|---|
| |

**Question 55: What did you use the money for? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**PERSONNEL**

To pay personnel costs ☐
To pay for training ☐

**EQUIPMENT**

To purchase instruments and equipment ☐
To pay for lab costs ☐

**PURCHASE EXTRNAL SUPPORT**

To purchase external business support ☐
To purchase external technical support ☐

**OVERHEADS**

To pay for overheads ☐

**INTELLECTUAL PROPERTY**

To pay for intellectual property protection ☐
Other (please specify) ☐

| |
|---|
| |

**Question 56: What made it difficult for you to get through this phase? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST. IF MORE THAN 3 REPSONSES RANK TOP 3**

**ACCESS TO KEY VARIABLES**

Lack of finance ☐
Cash flow problems ☐
Lack of access to external expertise ☐
Limited public sector support ☐

**MARKET BARRIERS**

Difficulty selling the product ☐
Market not ready to apply the product/process/service ☐
Lack of demand for the product ☐
Changes in the market ☐
Competitors have developed similar products, processes, services ☐
Competitors copying the product/process/service ☐

**LACK OF SKILLS**

Lack of skills – finance ☐
Lack of skills – intellectual property ☐
Lack of skills – project management ☐
Lack of skills – technology ☐
Lack of skills – marketing ☐

**UNCERTAINTIES**

Length of stage ☐
Other (please specify) ☐

**Question 57: Please provide further details about the main difficulty?**

[PROMPT - what was the main difficulty
how long did the difficulty last
how were they resolved (if they were resolved)

**Question 58: What support do you feel would be useful for you to achieve your objectives for the growing business phase?**

## SECTION G: INTELLECTUAL ASSETS AND IP PROTECTION

*This section of the survey looks at the wide range of potential intellectual property protection and business model.*

**Question 59: Have you secured any intellectual property protection?**

Yes ☐
No [IF NO SKIP TO SECTION H] ☐

**Question 60: What Intellectual Property protection have you used?**

| | Any | UK | EU | Global |
|---|---|---|---|---|
| Registered company names | ☐ | ☐ | ☐ | ☐ |
| Registered domain names | ☐ | ☐ | ☐ | ☐ |
| Registered designs/design rights | ☐ | ☐ | ☐ | ☐ |
| Copyrighted works | ☐ | ☐ | ☐ | ☐ |
| Trade marks (registered) | ☐ | ☐ | ☐ | ☐ |
| Trade marks (unregistered) | ☐ | ☐ | ☐ | ☐ |
| Patents | ☐ | ☐ | ☐ | ☐ |
| Unregistered designs/design rights | ☐ | ☐ | ☐ | ☐ |
| Plant variety rights | ☐ | ☐ | ☐ | ☐ |
| Database rights | ☐ | ☐ | ☐ | ☐ |
| Other (please specify) | ☐ | ☐ | ☐ | ☐ |

**Question 61: What is the nature of your business organisation based intellectual assets? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**GROWTH PLANS**

Acquisition plans ☐
Reorganization plans ☐
Organization vision ☐
Organization strategy ☐
Business plans ☐

**NETWORKS**

College affiliation ☐
University affiliation ☐
Business networks ☐
Personal networks ☐

**PERSONNEL DEVELOPMENT**

Training plans ☐
Marketing plans ☐
Management methods ☐
Experiences ☐
Tacit rules ☐

**INTELLECTUAL ASSET MANAGEMENT**

| | |
|---|---|
| Intellectual Assets/Intellectual property inventory/portfolio | ☐ |
| Intellectual Assets/Intellectual property policy | ☐ |
| Other (please specify) | ☐ |

## SECTION H: EVALUATION OF PROCESS – CAN BE USED FOR GTI

*This section of the survey looks at how you have engaged with Scottish Enterprise, how you have found out about support, why you worked with Scottish Enterprise and how you rated the process.*

**Question 62: In what year did you first start working with Scottish Enterprise?**

**Question 63: How did you find out about the SE support? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| **OTHER BUSINESS** | | | | | |
| Word of Mouth | ☐ | ☐ | ☐ | ☐ | ☐ |
| **PUBLIC SECTOR** | | | | | |
| From Business Gateway | ☐ | ☐ | ☐ | ☐ | ☐ |
| From SE – Account Manager | ☐ | ☐ | ☐ | ☐ | ☐ |
| From Scottish Enterprise – Other | ☐ | ☐ | ☐ | ☐ | ☐ |
| From Scottish Government | ☐ | ☐ | ☐ | ☐ | ☐ |
| From a Local Authority | ☐ | ☐ | ☐ | ☐ | ☐ |
| From Elsewhere in the public sector | ☐ | ☐ | ☐ | ☐ | ☐ |
| **PRIVATE SECTOR** | | | | | |
| From private sector adviser | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other (please specify) | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 64: How well promoted was the Scottish Enterprise support?**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Very good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Neither Good nor poor | ☐ | ☐ | ☐ | ☐ | ☐ |
| Poor | ☐ | ☐ | ☐ | ☐ | ☐ |
| Very poor | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 65: How would you rate the application/selection/engagement process for the Scottish Enterprise support?**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Very straightforward | ☐ | ☐ | ☐ | ☐ | ☐ |
| Straightforward | ☐ | ☐ | ☐ | ☐ | ☐ |
| Neither Straightforward/bureaucratic | ☐ | ☐ | ☐ | ☐ | ☐ |
| Bureaucratic | ☐ | ☐ | ☐ | ☐ | ☐ |
| Very Bureaucratic | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 66: What was your main reason for working with Scottish Enterprise? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Quality of services | ☐ | ☐ | ☐ | ☐ | ☐ |
| Cost of services | ☐ | ☐ | ☐ | ☐ | ☐ |
| No other services available | ☐ | ☐ | ☐ | ☐ | ☐ |
| Lack of knowledge on other services | ☐ | ☐ | ☐ | ☐ | ☐ |
| SE support was appropriate to our needs | ☐ | ☐ | ☐ | ☐ | ☐ |
| Other (please specify) | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 67: How would you rate the communication with Scottish Enterprise throughout the support?**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Very Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Neither Good nor weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Very Weak | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 68: How would you rate the quality of the project management throughout the support?**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Very Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Neither Good nor weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Very Weak | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 69: How would you rate the quality of the advice support received from Scottish Enterprise throughout the support?**

| | Stage 1 | Stage 2 | Stage 3 | Stage 4 | GTI |
|---|---|---|---|---|---|
| Very Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Good | ☐ | ☐ | ☐ | ☐ | ☐ |
| Neither Good nor weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Weak | ☐ | ☐ | ☐ | ☐ | ☐ |
| Very Weak | ☐ | ☐ | ☐ | ☐ | ☐ |

**Question 70: How satisfied were you with the overall service received from Scottish Enterprise?**

| | | GTI |
|---|---|---|
| Very satisfied | ☐ | ☐ |
| Fairly satisfied | ☐ | ☐ |
| Neither satisfied nor dissatisfied | ☐ | ☐ |
| Dissatisfied | ☐ | ☐ |
| Very Dissatisfied | ☐ | ☐ |

## SECTION I: ECONOMIC IMPACT - OUTPUTS

*This section of the survey looks at the potential early benefits that you may have realised from working with Scottish Enterprise.*

**Question 71: Has the support you have received from Scottish Enterprise allowed you to develop any of the following? TICK ALL THAT APPLY**

**NEW PRODUCTS**
- New products to the company ☐
- New products to the market ☐

**NEW PROCESSES**
- New processes to the market ☐
- New processes to the company ☐

**NEW SERVICES**
- New services to the company ☐
- New services to the market ☐

**IMPROVED PRODUCTS**
- Improved products to the company ☐
- Improved products to the market ☐

**IMPROVED PROCESSES**
- Improved processes to the company ☐
- Improved processes to the market ☐

**IMPROVED SERVICES**
- Improved services to the company ☐
- Improved services to the market ☐

**Question 72: Has the support you have received from Scottish Enterprise allowed you to develop any of the following? TICK ALL THAT APPLY**
- Implement a new or significantly improved corporate strategy ☐
- Implementation of new management techniques within your business ☐
- Implementation of major changes to your organizational structure ☐
- Implementation of changes to marketing concepts or strategies ☐

**Question 73: What wider benefits have you experiences as a result of the support received from Scottish Enterprise? IF USING EXAMPLES PICK AT RANDOM FROM THE LIST**

**IMPROVED SKILLS**
- Improved technological knowledge ☐
- Improved ability to attract highly skilled staff ☐
- Improved skills of staff ☐
- Improved qualifications of staff ☐

**SALES**
- New domestic sales ☐
- Improved domestic sales ☐
- New export markets ☐
- Improved export sales ☐

**PRODUCTIVITY**
- Cost savings ☐
- Improved delivery times ☐

**INTELLECTUAL PROPERTY**
- Protection of intellectual property (patents, copyrights, trade marks) ☐
- Increased income from intellectual property (licensing, joint ventures) ☐

**IMPROVED QUALITY**
- Achievement of quality standards (ISO, industry standards) ☐

**INCREASES COMPANY VALUES**

Increase in the overall value of the company ☐

Increase in the value of assets ☐

## SECTION J: ECONOMIC IMPACT - OUTCOMES

*This section of the survey looks at your company growth and tries to understand the role Scottish Enterprise may have played in the achievement of this*

**Question 74: What has been your business turnover in each year over the last 5 years?**

| | |
|---|---|
| 2007 | |
| 2006 | |
| 2005 | |
| 2004 | |
| 2003 | |

**Question 75: how different would your turnover change have been without Scottish Enterprise assistance? SINCE THE COMPANY STARTED TO WORK WITH SE**

| | Overall | GTI |
|---|---|---|
| Between 2006-2007 | | |
| Between 2005-2006 | | |
| Between 2004-2005 | | |
| Between 2003-2004 | | |

[PROMPT – How different would your change in turnover have been without SE support?

- A lot lower
- Moderately lower
- About the same
- Moderately higher
- A lot higher

PROMPT – if about the same – do you think turnover change would have been?

- A bit lower
- Exactly the same - PROMPT – Clarify that the support they have has made no difference
- A bit higher

PROMPT – providing your best estimate what proportion of your turnover change could you attribute to Scottish Enterprise support?

- Record actual value if given
- 1-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%]

PROMPT – Check implication positive or negative]

**Question 76: What proportion of your turnover has been accounted for by bought in goods & services in each year over the last 5 years?**

| | | |
|---|---|---|
| 2007 | | IF PRE REVENUE BROAD AMOUNT |
| 2006 | | IF PRE REVENUE BROAD AMOUNT |
| 2005 | | IF PRE RECENUE BROAD AMOUNT |
| 2004 | | IF PRE REVENUE BROAD AMOUNT |
| 2003 | | IF PRE REVENUE BROAD AMOUNT |

[PROMPT – providing your best estimate what % band would you say best reflects the cost of bought in goods & services

- 0-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%
- 101-110% - reflects a company making a loss
- 111-120% - reflects a company making a loss
- 121-130% - reflects a company making a loss]

**Question 77: What has been your profit/loss level in each year over the last 5 years?**

| | |
|---|---|
| 2007 | |
| 2006 | |
| 2005 | |
| 2004 | |
| 2003 | |

**Question 78: how different would your change in profit have been without Scottish Enterprise assistance? SINCE THE COMPANY STARTED TO WORK WITH SE**

| | Overall | Overall GTI |
|---|---|---|
| Between 2006-2007 | | |
| Between 2005-2006 | | |
| Between 2004-2005 | | |
| Between 2003-2004 | | |

[PROMPT – How different would your change in profit have been without SE support?

- A lot lower
- Moderately lower
- About the same
- Moderately higher
- A lot higher

PROMPT – if about the same – do you think your change in profit would have been?

- A bit lower
- Exactly the same – PROMPT – Clarify that the support they have has made no difference
- A bit higher
-

PROMPT – providing your best estimate what proportion of your change in profit could you attribute to Scottish Enterprise Support?

- Record actual value if given
- 1-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%]

PROMPT – Check implication positive or negative]

**Question 79: What has been your level of employment in each year over the last 5 years?**

| | |
|---|---|
| 2007 | |
| 2006 | |
| 2005 | |
| 2004 | |
| 2003 | |

**Question 80: how different would your change in employment have been without Scottish Enterprise assistance? SINCE THE COMPANY STARTED TO WORK WITH SE**

| | Overall | GTI |
|---|---|---|
| Between 2006-2007 | | |
| Between 2005-2006 | | |
| Between 2004-2005 | | |
| Between 2003-2004 | | |

[PROMPT – How different would your change in employment have been without SE support?

- A lot lower
- Moderately lower
- About the same
- Moderately higher
- A lot higher

PROMPT – if about the same – do you think your change in employment would have been?

- A bit lower
- Exactly the same - PROMPT – Clarify that the support they have has made no difference
- A bit higher

PROMPT – providing your best estimate what proportion of your change in staff could you attribute to Scottish Enterprise support?

- Record actual value if given
- 1-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%]

ALTERNATIVE (if more comfortable with actual numbers)
0-10 staff
11-20 staff
21-30 staff
31-40 staff
41-50 staff
50+ staff

PROMPT - check implication positive or negative]

**Question 81: What has been your total employee costs in each year over the last 5 years?**

| | | |
|---|---|---|
| 2007 | | Potentially as a % of turnover |
| 2006 | | Potentially as a % of turnover |
| 2005 | | Potentially as a % of turnover |
| 2004 | | Potentially as a % of turnover |
| 2003 | | Potentially as a % of turnover |

**Question 82: What has been total depreciation in each year over the last 5 years?**

| | | |
|---|---|---|
| 2007 | | Potentially as a % of turnover |
| 2006 | | Potentially as a % of turnover |
| 2005 | | Potentially as a % of turnover |
| 2004 | | Potentially as a % of turnover |
| 2003 | | Potentially as a % of turnover |

**Question 83: Which of the following statements best describes the location of your competitors?**

All my competitors are based in Scotland ☐
The majority of my competitors are based in Scotland ☐
Around half of my competitors are based in Scotland ☐
A minority of my competitors are based in Scotland ☐
None of my competitors are based in Scotland ☐

**Question 84: What proportion of your competitors are based in Scotland?**

**Question 85: How would you describe the market for your main products or services over the last 3 years?**

Growing strongly ☐
Growing ☐
Static ☐
Declining ☐
Declining strongly ☐

**Question 86: Which of the following statements best describes your purchase of supplies for your business?**

All our supplies are purchased from Scotland ☐
The majority of my supplies, in terms of value are purchased from Scotland ☐
Around half of my supplies, in terms of value are purchased from Scotland ☐
A minority of my supplies, in terms of value, are purchased from Scotland ☐
None of our supplies are purchased from Scotland ☐

**Question 87: What proportion of your supplies come from within Scotland?**

## SECTION K: FUTURE IMPACTS – FUTURE OUTCOMES

*This section of the survey looks at your potential company growth over the next 10 years focusing on employment, bought in goods and services and employment.*

### Question 88: What do you expect your employment to be?

| | |
|---|---|
| This year (2008) | |
| Next year (2009) | |
| 3 years from now 2011 | |
| 5 years from now 2013 | |
| 10 years from now 2018 | |

[PROMPTS – What you are saying is that you expect your employment to decline/remain static/grow over the next 3 years
PROMPTS – this amounts to a increase/decrease of around 25%/50%/75%/100% (doubling)
PROMPTS – what will be the key activities that will require extra staff]

### Question 89: What do you expect your turnover to be?

| | |
|---|---|
| This year (2008) | |
| Next year (2009) | |
| 3 years from now 2011 | |
| 5 years from now 2013 | |
| 10 years from now 2018 | |

[PROMPTS – What you are saying is that you expect your turnover to decline/remain static/grow over the next 3 years
PROMPTS – this amounts to a increase/decrease of around 25%/50%/75%/100% (doubling)
PROMPTS – what are the key areas where you expect to increase/decrease your turnover – new domestic markets/ increased sales in existing markets/ new export markets/increased sales in existing export markets/ licensing income from patented products/ selling of new product/process/service innovation]

### Question 90: What would you expect the cost of bought in goods & services to be?

| | | |
|---|---|---|
| This year (2008) | | potentially as a % of turnover |
| Next year (2009) | | potentially as a % of turnover |
| 3 years from now 2011 | | potentially as a % of turnover |
| 5 years from now 2013 | | potentially as a % of turnover |
| 10 years from now 2018 | | potentially as a % of turnover |

PROMPT – providing your best estimate what % band would you say best reflects the cost of bought in goods & services

- 0-10%
- 11-20%
- 21-30%
- 31-40%
- 41-50%
- 51-60%
- 61-70%
- 71-80%
- 81-90%
- 91-100%
- 101-110%
- 111-120%
- 121-130%

**Question 91: What do you expect your profit to be?**

| | | |
|---|---|---|
| This year (2008) | | potentially as a % of turnover |
| Next year (2009) | | potentially as a % of turnover |
| 3 years from now 2011 | | potentially as a % of turnover |
| 5 years from now 2013 | | potentially as a % of turnover |
| 10 years from now 2018 | | potentially as a % of turnover |

[PROMPTS – What you are saying is that you expect your profit to decline/remain static/grow over the next 3 years
PROMPTS – this amounts to an increase/decrease of around 25%/50%/75%/100% (doubling)
PROMPTS – what are the key areas where you expect to increase/decrease your profits – greater efficiency through products/processes/service innovation, increase revenue with same margins – domestic market, increased revenue with same margins – export market, licensing income]

**Annex B2: Stakeholder Topic Guide**

## Rationale and intervention

What was the rationale for the GTI project?

What evidence underpinned the development of the GTI project?

What was the fit of the project with the policy environment?
Fit, overlap, similar projects, duplication

Why did SE fund the project?

Why did Edinburgh University fund the project?

Was the level of funding appropriate?

If the project was designed to overcome information failure…

- what information do companies need to operate in the genomics market?
- what is the demand for information in this market?
- is the information on the genomics market readily available?
- who provides information on the market?
- what are the costs associated with accessing information on the market?
- is the perception of costs different from the actual cost?
- what are the benefits of accessing information on the market?
- are the perceived benefits different from the actual benefits?
- are individuals able to understand the information on the genomics market?
- how has this changed since the inception of GTI?
- areas of progress – market adjustment?
- areas of limited progress – continued market failure/imperfection?

What were the projects key objectives? – why these?

What activities were delivered? – why?

What would success of GTI look like?

## Project management and delivery

What was the management structure of GTI? – was this appropriate?

Who were the key partners? – How well did they work together?

What processes were in place for partner communication? – how well did these work?

What processes were in place for monitoring progress? - how well have these been tracked over time?

What was the process for engaging companies? – was this the right approach?

What were procedures for engaging with other SE Support? – key linkages?

Overall, how well was the project delivered?

What worked well? - why?

What didn't work so well? – why?

What problems were encountered (barriers)? – how were these overcome?

What could have been done differently – why?

### Project Outputs and Outcomes

Was demand for the project in line with expectation? – reasons for variance?

What objectives were achieved? – why?

What objectives were not achieved? – why?

In what areas was satisfaction highest? – why?

In what areas was satisfaction lowest? – why?

What were the benefits of the GTI project? – time period for realisation?
Collaborations, leverage, innovations, IP generation

What were the outcomes from the GTI project? – time period for realisation?
Improved business performance, market adjustment, sustainable development

Were there any unintended consequences of the project? – what?

Did the project offer value for money?

- Cost of acquiring the inputs (economy)
- Cost of inputs to outputs (efficiency)
- Did outputs lead to outcomes (effectiveness)

### The Future

Is there a continued rationale for the intervention? – what?

Is there continued demand for the services? – level of demand?

Where should the focus be – market segments?

What improvements could be made for the remaining period of the project?

What level of resources should be committed to the project?

Where would resources come from?
SE, Edinburgh University, EU sources, others

How could the project be aligned with other SE support?

### Bioquarter Commercialisation Strategy

What is the bioquarter commercialisation strategy?

How does the commercialisation plan align with other SE activity?

Has GTI been part of the thinking behind the commercialisation strategy?

If not considered why not?

Where is there crossover with the GTI project?

What issues would there be in aligning current and past GTI activity with the commercialisation plan?

Where would there be gaps? How could these be filled?

# Appendix 3

**ECONOMIC IMPACT WORKBOOKS**

**Appendix 4**

# Consultees

| Companies Surveyed |
|---|
| Affymetrix |
| Aptuit |
| Arrayjet |
| Dharmacon |
| Lab 901 |
| Fios Genetics |

| Stakeholder Name | Organisation |
|---|---|
| Rhona Allison | Scottish Enterprise |
| Ed Hutchinson | Scottish Enterprise |
| Jonathan Wilson | Scottish Enterprise |
| Peter Ghazal | Division of Pathway Medicine |
| Till Bachmann | Division of Pathway Medicine |
| Jamie Love | Division of Pathway Medicine |
| Catriona Anderson | Division of Pathway Medicine |
| Gillian Brown | ITI Techmedia |
| Terry Hurley | ITI Techmedia |
| Ana Gallardo | ITI Techmedia |
| Eleanor Mitchell | ITI Life Sciences |
| Paul Heaney | ITI Life Science |

**Appendix 5**

# Outline Monitoring and Evaluation Framework

## Monitoring of the Project

An example monitoring structure is included in this section with some Business Connections specific examples to guide thinking.

A transparent monitoring and evaluation structure should be implemented to ensure that the benefits of the project are considered at critical project development and delivery stages. This should include:

- quarterly reporting on financial inputs and costs over the period of the project works, including spend against target and by element; and
- monitoring of the programme across any phased work streams

The objectives will require to be monitored over the period of the project. Some basic project variables are included in Table A5.1 below

**Tale A5.1: Basic Project Monitoring Variables**

| **Basic Project Variables** |
|---|
| **Inputs** |
| SE contribution |
| University contribution |
| **Activities** |
| Events – attendees |
| Events – companies |
| Company collaborations |
| Company start ups |
| **Outputs** |
| Investment in R&D |
| New products/processes/services |
| **Outcomes** |
| GVA |
| Employment safeguarded |
| Employment created |

The purpose of the ex-post evaluation should be directed towards a full consideration of the project, and detail the way in which support has delivered the intended outcomes, and identify lessons for future intervention. The issues covered should include:

- **Appropriateness –** was it the right thing to do?
- **Process efficiency** – was it well implemented?
- **Process improvement** – how could it have been done better?
- **Quality** – how good were the outputs?
- **Impact** – what has happened as a consequence?
- **Additionality** – what has happened which would not have happened otherwise?
- **Displacement** – have benefits come at the expense of other companies in Scotland?
- **Economy** – were the costs of acquiring the inputs to the programme reasonable?
- **Efficiency** – Did the project deliver the maximum outputs for the inputs?
- **Effectiveness** – did the project deliver the desired outcomes?
- **Efficacy** – how did the ROI compare with expectations?
- **Strategy –** what should be done next?