

**Baseline Study for the Life Sciences
Sector in the Highlands & Islands**

Final Report

to

Highlands & Islands Enterprise



with



January 2010

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EXECUTIVE SUMMARY

RESEARCH OBJECTIVES

The overall objective of the research was to produce a baseline assessment of activity in the life sciences sector in the Highlands & Islands. The detailed objectives were to:

- Produce indicators for analysing the performance of the life sciences sector in the Highlands & Islands.
- Use the indicators to develop a baseline of the existing position of life sciences in the Highlands & Islands, including trend data for recent years.
- Inform the overall findings through consultations with a number of life sciences organisations operating in the Highlands & Islands.

APPROACH

The approach to undertaking the research was as follows:

- A definition was developed for life sciences.
- Existing official economic datasets were reviewed. A number of significant weaknesses were identified. It was concluded that a proper assessment of the sector's economic contribution would require primary research with life sciences organisations.
- A series of indicators covering both economic and other measures was developed to structure the baseline assessment.
- An online survey of life sciences organisations covered by the agreed definition was undertaken.
- The survey results were supplemented with our own knowledge of the sector and publicly available information to produce estimates of the sector's economic contribution.
- Consultations were undertaken with a representative sample of Highlands & Islands life sciences companies.

SECTORAL DEFINITION

For the purposes of the study the following definition was adopted. A life sciences organisation is one that uses science and/or technology:

1. For research into biological systems (i.e. those from living organisms such as plants, animals, human beings, or bacteria), biologically derived data or with biological application;
2. For the development of products that are derived from, interact with, or are based on biological materials, systems or data; **or**
3. Provides key sectoral services; **or**
4. Supplies key active components to support these activities.

Those providing products and services which are not key to the sector and do not use science or technology in the immediate provision of said products or services lie outside of this definition. Under this definition the sector encompasses the private, academic and third sectors.

ECONOMIC CONTRIBUTION OF THE LIFE SCIENCES SECTOR

For the financial year 2008-2009 the direct economic contribution of the life sciences sector in the Highlands & Islands is estimated as:

- Employment: 1,789 Full-Time Equivalent jobs.
- Annual turnover: £194.3 million.
- Annual Gross Value Added: £131.1 million.
- Annual gross wages & salaries: £48.7 million

The survey responses suggest that the recent underlying trend among Highlands & Islands life sciences organisations has been one of growth in turnover, GVA and wages & salaries. However, employment has tended to increase at a slower rate than that for the other measures.

LIFE SCIENCES ORGANISATIONS IN THE HIGHLANDS & ISLANDS: PRIMARY RESEARCH FINDINGS

In terms of **length of operation in the Highlands & Islands** over half of the organisations had been operating before 2004, with around one in five since before 2000. The private companies responding to the survey have a younger profile than all respondents. The overall findings suggest that the sector has a relatively young group of companies with high growth potential.

Approaching half of the survey respondents' offices/facilities in the Highlands & Islands are **part of a larger organisation**.

The organisations were at a wide range of **stages of development**. The main ones cited were "Growing business", "Early stage technology development" and "Product development".

Organisations believe the **level of competency** within their organisation to be at least adequate in the fields of "Technology Development", "Finances" and "Intellectual Assets". In contrast, respondents had less confidence in their abilities regarding "Securing Investment".

Just over two-thirds of respondents stated that they had been awarded **research and development grants** within the past three years in relation to their activities within the Highlands & Islands. HIE and Scottish Government (including Funding Councils) were the most common sources of these grants.

Slightly over a third of organisations had obtained **equity and loan finance** within the last three years. In almost all cases, more than one source had been utilised. The most common sources were family & friends and bank loan.

A slight majority of survey respondents obtain turnover/income from more than one **sub-sector** of life sciences. Almost all respondents gain turnover/income from between one and three sub-sectors. The results for private limited companies-excluding ones involved with sector-specific consultancy-show a reasonably even spread of activities across the full range of sub-sectors.

Respondents' main **areas of specific activity** are own research & development and contract research. Each is undertaken by half of the organisations. In contrast, none of the respondents is involved in contract manufacture. This spread of activity across the various categories reflects the mix of respondents to the survey.

Respondents' *main customers* are quite evenly spread in terms of geographical location. However, the picture is quite different in terms of the *most important* customer. The predominant category is "Scotland outside the Highlands & Islands", followed by "UK outside Scotland" and "Rest of the World".

Overall, **competition** is with organisations based outside the Highlands & Islands and also, in general, outside Scotland. This picture is more pronounced for private limited companies.

The level of **patenting** activity indicates that a reasonable number of respondents are aware of the value of intellectual assets and have some first-hand experience of the patenting process.

The modest level of **in and out licensing** is indicative of a relatively young sector.

There is a higher level of all types of **formal strategic alliance** between companies than between companies and academic organisations. In most instances, there are more alliances within the UK than outside.

Half of the respondents stated that they are obligated to work to a **Quality Assurance Standard** because of the nature of their work.

Over three quarters of respondents indicated that the life sciences **supply chain** in the Highlands & Islands meets, at least in part, their requirements. However, only one in eight view that the supply chain "fully" meets their requirements.

Over half reported problems in **recruiting staff** for positions within the Highlands & Islands. However, none reported very significant problems.

The consultations identified a range of challenges arising from **operating a life sciences company from a Highlands & Islands location**. They also suggest that companies undertake only limited **networking within the Highlands & Islands**.

1 INTRODUCTION

This is the final report for a baseline study of the life sciences sector in the Highlands & Islands. The research was undertaken on behalf of Highlands & Islands Enterprise (HIE) between March and November 2009.

1.1 RESEARCH OBJECTIVES

The overall objective of the research was to produce a baseline assessment of activity in the life sciences sector in the Highlands & Islands. The detailed objectives were to:

- Produce indicators for analysing the performance of the life sciences sector in the Highlands & Islands.
- Use the indicators to develop a baseline of the existing position of life sciences in the Highlands & Islands, including trend data for recent years.
- Inform the overall findings through consultations with a number of life sciences organisations operating in the Highlands & Islands.

1.2 STRUCTURE OF THE REPORT

Chapter 2	Describes and explains the approach to the research.
Chapter 3	Presents the findings on the economic contribution of the life sciences sector in the Highlands & Islands.
Chapter 4	Contains a range of other information about life sciences organisations in the Highlands & Islands.

There is also an **Appendix** which contains a copy of the online survey questionnaire.

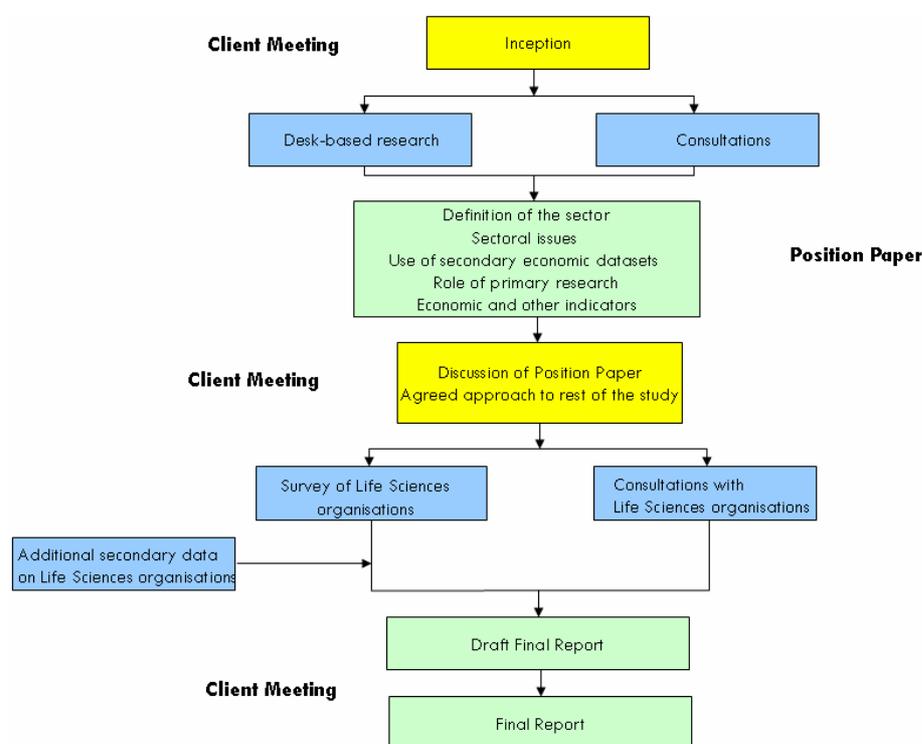
2 APPROACH TO THE RESEARCH

2.1 INTRODUCTION

This Chapter describes and explains the approach taken to the research. It covers:

- Contextual information on the life sciences sector.
- The definition of life sciences adopted for this study.
- Limitations of official economic datasets.
- Indicators.
- Primary research with life sciences organisations.
- Supplementing the primary research findings.

The diagram below summarises the method by which the study has been undertaken.



It shows that the initial phase of the study involved both desk-based research and consultations. These were used to inform the subsequent approach. Consultations were undertaken with:

- Scottish Government.
- Scottish Enterprise.
- Scottish Development International.
- BiIndustry Association.
- Targeting Innovation.
- East Region Biotech Initiative.
- One North East.

These organisations were selected on the basis of their being known to have a particular focus on life sciences. The consultations covered: sectoral definitions; previous studies undertaken and metrics used; and sector-specific issues.

2.2 CONTEXT: THE LIFE SCIENCES SECTOR

2.2.1 The Sector

The global life sciences sector, and in particular the biotechnology tool box which fuels much of the progress, is approaching the end of its fourth decade. Over the years there have been a wealth of enabling technologies making an invaluable contribution to the world we know.

However, it is generally considered that this is likely to pale into insignificance when compared with the advances that will be made in life sciences during the forthcoming years. Genome and proteome projects, the huge advances in understanding of cellular processes, and the convergence of previously separate disciplines, has accelerated the pace of discovery and brought new subjects and a new associated vocabulary to the fore.

This, coupled with a rapidly aging population with its associated healthcare demands, will ensure that life sciences will be a leading industry in the 21st century. From a human healthcare perspective, the key drivers for the future are seen to be the challenge faced by the pharmaceutical industry caused by the imminent expiry of key patents, the growth in personalised medicines, and the globalisation agenda.

Other industry sectors contribute their own drivers such as the need for sustainable, environmentally-friendly agriculture; conservation of non-renewable resources; and the spiralling demand for novel biocatalysts and biosensors. When taken together there are a myriad of industry sectors with much to gain from life sciences.

2.2.2 The Sector In Scotland

Scotland is host to one of the most sizeable life sciences clusters in Europe, estimated to include over 600 organisations. With over 400 of these organisations having less than 50 employees, the sector might still be considered to be in its infancy. However on either side of these 400 sits:

- The research power of over 50 publicly-funded academic research facilities attracting annual research funding of over £400 million; and
- Corporate giants with significant global reach, such as Wyeth, Invitrogen, Schering Plough, Charles River, and Johnson & Johnson.

Moreover with an average of 20 new life sciences companies starting to trade each year, and significant merger and acquisitions activity, the cluster is dynamic. This dynamism is further reflected in the requirement for the sector to be ever mindful of the changing market place in which it operates and for innovation and reinnovation to lie at the heart of business strategy. This was recently recognised internationally by FierceBiotech (promoted as 'the biotechnology industry's daily monitor') which listed Scotland as one of the global top five innovative regions for biotech.

There is a growing number of examples of serial entrepreneurship within the life sciences sector, with smaller companies being supported by the technology and business acumen of individuals with a proven track record. While Scotland considers itself to have something to offer in almost all areas of life sciences, key areas of strength are seen as being translational medicine (often referred to as bench-to-bedside technology), drug discovery and development, stem cell technology, animal sciences, and point-of-care diagnostics.

life sciences is identified in Scottish Government's Economic Strategy as one of six key sectors with high-growth potential. Support for the sector comes from a number of public sector bodies, including HIE and Scottish Enterprise. These in turn have supported and encouraged the establishment of a number of organisations (BIA Scotland, Nexxus, BioDundee) aimed at the provision of high-quality information relevant to the sector and facilitating networking with a view to enhancing collaborative endeavour.

The human resource requirement of the life sciences sector varies from those with a sound grounding in technological innovation and laboratory techniques, to those with demonstrable regulatory or senior management experience, from those well versed in marketing and sales to those with knowledge of finance. As such, the sector faces many of the same challenges as other technology-driven sectors in terms of recruitment. Within Scotland the most frequent complaint is the shortage of individuals with strong business acumen; in particular senior executives with an understanding of science and technology.

2.2.3 The Sector in the Highlands & Islands

The Highlands & Islands has developed its own areas of specialism highly relevant to the Scottish life sciences agenda. For example:

- Inverness and its environs has become a centre of excellence for diabetes. This is in major part due to the presence of LifeScan Scotland. However, it is also a consequence of the creation of two new professorial positions and the associated staffing covering both clinical and research aspects of diabetes, the creation of the Centre for Health Science, and a number of diabetes focussed commercial enterprises established in recent years.
- The rich biodiversity afforded by a substantial coastline and ecological niches lends itself to organisations interested in mining the biodiversity for new products with application across a range of life sciences markets.
- A dispersed population requires the development of innovative technology aimed at the remote and rural healthcare agenda. As a consequence this has become an area of strength and a strategic focus.

The growth of the UHI Millennium Institute is providing the region with its own academic research capability. It is also helping to provide a pool of well-trained employees for the future. This, coupled with networking organisations such as Fusion, and the emergence of new companies, is helping to provide the necessary critical mass to allow the successful development of the sector.

2.3 DEFINITION OF LIFE SCIENCES

2.3.1 Definition

For the purposes of the study the following definition was adopted. A life sciences organisation is one that uses science and/or technology:

1. For research into biological systems (i.e. those from living organisms such as plants, animals, human beings, or bacteria), biologically derived data or with biological application;
2. For the development of products that are derived from, interact with, or are based on biological materials, systems or data; **or**
3. Provides key sectoral services; **or**
4. Supplies key active components to support these activities.

Those providing products and services which are not key to the sector and do not use science or technology in the immediate provision of said products or services lie outside of this definition.

It was agreed that utilising this definition would mean encompassing the private, academic and third sectors.

This definition of life sciences means that organisations may be included or excluded from this baseline study with reasoned justification. The use of this definition does, however, exclude some companies that operate within the health space. For example, communications and software companies are important players within the field of remote healthcare (an area of strategic focus for HIE's life sciences activity) and thus contribute to the region's economy. Nevertheless, they have been excluded from this baseline analysis.

A similar situation exists with nutraceuticals and cosmeceuticals. The vendors of such products are important actors in the supply chain but have been excluded from this baseline analysis.

Given the above, there is limited ability to compare the characteristics of the sector (as defined) in the Highlands & Islands with those of the sector elsewhere (where a different definition has been applied). This is particularly the case in terms of economic contribution.

Nevertheless, the definition adopted by this work builds on, and is consistent with, the less detailed definitions used by others. These include:

“Life sciences is all sciences that have to do with ‘organisms’ like plants, animals and human beings”

“Life science is the use of science and technology to improve the health and well-being of a population”

“Life science includes any of several branches of science, such as biology, medicine, anthropology, or ecology, that deal with living organisms and their organisation, life processes, and relationships to each other and their environment”

“Life sciences refers to the scientific study of the living world as a whole”

2.3.2 Subsectors

Organisations falling under definition (1) or (2) at **2.3.1** can be further categorised in terms of the following subsectors:

- **Agri-biotechnology.** Biotechnology as applied to agriculture.
- **Aquaculture.** The rearing of aquatic animals or the cultivation of aquatic plants for food.
- **Cosmeceutical.** Cosmetic products that are claimed to have medicinal benefit.
- **Environmental.** Of, relating to, or associated with the environment.
- **Medical Devices-Diagnostics.** Devices used to identify or determine the nature and circumstances of an existing medical condition.
- **Medical Devices-Other.** Any non-diagnostic medical device.
- **Non-diagnostic, Non-medical Test Platforms.** A life science test platform aimed at, for example, oil scavenging.
- **Nutraceuticals.** Extracts of food that are claimed to have a medicinal effect.
- **Therapeutics.** A branch of medicine concerned with the treatment of disease.
- **Veterinary.** Concerned with, or connected to, the medical or surgical treatment of animals.

It is recognised that most organisations will straddle two or more of these categories.

2.4 **LIMITATIONS OF OFFICIAL ECONOMIC DATASETS**

2.4.1 Introduction

The size and nature of most sectors of the Scottish economy can be assessed through official economic statistics. This can be done by matching the sector to the relevant Standard Industrial Classification (SIC) codes. This approach was utilised in, for example, the HIE baseline study of the Financial & Business Services sector. Therefore, that study did not have to collect data on employment, turnover, etc. via primary research with organisations in the sector.

2.4.2 SIC-Based Approach

It was recognised at the outset that there would be limitations to a SIC-based approach for measuring life sciences in the Highlands & Islands. This reflects that the SIC codes do not fit well with the usual definitions of the sector, including the one adopted for this study as set out at **2.3**.

However, data were collected using the SIC codes that have been adopted by Scottish Government for tracking the sector. Recognising that, at best, this would offer only a proxy for life sciences activity in the Highlands & Islands, the data cover the following classifications:

- Manufacture of pharmaceuticals, medicinal chemicals and botanical products (SIC 24.4).
- Manufacture of medical and surgical equipment and orthopaedic appliances (SIC 33.1).
- Research and experimental development on natural sciences and engineering (SIC 73.1).

Analysis of the three classifications separately would have been heavily constrained by data confidentiality issues. Publishing separate data for each of the three SICs shown above could effectively allow identification of the size (employment, turnover, etc.) of a specific organisation, which is dominant within a particular classification. Therefore, for reasons of confidentiality it is only possible to show the total results for the three SIC codes combined.

The results are shown at **Table 2.1**, over. The available data suggest that activity in the Highlands & Islands has been increasing since 2002 in terms of number of business units, employment and, in particular, turnover. The pattern for wages & salaries has been less consistent, particularly when measured on a per employee basis.

The number of business units, employment and turnover have also increased in Scotland during the same period. The rate of growth has been higher within the Highlands & Islands than for Scotland as a whole, although from a much lower base.

The data also suggest that:

- Across most measures (employment, turnover, GVA and wages & salaries) activity in the Highlands & Islands accounts for 3%-5% of total sectoral activity in Scotland.
- In contrast, the region's share of Scottish business units is higher (10% in 2007). This indicates that the average size of Highlands & Islands organisations is lower than the Scottish average.
- Possibly reflecting this, the average GVA per employee and wages & salaries per employee is lower among the Highlands & Islands organisations than for Scotland as a whole.

The data suggest that in 2007 in the Highlands & Islands the sector employed around 800 people, had a turnover of approaching £44 million and GVA of around £32 million. **However, publicly available information-particularly regarding employment-suggests that this is an underestimate of life sciences activity in the region.** This again points to the difficulties of relying on an approach based on official economic datasets.

TABLE 2.1: LIFE SCIENCES : SIC-BASED ANALYSIS

Highlands & Islands							
Year	Business Units	Employees (Thousand)	Turnover (£m)	GVA (£m)	Gross Wages & Salaries (£m)	GVA Per Employee (£)	Gross Wages & Salaries Per Employee (£)
2002	30	0.4	16.0	*	7.9	*	22,221
2003	36	0.7	38.8	*	18.3	*	27,804
2004	33	0.6	44.0	*	16.9	*	28,965
2005	36	0.6	41.3	30.0	18.3	49,274	30,071
2006	43	0.8	47.8	32.2	18.8	42,024	24,564
2007	48	0.8	43.8	31.5	15.9	39,399	19,913
Scotland							
2002	385	13.4	1,103.1	*	339.7	*	25,327
2003	405	13.3	1,413.7	*	361.0	*	27,218
2004	416	13.0	1,276.5	*	362.7	*	27,863
2005	457	13.3	1,460.5	751.3	405.4	56,418	30,445
2006	472	15.8	1,558.1	753.4	412.0	47,725	26,099
2007	491	18.0	1,614.1	762.8	447.8	42,438	24,912

Source: Annual Business Inquiry (ABI) Notes: Estimates for 2005 and earlier are on a different basis to those from 2006 onwards, mainly due to a change in the specific date to which the data relate. The 2003 data are based on the Standard Industrial Classification (SIC) 2003 which differs from previous years' data. These factors limit the ability to confidently analyse trends over time. * Data cannot be published for reasons of confidentiality

2.4.3 Alternative Approach Using Secondary Datasets

The limitations of the SIC-based approach were discussed above. One potential means of addressing this was to replicate an approach used by Scottish Enterprise. This would involve:

- Developing a list of organisations currently active in life sciences-as per the agreed definition-in the Highlands & Islands.
- Submitting the list to Scottish Government for them to provide economic data (on an aggregated and wholly anonymised basis) for the specific organisations. The available data covered the period 1998-2006.

This approach was undertaken for this study. The aim was to explore how far it would generate useful secondary economic data for the sector in the Highlands & Islands.

We developed an initial list of 46 organisations involved in life sciences in the Highlands & Islands, as per the sectoral definition shown at **2.3**. Scottish Government statisticians undertook the work to match the organisations against official economic data. Around two thirds (31) of the organisations were matched against the official data in at least one of the nine years. The highest number of matches in any one year was 25 (in 2006).

Thus a number (equal to around one third of the total) of the organisations on the list were not matched for any of the years between 1998 and 2006. We understand that non-matches can be for a number of reasons. The principal ones are that:

- The organisations were not operating during the period covered by the data-that is, 1998-2006. This is an important issue in the context of what is a dynamic sector in the Highlands & Islands. As shown at **Chapter 4**, a number of life sciences organisations have commenced operations in the region since 2006.
- There are differences between the organisations' records (address, name, etc.) that are recorded and those contained in our own list. It could be, for example, that an organisation has changed its name since 2006.

In addition, Scottish Government's analysis highlighted that the total size of the sector (in terms of employment, Gross Value Added, etc.) was dominated by one specific organisation. Therefore, for reasons of confidentiality Scottish Government were unable to release the data.

2.4.4 Review

To summarise, the official economic data:

- Do not relate to the full body of organisations currently active in the Highlands & Islands life sciences sector.
- Do not fully reflect the known size of the sector in the region.
- Can only describe the position up to 2007 in what is a dynamic sector.

- Do not fully describe the full activity in the sector for any one year. This is because they exclude those organisations that were trading at some point between 1998 and 2007 but are no longer trading in 2009.

For larger sectors or for larger geographies these issues are much less significant. This is because the data are less prone to influence from the exclusion of a small number of organisations. However, the life sciences sector in the Highlands & Islands is much more susceptible to this given its relatively small number of organisations.

2.4.5 Conclusion

It was recognised that available secondary economic data are inadequate for properly measuring the economic contribution of the sector. It was therefore agreed with HIE that economic data, as well as information on other indicators and areas of interest, would be collected mainly via primary research with Highlands & Islands life sciences organisations.

2.5 INDICATORS

Two sets of key indicators were developed and agreed with HIE. First, **economic** indicators which reflect standard measures of economic activity. These are:

- Number of business units.
- Employment.
- Turnover.
- Gross value added.
- Gross wages & salaries.

Second, **other** indicators. These reflect both our own knowledge of the sector and metrics adopted by other organisations in measuring life sciences activity. The indicators are:

- Grants, including amount and source.
- Patent applications filed.
- Patents granted.
- Other intellectual assets (trade marks, design rights, etc.).
- In-licensing and out-licensing deals signed.
- Number and type of formal strategic alliances i.e. those underpinned by formal, written agreements.
- Quality standards implemented.

2.6 PRIMARY RESEARCH WITH LIFE SCIENCES ORGANISATIONS

2.6.1 Online Survey

As noted at **2.4.5** it was agreed that collecting data for the indicators would be mainly via primary research with Highlands & Islands life sciences organisations.

An online survey of Highlands & Islands life sciences organisations was undertaken. This contained questions designed to collect information for the indicators shown at **2.5**. In addition, and as shown at **Chapter 4**, the survey covered a range of other issues relating to the sector. These included: length of time operating in the Highlands & Islands; location of customers and competitors; and views on the supply chain, recruitment and development opportunities for the sector in the Highlands & Islands.

2.6.2 Response to the Survey

The online survey was piloted with five life sciences organisations in late July/early August 2009. The pilot questionnaire received some minor amendments for its use in the full survey, which was undertaken in September 2009.

A total of 42 organisations were identified as being active in the life sciences sector at August 2009. This is lower than the number (46) in our initial list of organisations which was referred to at **2.4.3**. This is because further investigation showed that four of those on the initial list either did not fully fit the agreed sectoral definition or were no longer operating.

Some 41 organisations were sent either the pilot or the full survey questionnaire; the other having indicated in advance that it did not wish to participate. A total of 27 organisations responded, **although not all respondents answered all questions**. This represents a response rate of 66%.

2.7 **SUPPLEMENTING THE PRIMARY RESEARCH FINDINGS**

2.7.1 Estimating The Sector's Economic Contribution

As noted at **2.6.2**, not all life sciences organisations responded to the online survey, while others did not provide all of the economic data that were requested. Therefore, the survey results had to be grossed-up to the population of life sciences organisations. This was done by adding information to the survey results from our own knowledge of the sector and publicly available information. This allowed us to produce the estimates of the sector's economic contribution, which are shown at **Chapter 3**.

2.7.2 Consultations With Life Sciences Companies

Consultations were undertaken with eight Highlands & Islands life sciences companies. Selection of companies was on the basis of a combination of size, geographical location, and primary technology or subsector, such that when taken together they were representative of the life sciences sector in the Highlands & Islands.

The consultations explored issues in more depth than was possible in the online survey. The findings were used to add qualitative depth to the survey results and also to highlight other issues affecting the sector.

2.8 SUMMARY

The approach to undertaking the research can be summarised as follows:

- A definition was developed for life sciences.
- Existing economic datasets were reviewed. A number of significant weaknesses were identified. It was concluded that a proper assessment of the sector's economic contribution would require primary research with life sciences organisations.
- A series of indicators-covering both economic and other measures-was developed to structure the baseline assessment.
- An online survey of life sciences organisations covered by the agreed definition was undertaken.
- The survey results were supplemented with our own knowledge of the sector and publicly available information to produce estimates of the sector's economic contribution.
- Consultations were undertaken with a representative sample of Highlands & Islands life sciences companies.

3 **ECONOMIC CONTRIBUTION OF THE LIFE SCIENCES SECTOR**

3.1 **INTRODUCTION**

This Chapter reports our estimates of the economic contribution of the life sciences sector in the Highlands & Islands. As discussed at **Chapter 2**, the estimates are based on the results of the online survey of life sciences organisations supplemented with data for non-responses based on our knowledge of the sector and publicly available information.

In addition, there is some more detailed analysis of trends, employment and turnover. This is based solely on responses to the online survey.

The timings of financial year-ends vary by organisation. However, the results shown in this Chapter should be taken as generally representative of organisations' financial year 2008-2009. **They relate to this period unless otherwise stated.**

Finally, the data in some Tables do not sum to the column totals shown due to rounding.

3.2 **BUSINESS UNITS**

As noted at **Chapter 2**, the research identified a total of 42 business units active in life sciences at August 2009. Their geographical distribution is shown at **Table 3.1**.

TABLE 3.1: BUSINESS UNITS BY AREA		
Area	Number of Units	Share
Inner Moray Firth	20	48%
Argyll & The Islands	8	19%
Lochaber, Skye & Wester Ross	4	10%
Outer Hebrides	3	7%
Caithness and Sutherland	2	5%
Orkney	2	5%
Shetland	2	5%
Moray	1	2%
Total	42	100%

Most areas have few life sciences business units. Apart from the Inner Moray Firth and Argyll & The Islands, they number less than five in each area. Inner Moray Firth is clearly the main area with approaching half (48%) of the units, followed by Argyll & The Islands with around one in five (19%). Collectively these two areas account for two-thirds of the region's life sciences business units.

The concentration of business units in the Inner Moray Firth area reflects the high percentage of the Highlands & Islands' total population who reside in the area; as well as the presence of key organisations such as LifeScan Scotland, The Centre for Health Science, Raigmore Hospital, all of which act as magnets for new business.

Argyll & The Islands is an important area for natural products and marine science by virtue of the diversity of, and access to, an abundant natural resource. As such, the area has become home to a disproportionate number of business units focused on the use of naturally derived materials.

3.3 DIRECT EMPLOYMENT

3.3.1 Total Annual Employment

Total direct employment in life sciences organisations is estimated as **1,789 FTE (Full-Time Equivalent) jobs**. This encompasses permanent full-time, permanent part-time and temporary staff.

3.3.2 Employment Sizeband

Table 3.2 shows the estimated distribution of employment by sizeband among the 40 life sciences organisations operating during 2008-2009.

TABLE 3.2: FTE EMPLOYMENT BY SIZEBAND	
Sizeband (FTE)	Share
Less than 5	40%
5-10	25%
11-25	25%
More than 25	10%

Most organisations are relatively small in employment terms. Approaching two-thirds (65%) employ no more than 10 FTE staff. Few (10%) employ more than 25 FTE. The median level of employment is 6 FTE.

This reflects the dominance of micro and small businesses in the sector, and is consistent with the picture across Scotland. The academic research organisations tend to employ larger numbers.

3.3.3 Full-Time, Part-Time and Temporary Staff: Survey Respondents

Most (71%) of the survey respondents employ permanent part-time staff, although in most cases the staff number just one or two individuals. In addition, 41% employed temporary staff at some point during the year.

However, full-time permanent staff are by far the main component of FTE employment. They account for 83% of total FTE employment. The remaining share is divided evenly between part-time permanent and temporary staff.

3.3.4 Trends Among Survey Respondents

Across the survey respondents' total FTE employment increased by 15% between 2006-07 and 2008-09. The trend was consistent in that there was year-on-year growth in each of the years 2007-2008 (6%) and 2008-2009 (8%).

However, at the individual organisation level the pattern was more varied between 2006-07 and 2008-09, with:

- 40% reporting increased employment. The largest individual increase was 7 FTE.
- 40% reporting unchanged employment levels.
- 20% seeing employment fall. The largest individual decrease was around 4 FTE.

3.4 TURNOVER

3.4.1 Total Annual Turnover

Total annual turnover is estimated as **£194.3 million**. This figure includes public sector sourced research income and research grants.

3.4.2 Turnover Sizeband: Survey Respondents

Table 3.3 shows the distribution of annual turnover sizeband (for 2008-2009) among the organisations responding to the online survey.

TABLE 3.3: ANNUAL TURNOVER BY SIZEBAND	
Sizeband	Share
Up To £50,000	13%
£50,001-£100,000	7%
£100,001-£250,000	33%
£250,001-£500,000	13%
Over £500,000	33%

The most common sizebands were £100,001-£250,000 and over £500,000. These account for two thirds of survey respondents. In total, 20% of organisations had a turnover of up to £100,000, while approaching half (46%) had a turnover above £250,000. The median annual turnover was £237,000.

3.4.3 Trends Among Survey Respondents

Across the respondents total turnover increased by 37% between 2006-07 and 2008-09. The trend was consistent in that there was year-on-year growth in each of the years 2007-2008 (16%) and 2008-2009 (18%).

The vast majority (83%) of respondents reported increased turnover over the period. The remainder saw turnover either remain unchanged or decrease.

The largest absolute reported increase was £960,000. The remaining respondents had either seen turnover remain unchanged or decrease. For all respondents, the median change was an increase in turnover of £52,000 over the period.

3.5 **GVA**

3.5.1 Introduction

Put simply, GVA (Gross Value Added) has been calculated on the basis of the conventional definition, as follows:

Turnover (as defined at **3.4.1**)

Less public sector sourced research income and research grants

Less purchases of energy, goods, materials and services

3.5.2 Total Annual GVA

Total annual GVA is estimated as **£131.1 million**.

3.5.3 Trends Among Survey Respondents

Across the survey respondents total GVA increased by 23% between 2006-07 and 2008-09. The trend was not consistent. Total GVA saw a year-on-year fall of 17% in 2007-08. This was followed by year-on-year growth of 48% in 2008-09.

These are quite large annual changes. They reflect the influence on the overall results of a small number of companies with relatively high GVA levels.

Over half (62%) of the organisations saw their GVA increase between 2006-07 and 2008-09, while the remaining 38% saw a decrease. The largest individual increase was £870,000. For all respondents, the median change was an increase in GVA of £30,000 over the period.

3.5.4 GVA: Alternative Definition

As agreed with HIE, we have also calculated GVA based on the alternative definition of:

Turnover (as defined at **3.4.1**)

Less Purchases of energy, goods, materials and services

GVA under this alternative definition is estimated as £134.5 million. This is very similar to the figure shown at **3.5.2** for the conventional definition.

3.6 **WAGES & SALARIES**

3.6.1 Total Annual Wages & Salaries

Total annual wages & salaries were defined as gross payments excluding employer's costs and contributions. It is estimated as **£48.7 million**.

3.6.2 Trends Among Survey Respondents

Across the survey respondents total payments for wages & salaries increased by 30% between 2006-07 and 2008-09. The trend was consistent in that there was year-on-year growth in each of the years 2007-2008 (18%) and 2008-2009 (11%).

Of the individual organisations, over three quarters (78%) saw total payments increase between 2006-07 and 2008-09. The remaining respondents (22%) saw total payments decrease during this period.

Across the survey respondents the average wage/salary per FTE increased by 19% between 2006-07 and 2008-09. The trend was consistent in that there was year-on-year growth in each of the years 2007-2008 (12%) and 2008-2009 (6%).

3.7 SUMMARY

Table 3.4 summarises the economic contribution of the sector in the Highlands & Islands.

TABLE 3.4: ECONOMIC CONTRIBUTION OF LIFE SCIENCES SECTOR		
Measure	Total	Per FTE
Direct employment (FTE)	1,789	-
Turnover	£194.3 million	£108,614
GVA	£131.1 million	£73,268
Wages & Salaries	£48.7 million	£27,238

It shows total direct employment of approaching 1,800 FTE jobs in Highlands & Islands life sciences organisations during 2008-2009. These organisations had a turnover of around £194 million and Gross Value Added of around £131 million. Direct employees received around £49 million in gross wages and salaries.

The survey responses suggest that the recent underlying trend among Highlands & Islands life sciences organisations has been one of growth in turnover, GVA and wages & salaries. However, employment has tended to increase at a slower rate than that for the other measures.

4 LIFE SCIENCES ORGANISATIONS IN THE HIGHLANDS & ISLANDS

4.1 INTRODUCTION

This Chapter reports the findings from the primary research undertaken for the study. It mainly draws on the results of the survey of organisations, other than those relating to economic activity. It covers:

- Respondent profile.
- Organisational characteristics.
- Finance.
- Sub-sectors and activities.
- Customers and competitors.
- Intellectual assets, licensing agreements and strategic alliances.
- Quality assurance.
- Development issues.

Not all survey respondents answered every question covered by the survey. References in this Chapter to percentages of “survey respondents” answers to certain questions relate to the percentage of survey respondents answering the relevant question. Also, in some Tables the columns and rows do not sum to the totals shown due to rounding.

In addition, there is reference to the findings from the consultations with eight life sciences companies. These are included in support of the findings from the survey of organisations, while some other, specific issues are reported at **4.10**.

4.2 RESPONDENT PROFILE

4.2.1 Location

The breakdown of respondents in terms of geographical location was:

- Inner Moray Firth: 59%.
- Argyll & The Islands: 19%.
- Outer Hebrides: 7%.
- Caithness and Sutherland: 4%.
- Lochaber, Skye & Wester Ross: 4%.
- Moray: 4%.
- Orkney: 4%.

In comparison to the geographical distribution of Highlands & Islands life sciences organisations as a whole (shown at **Table 3.1**) the respondents are broadly representative. The main points are that the Inner Moray Firth area is over-represented in the survey while there were no respondents from Shetland, and Lochaber, Skye & Wester Ross is under-represented.

Given the nature of the work undertaken within the life sciences sector, the drivers for an organisation choosing to locate in a particular geographical area sometimes extend beyond those of economics and access to human resource, to factors such as proximity to a particular natural resource.

4.2.2 Type of Company/Organisation

Almost two-thirds (63%) of those responding to the survey were private limited companies. The balance of respondents were quite evenly split between:

- Research institute (15% of all respondents).
- Charitable organisation (11%).
- Part of a university (11%).

4.2.3 Parent Organisations

Approaching half (44%) of the respondents' offices/facilities in the Highlands & Islands are part of a larger organisation. These were mainly the research institutes and universities referred to above, but it was also the case for 25% of private sector organisations.

The parent organisations of:

- Research Institutes were based in Scotland-in some cases within the Highlands & Islands and in others elsewhere in Scotland.
- Private limited companies tended to be based outside Scotland and principally outside the UK.

4.2.4 Length of Time Operating in the Highlands & Islands

Table 4.1 shows the year in which the organisation started operating in the Highlands & Islands.

TABLE 4.1: YEAR IN WHICH THE ORGANISATION STARTED OPERATING IN THE HIGHLANDS & ISLANDS		
	All Respondents	Private Limited Companies
Before 2000	21%	12%
2000-2003	33%	25%
2004-2006	29%	38%
2008-2009	17%	25%
Total	100%	100%

A majority of respondents (54%) had been operating before 2004, with around one in five since before 2000. One in six had begun operations from 2008 onward.

The private companies have a younger profile than all respondents. Over one-third (37%) had been operating before 2004, while one in four had started within the last two years.

It is encouraging that 25% of the private companies responding had begun operations in the last two years, indicating the dynamism of the sector. However, it is important to recognise that there will be a number that have not been included in the survey because they are no longer trading. The same situation would exist anywhere. There is no reason to believe that building a sustainable business is any more difficult in the Highlands & Islands than elsewhere.

4.3 ORGANISATIONAL CHARACTERISTICS

4.3.1 Current Stage of Development

Respondents' current stage of development is shown at **Table 4.2**.

TABLE 4.2: CURRENT STAGE OF DEVELOPMENT	
Stage of Development	Respondents
Growing business	26%
Early stage technology development	15%
Product development	15%
Production and marketing	11%
Proof of concept	4%
Other	30%
Total	100%

“Other” was the most common response, given by approaching one in three respondents. Where additional detail was provided this encompassed:

- Consultancy advising others.
- Clinical laboratory.
- Developing research centre.
- Early stage technology development and growing service business.
- Established but in need of investment to upgrade facilities.
- Not trading but still in receipt of funds.
- Operational charity.
- Research and development.

Apart from this, the main category was “Growing business” which was selected by around one in four respondents, followed by “Early stage technology development” and “Product development”.

The responses from the private limited companies were not markedly different from those for all respondents. The main differences were that fewer (18%) stated “Other”, while the companies were more likely to state “Product development” (24%).

It is the case with a number of the private limited companies that revenue-generating business, often service delivery, is being used to sustain the company through to the point that the core technology is sufficiently developed to be able to contribute, in its own right, to the turnover of the business. For reasons of customer perception, companies in this situation are more likely to present themselves as a growing technology-based business.

4.3.2 Managing Specific Activities: Levels of Expertise

Respondents were also asked to indicate their organisation's level of management expertise in four specific areas. The results are shown at **Table 4.3**. Again, they exclude those answering "not applicable".

TABLE 4.3: LEVEL OF MANAGEMENT EXPERTISE IN SPECIFIC AREAS				
Managing...	Expert	Competent	Limited	Don't Know
Technology Development	60%	25%	10%	5%
Finances	29%	67%	4%	0%
Securing Investment	12%	50%	33%	4%
Intellectual Assets	35%	35%	27%	4%

The highest level of expertise was claimed for technology development. Over half (60%) stated "expert" with only 10% stating "limited". Overall, slightly higher levels of expertise were claimed for finances compared to intellectual assets. Over one in four stated "limited" in the case of the latter.

The lowest levels of expertise were for securing investment. Only one in eight stated "expert", with one in three stating "limited".

In general, the responses from the private limited companies were very similar to those for respondents as a whole. The exception was for technology development where a higher levels of expertise was claimed. Some 79% stated "expert" compared to 60% for all organisations (as shown at **Table 4.3**), with none of the companies stating "limited".

It was hoped that the answers to this question would reveal areas where additional expertise might be needed within an organisation. With the exception of "Securing Investment" it appears that organisations believe the level of competency within their organisation to be at least adequate. However, it should be remembered that in a self-assessment exercise few are likely to openly acknowledge weaknesses and it may be the case that the actual level of competency is lower than that reported.

4.4 **FINANCE**

4.4.1 Research & Development Grants

Value of Grants

A majority (69%) of respondents stated that they had been awarded research and development grants within the past three years in relation to their activities within the Highlands & Islands. The total value for these respondents was £5.6 million, with two organisations (one academic, the other private sector) accounting for three quarters of this amount. In addition:

- Two other organisations (both academic) had been awarded between £300,000-£600,000; and
- A further two organisations (one research institute, the other private sector) had been awarded between £100,000-£200,000.

The median value across those receiving research and development grants was £131,000. For most private limited companies, the total value of grants was less than £50,000.

Public sector, grant-in-aid, funding is the main route by which universities and research institutes finance their research activity. In most instances core funding will come from a higher education funding council or from one of a variety of research councils, with additional research monies being secured from such sources as European Framework Programmes. In the majority of cases funding provided is based on a Full Economic Cost model.

For private limited companies, the technology and product development timelines mean that securing grant funding is often a critical part of business strategy for both start-up and established entities. The sources of funding tend to be those that are specific to commercial organisations-although the changes in the subvention level for SME participation in EU Framework VII Programmes has made this route more attractive than was the case previously. Likewise, projects funded via Technology Strategy Board have proved popular in recent years. They can be an excellent way of encouraging public and private sector research organisations to collaborate.

Different subvention levels are associated with different grants, but are normally in the 30-75% range. The requirement for the business in question to provide matching funding helps to discourage applications where there is a lack of alignment between the funding criteria and the strategic vision of the business.

Sources of Grants

HIE and Scottish Government (including Funding Councils) were the most common sources of these grants. They were cited by 64% of respondents. The others were:

- UK Government (including Research Councils): 45% of respondents.
- “Other”: 45%.
- European Union: 36%.

Organisations cited under “Other” included the private sector, aquaculture producers organisations, NHS and charities.

4.4.2 Equity and Loan Finance

Value of Finance

Respondents were asked to provide the financial value of any equity and loan finance they had sourced over the past three years to support and develop their activities within the Highlands & Islands.

38% of respondents had received such finance. These were all private limited companies, meaning that 60% of such companies stated that they had received equity and loan finance. The total value across the respondents was £5.3 million, with one company accounting for £4.2 million. Two others each received between £300,000 and £650,000. The median value across those obtaining equity and loan finance was £189,000.

Sources of Finance

Where identified, the main sources of finance were:

- Family & Friends: 50% of respondents.
- Bank Loan: 50%.
- Business Angel Equity & Loan Investment: 33%.
- Institutional Equity & Loan Investment (including Venture Capital): 33%.

In almost all cases, more than one source had been utilised.

The funding requirement of most life sciences companies is such that it is unusual to achieve profitability without securing finance of £250,000, and more often considerably more. The consequence of this requirement is that most companies need to secure institutional investment at some point in the pre-revenue window.

4.5 SUB-SECTORS AND ACTIVITIES

4.5.1 Life Sciences Sub-Sectors

Respondents were asked to identify the approximate percentage of their turnover/income that is attributable to specific life sciences sub-sectors. The results are shown at **Table 4.4**, expressed in simple averages (i.e. unweighted by each respondent's total turnover) across respondents as a whole. **It should be appreciated that the results reflect the activities of those organisations that responded to the online survey.**

TABLE 4.4: PERCENTAGE OF TURNOVER/INCOME FROM LIFE SCIENCES SUB-SECTORS	
Sub-Sector	Percentage of Turnover/Income
Other Life Science	26
Medical Devices-Diagnostics	16
Medical Devices-Other	15
Environmental	13
Aquaculture	9
Therapeutics	9
Nutraceuticals	8
Cosmeceuticals	4
Non-Diagnostic, Non-Medical Test Platforms	1
Agri-biotechnology	0
Veterinary	0
Total	100%

“Other” accounts for the highest simple average percentage, followed by sub-sectors related to medical devices and environmental. None of those providing responses was involved in either “Agri-biotechnology” or “Veterinary”.

Specific additional information provided for the “Other” category showed a wide variety of activities, as follows:

- Health research.
- Fisheries.
- Regulatory affairs.
- Consultancy.
- US FDA mock inspection.
- ISO 9001 audit.
- Clinical trials support services.
- Health care.
- Research into disease aetiology.

Table 4.5 shows the percentage of respondents obtaining some turnover/income from the various sub-sectors.

TABLE 4.5: PERCENTAGE OF RESPONDENTS OBTAINING TURNOVER/INCOME FROM LIFE SCIENCES SUB-SECTORS	
Sub-Sector	Percentage Obtaining Turnover/Income
Other Life Science	53%
Aquaculture	24%
Medical Devices-Diagnostics	24%
Therapeutics	24%
Environmental	18%
Medical Devices-Other	18%
Nutraceuticals	18%
Cosmeceuticals	12%
Non-Diagnostic, Non-Medical Test Platforms	12%
<i>Non-Life Sciences Activity</i>	6%
Agri-biotechnology	0%
Veterinary	0%

Just over half of the organisations obtain some of their turnover from “Other” Life Science activity. One in four do so from Aquaculture, Medical Devices-Diagnostics and Therapeutics. The Table also shows that very few (6%) generate turnover/income from outwith the life sciences sector.

The activities from which at least one organisation obtain all of their turnover/income were:

- “Other”.
- Aquaculture.
- Environmental.
- Medical Devices-Diagnostics.
- Medical Devices-Other.
- Nutraceuticals.

A slight majority (53%) obtain turnover/income from more than one sub-sector. Almost all respondents gain turnover/income from between 1 and 3 sub-sectors. The most common combinations were:

- Aquaculture with Environmental.
- Cosmeceuticals with Therapeutics.
- Non-Diagnostic, Non-Medical Test Platforms with Nutraceuticals and with Therapeutics.

The results for private limited companies-excluding ones involved with sector-specific consultancy-show a reasonably even spread of activities across the full range of sub-sectors, with “Cosmeceuticals” and “Non-Diagnostic, Non-Medical Test Platforms” being the least represented.

4.5.2 Activities

Table 4.6 shows the involvement of respondents in specific activities.

TABLE 4.6: PERCENTAGE OF RESPONDENTS OBTAINING TURNOVER/INCOME FROM SPECIFIC ACTIVITIES	
Activity	Percentage Obtaining Turnover/Income
Own Research & Development	59%
Contract Research	59%
Other	41%
Own Production & Sales	35%
Contract Manufacture	0%

The main areas of activity are own research & development and contract research. Each is undertaken by half of the organisations. In contrast, none of the respondents is involved in contract manufacture.

Some 41% referred to “Other” activities. Where additional detail was provided this encompassed:

- Academic activity mostly attributable to teaching.
- Consultancy and evaluation work.
- Licensing agreement.
- Training and regulatory consultancy.
- Marketing.
- Events management.
- Distribution of third party products.

Around two thirds (65%) of respondents generate turnover/income from more than one type of activity. The most common combination was own research & development with own production & sales with contract research.

Among those who generated turnover/income from the activity the median share of total turnover/income was:

- Own Research & Development 75%.
- Other 50%.
- Own Production & Sales 35%.
- Contract Research 32%.

The spread of activity across the various categories is as would be expected given the mix of respondents. All publicly funded research organisations would be expected to focus on their own research and development. Likewise within the private limited SME base a significant proportion of activity is likely to be “Own Research & Development” as the proprietary technology is developed and refined. In time, and as the organisation becomes revenue generating, it would be expected that this would be replaced with a mix of “Own Production and Sales” and “Contract Research” depending on the business model.

4.6 LOCATION OF CUSTOMERS AND COMPETITORS

4.6.1 Customers

Table 4.7 shows the location of respondents’ customers/potential customers.

TABLE 4.7: LOCATION OF CUSTOMERS/POTENTIAL CUSTOMERS		
Location	Main Customers	Most Important Customer
Highlands & Islands	72%	7%
Scotland outside the Highlands & Islands	67%	33%
UK outside Scotland	72%	27%
Europe outside the UK	61%	7%
Rest of the World	72%	27%

In terms of **main** customers the results are quite similar across the five geographies. In each case more than 60% of respondents identified an area as a location for their main customers.

The picture is quite different in terms of the **most important** customer. The predominant category is “Scotland outside the Highlands & Islands”, followed by “UK outside Scotland” and “Rest of the World”.

Very few respondents reported either “Highlands & Islands” or “Europe outside the UK”. Thus while these two areas provide general sources of business, they tend not be where organisations’ predominant customers are based.

The results for private limited companies showed no significant differences compared to those for all respondents.

In general the companies covered by our **consultations** appear to be focussed on one or a limited number of key clients. In all cases these clients are based outside the Highlands & Islands.

4.6.2 Competitors

Table 4.8 shows the location of respondents' competitors/potential competitors.

TABLE 4.8: LOCATION OF COMPETITORS/POTENTIAL COMPETITORS		
Location	Main Competitors	Most Important Competitor
Highlands & Islands	29%	6%
Scotland outside the Highlands & Islands	53%	25%
UK outside Scotland	76%	25%
Outside the UK	65%	44%

In terms of the location of **main** competitors the two predominant areas were "UK outside Scotland" and "Outside the UK". Nevertheless, the other two geographies are also significant. Over half the respondents identified competitors in parts of Scotland outside the Highlands & Islands.

In terms of the **most** important competitors, the main location was "Outside the UK". The least significant was the "Highlands & Islands".

Overall, competition is with organisations based outside the Highlands & Islands and also, in general, outside Scotland. This picture is more pronounced for private limited companies. None of these identified the Highlands & Islands as a location of competitors, while the rest of Scotland was less significant than for respondents as a whole.

4.7 **INTELLECTUAL ASSETS, LICENSING AGREEMENTS AND STRATEGIC ALLIANCES**

4.7.1 Patents

Around one third (35%) of respondents had filed at least one patent application. In most cases the number was less than five. The highest number was 11. Almost all of those that had filed a patent application were private limited companies.

In turn, one in three of those who had filed patent applications had had them granted in at least one jurisdiction. The number of patents granted was either one or two.

It is to be expected that the number of patent applications filed and subsequently granted will vary from technology to technology and therefore from organisation to organisation. It is clear from the level of patenting activity that a reasonable number of respondents are aware of the value of intellectual assets and have some first-hand experience of the patenting process.

4.7.2 Other Intellectual Assets

Table 4.9 summarises the findings for the possession of other intellectual assets.

TABLE 4.9: POSSESSION OF INTELLECTUAL ASSETS OTHER THAN PATENTS		
Intellectual Asset	% of Respondents	Number Held
Registered Trademark	12%	Each organisation has two
Unregistered Trademark	18%	Between 1 and 4 per organisation
Registered Design Rights	6%	Each organisation has one
Unregistered Design Rights	18%	Each organisation has one
Plant Breeders' Rights	0%	-

It is likely that those organisations that indicated that their organisation had either Registered or Unregistered trademarks had sought some protection for the business name and/or at least one product brand or platform technology. As for other intellectual assets it is encouraging that some level of protection of these important assets is being sought.

4.7.3 In-Licensing and Out-Licensing Agreements

Table 4.10 summarises the findings for the number of in-licensing and out-licensing agreements signed.

TABLE 4.10: IN-LICENSING AND OUT-LICENSING AGREEMENTS SIGNED				
Type of Deal	In-Licensing		Out-Licensing	
	% of Respondents	Number of Agreements	% of Respondents	Number of Agreements
Non-Exclusive	6%	2 per organisation	12%	Between 3 and 5 per organisation
Exclusive-Restricted Geography	0%	-	0%	-
Exclusive-Global	12%	1 per organisation	6%	1 per organisation
Other	0%	-	6%	1 per organisation

The modest level of licensing is indicative of a relatively young sector. In-licensing, although important to many businesses to allow full development of their in-house technology, is often beyond the financial reach of start-up companies. Out-licensing, on the other hand, tends to come only after products and or services have been developed, and as such is indicative of companies that have reached a certain level of maturity.

4.7.4 Formal Strategic Alliances

Table 4.11 shows the proportion of organisations that have formal strategic alliances (that is, formal written agreements).

TABLE 4.11: FORMAL STRATEGIC ALLIANCES (% OF RESPONDENTS)		
With A Company For..		
Type	Within UK	Outside UK
Incoming supplies	17%	22%
Marketing/sales/distribution	28%	16%
Technology partnership	33%	22%
Other	28%	22%
With An Academic Organisation For...		
Type	Within UK	Outside UK
Incoming supplies	11%	6%
Marketing/sales/distribution	0%	0%
Technology partnership	17%	11%
Other	39%	22%

Strategic alliances are very common within the life sciences sector, particularly those that allow organisations to access and utilise technology that complements their own. As would be expected, there is a higher level of all types of alliance between companies than between companies and academic organisations. Likewise, in most instances, there are more alliances within the UK than outside. This reflects that it is easier to form a partnership with an organisation that is in relatively close geographic proximity.

All of the eight companies covered by our **consultations** are involved with research and product development with other companies and academic organisations. Four are involved with academic collaborations with organisations outside the Highlands & Islands. Three are collaborating with UHI.

4.8 QUALITY ASSURANCE

Exactly half (50%) of respondents stated that they are obligated to work to a Quality Assurance Standard because of the nature of their work. All respondents were then asked whether they have implemented a number of specific quality standards and, if so, whether this was for regulatory reasons or through choice. The responses are summarised at **Table 4.12**.

TABLE 4.12: IMPLEMENTATION OF QUALITY STANDARDS		
Quality Standard	% of Respondents	Regulatory or Choice
Good Manufacturing Practice	17%	All regulatory
Good Laboratory Practice (GLP)	22%	Mostly regulatory
Good Clinical Practice	11%	All regulatory
UKAS Accreditation	11%	Equally regulatory and through choice
ISO Accreditation	17%	Mostly regulatory
Working in the spirit of GLP	33%	Mostly through choice

In addition 22% referred to other quality standards that they had implemented. These were through a mix of regulatory requirements and choice. Specific references were made to:

- Medical Devices Directive.
- Research governance.
- Teaching quality assurance.

4.9 DEVELOPMENT ISSUES

4.9.1 Views on the Supply Chain in the Highlands & Islands

Over three quarters (82%) of respondents were of the view that the life sciences supply chain in the Highlands & Islands meets, at least in part, their requirements. Within this, the extent of meeting needs was as follows:

- Fully: 12% of all respondents.
- To some extent: 41%.
- To a small extent: 29%.

Respondents were then asked how the life sciences supply chain in the Highlands & Islands could be improved. The specific responses are shown below.

“The MASTS programme will help organisations to pool resources, so will help to bridge current deficiencies”

“Improved general delivery services, in and out”

“Communication, enthusiasm, activity”

“More shared knowledge of other active companies”

“Equality of delivery charges with rest of UK”

“Improved courier/distribution services”

“Through creation of a HIE networking group similar in nature to BioDundee”

Two of the eight companies covered by our **consultations** indicated that they could commission a significant amount of work within the Highlands & Islands if the necessary resource existed. These comments had more to do with key items of equipment and specialist facilities than with human resource. Specific examples were the lack of analytical chemistry facilities to support the region’s interest in natural products, a prototyping facility, and a resource to allow non-pharma clinical trials to be undertaken.

The lack of networking within the Highlands & Islands, referred to at **4.10**, means that there is a relatively low level of intelligence available on what facilities and specialist resource exist throughout the life sciences sector. As such, it could be the case that a resource required by one organisation exists elsewhere in the region and could be accessed on a pay-as-you-go or fee-for-service basis.

Other regions have attempted to establish shared resource pools. While these work well within the academic community, spurred by the Scottish Funding Council Research Pooling Initiative, they have been less successful between academic establishments and the company base. The main reasons for lack of success appear to be to do with access terms enforced by universities and research institutes, either in terms of time or cost, and inadequate validation of, and standard operating procedures for, key items of equipment.

Given the additional freight charges applied by suppliers to deliveries to the Highlands & Islands it might be cost effective to establish a central resource facility, whereby purchasing is handled by a single organisation located in the region. Organisations using the service would benefit from free deliveries associated with larger, more frequent orders, and any economies of scale linked to increasing purchasing power. Such models exist elsewhere, for example Amici Procurement Solutions, an Ayrshire based business, which has a growing customer base extending across Scotland.

4.9.2 Views on Recruitment

Over half (59%) reported having problems in recruiting staff for positions within the Highlands & Islands. Specifically:

- 35% reported limited problems.
- 24% reported significant problems.

None reported very significant problems.

The following skill sets were identified as ones where problems arise in recruiting for positions in the Highlands & Islands:

- Marketing.
- Physical sciences.
- Research staff.
- Senior management positions.
- Statistician.
- Technically competent people (such as technicians).
- Technical, manual and administrative staff.
- Technicians/junior staff.

Among the eight companies covered by our **consultations**:

- While some had few issues in recruiting staff with the required skills, others saw this as a significant barrier to growth. Business development and skilled, but junior technical positions were cited as being the most difficult to recruit to.
- Two companies claimed that there was a general lack of innovative approach and drive within the local pool of potential employees, which in turn had forced them to look further afield.
- Three have developed required skills 'on the job', particularly with regard to management expertise.
- In one case the company now develops and manufactures the majority of its products outside the Highlands & Islands. This is because of past difficulties in recruiting staff, and also in being able to access relevant public sector support.

Part of the difficulty in recruiting appears to be that most individuals working within the company base are recruited from other companies rather than as local school leavers or graduates. With limited, but growing, commercial bioscience activity ongoing, there is, by definition, a limited pool of potential employees to draw upon. While there is one notable large employer in the region, which has generated a steady pool of employees for the smaller companies, the skill base is not always well matched to the needs of the SME.

While it is unlikely that there is an immediate solution to the problems of recruitment to the sector, it may be possible to work more closely with the schools, colleges, and universities to ensure that the employees of tomorrow are better prepared for the demands of the modern bioscience company.

4.9.3 Views on Opportunities for the Development of the Life Sciences Sector in the Highlands & Islands

Finally, respondents were asked, to state the opportunities that they see for the development of the life sciences sector in the Highlands & Islands. The responses are shown overleaf.

The feedback from the consultations, shown at **4.10**, suggests that the sectoral networking undertaken within the region appears very limited.

While it is not possible to force people to liaise, it is possible to provide the framework that could facilitate this process. The argument in support of creating a specific life sciences network in the Highlands & Islands is one that has been rehearsed on a number of occasions over the years and is gathering momentum. It is possible that this could be achieved via Fusion, the existing, more generic networking organisation serving the Highlands & Islands. Alternatively a separate entity similar to Nexxus or BioDundee could be established.

The advantage afforded by specific networking was demonstrated recently with the "Natural Products-Active Science for Business Growth" meeting held in Dunstaffnage. This brought together companies and academic researchers with common interests and goals from across the Highlands & Islands and Scotland as a whole.

“Ehealth hub in Elgin”

“Via further licensing deals with new devices”

“Long term opportunities for aquaculture of new species”

“Opportunity for improved marketing of fish and shellfish originating from the Highlands & Islands”

“The local food production, flora and fauna which is unique to the Highlands requires the medical research striving to provide healthy alternatives for all.
A win-win situation!”

“Developing health cluster in Inverness and openness to working closer with Highlands & Islands in a network approach e.g Natural products. Investment in disease prevention and education of population e.g in the plans for a Centre for Health and Wellbeing. Building on the collaborative approach of the Centre for Health Science; public/private partnerships”

“I think the support of a regional enterprise company is crucial to further development in Highland”

“Great opportunity for the development of a biotech industry. The Highlands & Islands area is already host to a number of life sciences businesses including Lifescan. Through collaboration with academic networks and commercial support from HIE there is a real growth opportunity within the region”

“Further start-ups. Increased commercialisation activity from SAMS. Inward migration for Marine Biotechnology & Drug Discovery”

“The rapid development of the 'diabetes centre of excellence' incorporating academic research, clinical research and commercial activity should attract top people to the area”

“Limited/focused development. Restricted by lack of clinical research infrastructure”

4.10 OTHER CONSULTATION FINDINGS

Some of the findings of our consultations with eight life sciences companies have been reported throughout the Chapter. The other specific issues identified are set out below.

Most relate to issues around **operating a life sciences company from a Highlands & Islands location**. The main points were as follows:

- Four companies located in the Highlands & Islands at least in part because of lifestyle choices.

- Four of the companies are dependent on raw materials sourced within the Highlands & Islands. In every case the raw materials were converted into high value-added products. While there were some cost and time issues, primarily in relation to acquiring raw materials, in every case the company did not have any locational issues in terms of transporting products to clients.
- For those companies still at the stage of developing a customer base, access to potential clients was seen as very time consuming. The majority of time is spent getting to a particular location and relatively little time spent in face-to-face meetings.
- For three of the companies there was significant advantage in allowing potential clients to see research facilities. This in turn presented some problems due to transport links not being as good as customers expected them to be.
- Two companies cited shortage of suitable housing for purchase or rental as a difficulty that had emerged in the last few years. In one instance this was coupled with a view that the secondary education provision in the area was not seen as being of a high enough standard by employees with children at or approaching the secondary education stage.
- In two cases a significant amount of senior management input comes from individuals located outside the Highlands & Islands. In one instance this has been part of corporate strategy to locate part of the business closer to a commercial centre. In the other case, the company could not afford or justify recruitment of full-time senior management personnel and there was unwillingness among those recruited to relocate for a part-time position.
- For those companies for which a trade sale was the most likely exit strategy, the Highlands & Islands was seen as a difficult area from which to operate.

The consultations also indicated that the companies undertake only **limited networking within the Highlands & Islands**. This was mainly attributed to the following factors:

- More relevant networks are based outside the Highlands & Islands.
- Their operating in a niche market in the Highlands & Islands meaning that there is a lack of relevant others with which to network.
- Lack of time.

Other findings were that:

- In every case the company was founded/established by an 'expert' with knowledge in a particular area who identified specific opportunities for a business in the Highlands & Islands.
- All the companies are undertaking their own R&D in-house, both to improve the quality of their products and to apply the same technologies to new areas/opportunities.
- In each case the company developed the specific technology and all eight are producing, or intend to produce, products for the market.

4.11 SUMMARY

In terms of **length of operation in the Highlands & Islands** over half of the organisations had been operating before 2004, with around one in five since before 2000. The private companies responding to the survey have a younger profile than all respondents. The overall findings suggest that the sector has a relatively young group of companies with high growth potential.

Approaching half of the respondents' offices/facilities in the Highlands & Islands are **part of a larger organisation**.

The organisations were at a wide range of **stages of development**. The main ones cited were "Growing business", "Early stage technology development" and "Product development".

Organisations believe the **level of competency** within their organisation to be at least adequate in the fields of "Technology Development", "Finances" and "Intellectual Assets". In contrast, respondents had less confidence in their abilities regarding "Securing Investment".

Just over two-thirds of respondents stated that they had been awarded **research and development grants** within the past three years in relation to their activities within the Highlands & Islands. HIE and Scottish Government (including Funding Councils) were the most common sources of these grants.

Slightly over a third of organisations had obtained **equity and loan finance** within the last three years. In almost all cases, more than one source had been utilised. The most common sources were family & friends and bank loan.

A slight majority of survey respondents obtain turnover/income from more than one **sub-sector** of life sciences. Almost all respondents gain turnover/income from between one and three sub-sectors. The results for private limited companies-excluding ones involved with sector-specific consultancy-show a reasonably even spread of activities across the full range of sub-sectors.

Respondents' main **areas of specific activity** are own research & development and contract research. Each is undertaken by half of the organisations. In contrast, none of the respondents is involved in contract manufacture. The spread of activity across the various categories reflects the mix of respondents to the survey.

Respondents' **main customers** are quite evenly spread in terms of geographical location. However, the picture is quite different in terms of the *most important* customer. The predominant category is "Scotland outside the Highlands & Islands", followed by "UK outside Scotland" and "Rest of the World".

Overall, **competition** is with organisations based outside the Highlands & Islands and also, in general, outside Scotland. This picture is more pronounced for private limited companies.

The level of **patenting** activity indicates that a reasonable number of respondents are aware of the value of intellectual assets and have some first-hand experience of the patenting process.

The modest level of **in and out licensing** is indicative of a relatively young sector.

There is a higher level of all types of **formal strategic alliance** between companies than between companies and academic organisations. In most instances, there are more alliances within the UK than outside.

Half of the respondents stated that they are obligated to work to a **Quality Assurance Standard** because of the nature of their work.

Over three quarters of respondents indicated that the life sciences **supply chain** in the Highlands & Islands meets, at least in part, their requirements. However, only one in eight view that the supply chain “fully” meets their requirements.

Over half reported problems in **recruiting staff** for positions within the Highlands & Islands. However, none reported very significant problems.

The consultations identified a range of challenges arising from **operating a life sciences company from a Highlands & Islands location**. They also suggest that companies undertake only limited **networking within the Highlands & Islands**.

Appendix:
Online Survey Questionnaire

Introduction

Reference Economic Consultants are undertaking research on behalf of Highlands & Islands Enterprise to collect baseline information of the Life Sciences sector within the Highlands & Islands.

The definition of the Highlands & Islands includes the areas covered by Highland Council, Moray Council, Shetland Islands Council, Orkney Islands Council, Comhairle nan Eilean Siar (Western Isles Council) and Argyll and the Islands. The survey contains a map showing the relevant area.

The information will be used to develop an overview of the size and activities of the sector within the Region. This will be used to inform HIE's future work with the sector.

All company/organisation survey data collected by the consultants will be treated as strictly confidential. They will not be released in an identifiable form to any third party including HIE. Reporting will be in aggregate form with no information attributed to any specific company/organisation.

The survey should take around 20 minutes to complete. The survey will close at 5pm on Friday 25th September 2009.

Any questions about the survey, points of clarification or help in completing the survey should be addressed to euan@refecon.co.uk.

Background Company Information

1. Company/organisation name

2. Please indicate the type of company/organisation?

- Sole Trader
- Partnership
- Private Limited Company
- Public Limited Company
- Research Institute
- Other (please specify)

3. Please enter the location of your offices/facilities within the Highlands & Islands. For example Portree, Inverness, Oban etc.

Location 1	<input type="text"/>
Location 2	<input type="text"/>
Location 3	<input type="text"/>
Location 4	<input type="text"/>
Location 5	<input type="text"/>

4. Are these offices/facilities part of a larger company/organisation/group of companies/organisations?

- Yes
- No

Parent Organisation

5. Please provide the name of the parent organisation

6. Where is the parent company located?

Operational Characteristics and Management Expertise

7. In what year did your company/organisation start operating in the Highlands & Islands?

Start of Operations in the Highlands & Islands

Year

8. What best describes your company/organisation's current stage of development?

- Proof of concept
- Early stage technology development
- Product development
- Production and marketing
- Growing business
- Other (please specify)

9. Please indicate the company/organisation's level of expertise in each of the following.

	Expert	Competent	Limited	Don't Know	Not Applicable
Managing a Small to Medium Sized Enterprise (SME)	<input type="radio"/>				
Managing a Large Company	<input type="radio"/>				
Managing a Public Sector Organisation	<input type="radio"/>				
Managing an Academic Organisation	<input type="radio"/>				

10. Please indicate the company/organisation's level of expertise in managing in each of the following areas of activity.

	Expert	Competent	Limited	Don't Know	Not Applicable
Technology Development	<input type="radio"/>				
Finances	<input type="radio"/>				
Securing Investment	<input type="radio"/>				
Intellectual Assets	<input type="radio"/>				

Financial and Employment Information

The following financial and employment information is required to allow us to estimate the total economic scale of the Life Sciences sector within the Highlands & Islands and to identify key trends over time. The information provided will be used to estimate key economic indicators such as employment, turnover and gross value added (GVA).

All company/organisation survey data collected by the consultants will be treated as strictly confidential. They will not be released in an identifiable form to any third party including HIE. Reporting will be in aggregate form with no information attributed to any specific company/organisation.

11. To allow us to aggregate responses over the same time frame would you indicate between which months your financial year operates?

	Month
Start	<input type="text"/>
End	<input type="text"/>

12. Please select the total number of permanent full-time staff based in all your offices/facilities within the Highlands & Islands at the end of your financial year. If zero, please leave blank.

This information should be provided for completed financial years only. Please also provide your current employment levels.

Permanent full time employment is defined as working 30 hours or more per week.

	FY 2008-09	FY 2007-2008	FY 2006-07	Current
Permanent Full Time Staff	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

13. Please select the total number of permanent part-time staff based in all your offices/facilities within the Highlands & Islands at the end of your financial year. If zero, please leave blank.

This information should be provided for completed financial years only. Please also provide your current employment levels.

Permanent part time employment is defined as working less than 30 hours per week.

	FY 2008-09	FY 2007-2008	FY 2006-07	Current
Permanent Part Time Staff	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

14. Please select the total number of days worked by temporary staff based in all your offices/facilities within the Highlands & Islands. If zero, please leave blank.

This information should be provided for completed financial years only.

Temporary employment is full time or part time work for part of the year. It should be reported as the total days per year worked by all temporary employees.

	FY 2008-09	FY 2007-08	FY 2006-07
Total number of days worked by all temporary staff	<input type="text"/>	<input type="text"/>	<input type="text"/>

15. Please provide the financial value of turnover/income generated by all your offices/facilities within the Highlands & Islands.

Turnover/income is defined as the total amount received covering sales of goods and services (including progress payments on work in progress).

EXCLUDE: other operating income; extra-ordinary income; amounts received from sales of capital assets, patents, trademarks and copyrights; VAT and non-research grants/subsidies.

INCLUDE: public sector sourced research income and research grants. Research income/grants are those payments made by the public sector and through university funding mechanisms to undertake research and development.

This information should be provided for completed financial years only.

FY 2008-2009 (£)	<input type="text"/>
FY 2007-2008 (£)	<input type="text"/>
FY 2006-2007 (£)	<input type="text"/>

16. Please provide the financial value of research income & research grants (as already included in your turnover/income data above) generated by all your offices/facilities within the Highlands & Islands.

Research income/grants are those payments made by the public sector and through university funding mechanisms to undertake research and development.

This information should be provided for completed financial years only.

FY 2008-2009 (£)	<input type="text"/>
FY 2007-2008 (£)	<input type="text"/>
FY 2006-2007 (£)	<input type="text"/>

17. Please provide the financial value of purchases/expenditures (excluding staff costs) made by all your offices/facilities within the Highlands & Islands.

Purchases/expenditures are incurred in operating the company/organisation and to generate turnover/income.

EXCLUDE: employment costs (wages/salaries and employer costs/contributions), stock variation, all interest payments, amounts charged to capital account and capitalised building repairs.

This information should be provided for completed financial years only.

FY 2008-2009 (£)

FY 2007-2008 (£)

FY 2006-2007 (£)

18. Please provide the financial value of wages & salaries incurred at all your offices/facilities within the Highlands & Islands- i.e. gross wages and salaries paid to employees.

Wages/salaries are the total for all full time/part time and temporary staff.

EXCLUDE employers costs and contributions.

This information should be provided for completed financial years only.

FY 2008-2009 (£)

FY 2007-2008 (£)

FY 2006-2007 (£)

19. Does your company/organisation operate from more than one office/facility within the Highlands & Islands?

Yes

No

Multiple Offices/Facilities

20. Please provide estimates of permanent full-time, permanent part-time and temporary staff for each of your offices/facilities within the Highlands & Islands at the end of your financial year 2008-09. The locations should correspond to those identified at Question 3, e.g. 'Location 1' here should be the same as 'Location 1' at Question 3.

Permanent full time employment is defined as working 30 hours or more per week.

Permanent part time employment is defined as working less than 30 hours per week.

Temporary employment is full time or part time work for part of the year. It should be reported as the total days per year worked by all temporary employees.

	Location 1	Location 2	Location 3	Location 4	Location 5
Permanent Full Time Staff (end FY 2008-09)	<input type="text"/>				
Permanent Part Time Staff (end FY 2008-09)	<input type="text"/>				
Total number of days worked by all temporary staff (during FY 2008-09)	<input type="text"/>				

Company Finance

21. In relation to your activities within the Highlands & Islands what has been the total financial value of research and development grants that you have been awarded over the past three years.

22. If applicable, please indicate the sources of these research and development grants (all that apply).

- Highlands & Islands Enterprise
- Scottish Government (including Funding Councils)
- UK Government (including Research Councils)
- European Union

Other (please specify)

23. In relation to supporting and developing your activities within the Highlands & Islands what has been the total financial value of equity and loan finance sourced over the past three years?

24. Please indicate the sources of this financing (all that apply).

- Family & Friends
- Business Angel Equity & Loan Investment
- Institutional Equity & Loan Investment (including Venture Capital)
- Bank Loan
- Other Type of Loan

Other (please specify)

Industry Sectoral Information

25. Please estimate the approximate percentage of your turnover/income that is attributable to each 'life science' sub-sector in which you are active.

TOTAL SHOULD SUM TO 100%

	% turnover/income
Agri-biotechnology	<input type="text"/>
Aquaculture	<input type="text"/>
Cosmeceuticals	<input type="text"/>
Environmental	<input type="text"/>
Medical Devices-Diagnostics	<input type="text"/>
Medical Devices-Other	<input type="text"/>
Non-Diagnostic, Non-Medical Test Platforms	<input type="text"/>
Nutraceuticals	<input type="text"/>
Therapeutics	<input type="text"/>
Veterinary	<input type="text"/>
Non-Life Sciences Activity	<input type="text"/>
Other Life Science (please provide details at Question 26 below)	<input type="text"/>

26. Please provide details of the activities you included within the category 'Other Life Science' at Question 25.

ONLY ANSWER THIS QUESTION IF YOU RESPONDED TO THIS CATEGORY IN THE PREVIOUS QUESTION. OTHERWISE GO TO QUESTION 27.

27. Please estimate the approximate percentage of your turnover/income that is attributable to each type of activity.

TOTAL SHOULD SUM TO 100%

	% turnover/income
Own Research & Development	<input type="text"/>
Own Production & Sales	<input type="text"/>
Contract Research	<input type="text"/>
Contract Manufacture	<input type="text"/>
Other (please provide details at Question 28 below)	<input type="text"/>

28. Please provide details of the activities you included within the category 'Other' at Question 27.

ONLY ANSWER THIS QUESTION IF YOU RESPONDED TO THIS CATEGORY IN THE PREVIOUS QUESTION. OTHERWISE CLICK ON 'NEXT' BELOW.

Competitors and Customers

29. Where are your existing, or potential, competitors located?

	Main competitors (all that apply)	Most important competitor (one only)
Within the Highlands & Islands	<input type="checkbox"/>	<input type="checkbox"/>
Scotland outside the Highlands & Islands	<input type="checkbox"/>	<input type="checkbox"/>
UK outside of Scotland	<input type="checkbox"/>	<input type="checkbox"/>
Outside the UK	<input type="checkbox"/>	<input type="checkbox"/>

30. Where are your existing, or potential, customers located?

	Main customers (all that apply)	Most important customer (one only)
Within the Highlands & Islands	<input type="checkbox"/>	<input type="checkbox"/>
Scotland outside the Highlands & Islands	<input type="checkbox"/>	<input type="checkbox"/>
UK outside of Scotland	<input type="checkbox"/>	<input type="checkbox"/>
Europe outside the UK	<input type="checkbox"/>	<input type="checkbox"/>
Rest of the World	<input type="checkbox"/>	<input type="checkbox"/>

Intellectual Assets, Licensing Agreements & Strategic Alliances

31. How many patent applications have you filed?

Number

Patent Applications

32. How many patents have you been granted?

Please note that for the purposes of this survey the same patent granted in different jurisdictions only counts as one patent.

Number

Patents Granted

33. Please indicate the number of other intellectual assets held.

Number

Registered Trademark

Unregistered
Trademark

Registered Design
Rights

Unregistered Design
Rights

Plant Breeders' Rights

34. Please indicate the number of in/out-licensing deals signed.

Non-Exclusive

Exclusive-Restricted
Geography

Exclusive-Global

Other

Number of in-licensing
deals signed

Number of out-
licensing deals signed

35. Please indicate whether you have any of the following types of formal strategic alliances (i.e. formal written agreement) within and outside the UK. (all that apply)

	Within UK	Outside UK
With a company for incoming supplies	<input type="checkbox"/>	<input type="checkbox"/>
With a company for marketing/sales/distribution	<input type="checkbox"/>	<input type="checkbox"/>
With a company for technology partnership	<input type="checkbox"/>	<input type="checkbox"/>
With a company for other types of alliances	<input type="checkbox"/>	<input type="checkbox"/>
With an academic organisation for incoming supplies	<input type="checkbox"/>	<input type="checkbox"/>
With an academic organisation for marketing/sales/distribution	<input type="checkbox"/>	<input type="checkbox"/>
With an academic organisation for technology partnership	<input type="checkbox"/>	<input type="checkbox"/>
With an academic organisation for other types of alliances	<input type="checkbox"/>	<input type="checkbox"/>

Quality Assurance

36. Are you obligated to work to a Quality Assurance Standard because of the nature of your work?

- Yes
- No
- Don't Know

37. Which of the following quality standards have you implemented for regulatory reasons or through choice? (One choice per row)

	Regulatory	Through Choice
Good Manufacturing Practice (GMP)	<input type="radio"/>	<input type="radio"/>
Good Laboratory Practice (GLP)	<input type="radio"/>	<input type="radio"/>
Good Clinical Practice (GCP)	<input type="radio"/>	<input type="radio"/>
UKAS Accreditation	<input type="radio"/>	<input type="radio"/>
ISO Accreditation	<input type="radio"/>	<input type="radio"/>
Working in the spirit of GLP	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>

(please specify)

General Comments

38. To what extent does the Life Sciences supply chain in the Highlands & Islands meet your requirements?

	Fully	To some extent	To a small extent	Not at all
Meet requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39. How could the Life Sciences supply chain in the Highlands & Islands be improved?

40. To what extent do you have problems in recruiting staff for positions within the Highlands & Islands?

	None	Limited problems	Significant problems	Very significant problems
Recruitment problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. Which, if any, skill sets do you have any problems in recruiting for positions in the Highlands & Islands?

42. What opportunities do you see for the development of the Life Sciences sector in the Highlands & Islands?

The End

Thank you for taking the time to complete this survey. Please click on the button below to submit the survey.