

BiGGAR Economics

Heriot-Watt University: Economic Impact Study

Final Report to



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1 EXECUTIVE SUMMARY

This report presents the results of an economic impact study of Heriot-Watt University that was undertaken by BiGGAR Economics in summer 2012.

1.1 Key Findings

The key findings of this report are that Heriot-Watt University:

- generates £278.2 million Gross Value Added (GVA) for the Scottish economy each year and supports 6,254 jobs;
- generates 10% of Scotland's educational exports but receives around 4% of Scottish public funding for higher education;
- attracts £73.9 million income from overseas and a further £28.1 million from the rest of the UK;
- accounts for nearly 6% of the GVA of the Orkney economy and supports more than 2% of employment on the Islands;
- makes a substantial, direct contribution to eight of the Scottish Government's National Performance Indicators;
- has a distinctive approach to industry engagement that directly enhances the competitiveness of the Scottish economy and is expected to generate significant benefits for Scottish businesses in the years ahead;
- graduates will earn 14% more over their life-times than graduates from other higher education institutions;
- will generate at least a further £22.7 million GVA per year and support a minimum of 779 more jobs in the Scottish economy over the next seven years if it achieves its strategic objective of doubling international activity; and
- will generate at least a further £36.6 million GVA per year and support a minimum of 321 more jobs in the Scottish economy over the next two years if it maintains current levels of industry engagement.

1.2 Summary of Findings

The study considers the impact of the University's four campuses in Edinburgh, the Scottish Borders, Orkney and Dubai. It also considers the impact affiliates such as the Edinburgh Business School, the Edinburgh Conference Centre and the Heriot-Watt University Research Park. The sources of economic impact considered are:

- core impacts arising from the University's day-to-day activity;
- impacts generated by Heriot-Watt students;
- tourism impacts generated by visitors to the University and its students and staff;
- knowledge exchange and commercialisation impacts resulting from the University's engagement with industry and exploitation of intellectual property;

- impacts generated by companies based on the Heriot-Watt University Research Park; and
- the additional life time earnings of graduates from the University.

Taken together total quantifiable economic impact of Heriot-Watt described in this report amount to:

- £179.9 million GVA and 3,829 jobs in Edinburgh and the Lothians;
- £7.6 million GVA and 223 jobs in the Borders;
- £8.8 million GVA and 119 jobs in Orkney;
- £278.2 million GVA and 6,254 jobs in Scotland; and
- £30.5 million GVA and 693 jobs in the Emirates.

This implies that every £1 of income received by the University generates £1.85 GVA for the Scottish economy. It also implies that every £1 funding that the University receives from the SFC generates £8.07 GVA for the Scottish economy.

After the direct impact of the University's day-to-day activity, the single largest source of impact is knowledge exchange and commercialisation activity, which contributes £56.5 million GVA to the Scottish economy each year and supports 605 jobs.

The University also generates £43.5 million GVA and supports 1,613 jobs as a result of student expenditure and part time work. Visitors to the University and its students and staff generate a further £5.1 million GVA each year and support 382 tourism related jobs while the Heriot-Watt University Research Park generates £44.9 million GVA each year and supports a further 440 jobs. In addition it is estimated that each year Heriot-Watt graduates who live in Scotland earn £166.1 million of additional income as a result of possessing a degree from the university.

The University also makes a significant contribution to the competitiveness of the Scottish economy by undertaking industry relevant research and successfully transferring this to industry. It also directly contributes to eight of the 50 National Performance Indicators identified by the Scottish Government. Specifically, it helps to:

- increase the number of businesses in Scotland;
- increase exports from Scotland;
- improve Scotland's reputation;
- improve the skill profile of the Scottish population;
- improve levels of educational attainment;
- increase the proportion of graduates in positive destinations;
- increase physical activity; and
- reduce Scotland's carbon footprint.

A key defining feature of Heriot-Watt University is the high level of international activity it undertakes. Half of the overseas students who are awarded a Scottish

degree each year, obtain it from Heriot-Watt University and the University is committed to the strategic target of doubling income from international activities over the next seven years.

It is estimated that in 2011/12 the University received £43.2 million from overseas sources and £13.7 million from the rest of the UK. In addition to this, international students studying at the University spend £22.4 million each year in the Scottish economy, international visitors spend a further £5.8 million in the Scottish tourism sector and the University receives around £2.3 million in collaborative research funding from overseas companies. In total these exports amount to £73.9 million each year.

Heriot-Watt University aims to double the amount of income from international activity over the next seven years. Achieving this objective would add an additional £22.7 million GVA per year to the Scottish economy and support a further 779 jobs. It would also increase the total value of exports from the University to £135.0 million per year.

In 2009 the University significantly increased engagement with industry. By 2014 this activity is expected to generate at least a further £36.6 million GVA per year and support a minimum of 321 more jobs in the Scottish economy.

2 INTRODUCTION

This report presents the results of an economic impact study of Heriot-Watt University undertaken by BiGGAR Economics in the summer of 2012.

2.1 Heriot-Watt University

Heriot-Watt University began life in 1821 as the School of Arts of Edinburgh and was established as Heriot-Watt University in 1966. In 2011/12, the University had 8,305 UK based students, 1,764 UK based staff and income of £150.4 million. Today the University is considered one of the leading higher education institutions in the UK and was named as the Scottish University of the Year for 2011/12 by the Sunday Times University Guide.

From the outset the University has had a strong focus on providing industry relevant education and training. The University continues this tradition today by maintaining close relationships with a variety of industrial partners. Another distinctive feature of Heriot-Watt University is the institution's strong international focus. Around one third of students studying at Heriot-Watt University's Scottish campuses come from 124 countries outside the UK and the University.

Heriot-Watt University currently operates across four campuses, three in Scotland and one in Dubai.

2.1.1 Riccarton Campus

Riccarton is the oldest and largest of Heriot-Watt University's four campuses. In 2011/12, 7,595 students were based at the Riccarton campus, of whom 65% were full time under-graduates. The Riccarton campus is set in 380 acres of parkland alongside the University owned Heriot-Watt University Research Park, Edinburgh Conference Centre and Edinburgh Business School (EBS).

The Heriot-Watt University Research Park is located adjacent to the University campus on an extensive, serviced green-belt site. The University offers the ground lease of sites in the park to individual companies, some of which have built their own research facilities on the site. The University also offers space in advance laboratory buildings that are available to lease in units ranging in area from 1,000 square feet upwards.

The Edinburgh Conference Centre is located adjacent to the main reception area at the Riccarton Campus. The centre piece of the Conference Centre are the James Watt Centres which together provide tiered seating for up to 600 delegates, three sub-dividable syndicate rooms and 1,000 square metres of versatile exhibition, conference or function space.

The EBS was founded in 1997 as a wholly owned subsidiary of Heriot-Watt University. From the beginning, the EBS pioneered the development of distance-learning materials. As a result, all of the programmes delivered by the EBS are fully flexible and can be delivered through a combination of self-study, distance learning at one of the University's network of Approved Learning Providers (ALPs) or taught on-campus in Edinburgh. The EBS currently has around 10,000 active students of whom 30% live in the Americas, 25% live in Europe, 20% live in Africa, 15% live in the Middle East and 10% live in Asia.

2.1.2 Orkney Campus

Based in Stromness, the Orkney campus is home to the International Centre for Island Technology (ICIT). The Centre was established in 1989 to carry out advanced research, postgraduate training and consultancy in marine resource management. Activity at the Orkney campus is predominantly research driven so the students are relatively small compared to the other three campuses.

2.1.3 Scottish Borders Campus

In 1998 the University merged with the Scottish College of Textiles to create a new campus in the Scottish Borders. The campus has recently undergone a multi-million pound refurbishment as part of a major co-location project with Borders College. In 2011/12 there were almost 700 students studying at the Borders campus, virtually all of whom were full-time under-graduates.

2.1.4 Dubai Campus

In 2006 Heriot-Watt University became the first overseas university to open a campus in the Dubai International Academic City. Building on an initial focus on engineering programmes, the campus now provides 42 different under-graduate and post-graduate courses to almost 3,000 students.

2.2 Study Objectives

Heriot-Watt University commissioned BiGGAR Economics Limited to undertake a study of the impact of the University on the wider economy and demonstrate its value as a generator of economic and social outcomes. This study covers the various impacts of Heriot-Watt University including the impacts associated with teaching, student activities, research, tourism, commercialisation, knowledge exchange, community involvement, construction and other activities.

This remainder of this report is structured as follows:

- Chapter three explains the methodology used to calculate the economic impact of the University and presents some of the key assumptions used;
- Chapter four describes the core economic impacts of the University;
- Chapter five describes the impacts of Heriot-Watt students;
- Chapter six describes the tourism impacts of Heriot-Watt;
- Chapter seven describes the knowledge exchange and commercialisation impacts of Heriot-Watt;
- Chapter eight summarises the impacts associated with Heriot-Watt University Research Park;
- Chapter nine estimates the additional life-time earnings of graduates from Heriot-Watt University.
- Chapter ten provides a summary of the quantitative impacts described in chapters three to nine;
- Chapter 11 quantifies the value of exports created and supported by the University;

- Chapter 12 describes the wider economic impacts of the University; and
- Chapter 13 discusses the potential future impact of Heriot-Watt University.

3 APPROACH

This chapter describes the approach taken to calculating economic impact in this report.

3.1 Sources of Economic Impact

The sources of economic impact considered in this report include:

- **Core economic impacts** – including the direct employment and GVA created by the university, the impact of the University's expenditure on supplies, the impact of the expenditure of University staff and the impact of capital projects;
- **Student impacts** – including the impact of student spending on accommodation, food, leisure and other activities and the impact of part-time student employment;
- **Tourism impacts** – including the impact of additional visitor expenditure associated with Heriot-Watt, including friends and family visiting students and staff, delegates attending conferences and events at Heriot-Watt and other international visitors to the University;
- **Knowledge exchange and commercialisation impacts** – including the impact of University spin-out companies and technology licensing, student placements, collaborative industrial research, consultancy and start-up companies;
- **Heriot-Watt University Research Park** – this considers the impact of current tenants and those that have graduated from the park to relocate to larger premises elsewhere; and
- **Graduate premium** – the value of the additional life-time earnings of graduates from Heriot-Watt University.

3.2 Estimating Economic Impact

Economic impact is reported using two measures:

- **Gross Value Added (GVA)** - this measures the monetary contribution that the University, or a particular area of activity undertaken within the University, makes to the economy; and
- **Employment (jobs)** – this is the number of full time equivalent (fte) jobs supported by the University, or a particular area of activity.

Three types of quantifiable economic impact are considered in this assessment:

- **direct effects** – economic activity directly supported by the organisation or individual (i.e. the turnover of the University or the spending of university employees) and employment (i.e. staff employed by University or employment supported by the direct spend of a student or tourist);
- **supplier (or indirect) multiplier effects** – the purchases of supplies and services associated with the direct impact and all the resulting purchases of supplies and services down the supply chain that has occurred because of the original purchase; and

- income (or induced) multiplier effects – the expenditure of employees supported by the direct effect and supplier effect.

3.2.1 Calculating Gross Economic Impact

In this report income and spending are considered analogous to turnover. The approach used to estimate the economic impact of each source of impact varies depending on the information available about the source of impact:

- for impacts where turnover and spending on goods and services are both known (e.g. in calculating direct impact) expenditure on goods and services is subtracted from turnover to give GVA;
- for impacts where only turnover is known, turnover was first of all divided by an estimate of turnover/employee in the relevant sector to obtain an estimate of the employment supported. The number of jobs supported was then multiplied by an estimate of GVA/employee in that sector to obtain an estimate of the GVA generated; and
- for impacts where only employee numbers are known, the number of employees is multiplied by an estimate of GVA per employee to obtain an estimate of GVA.

For all types of impact, estimates of turnover/employee and GVA/employee were obtained from the Business Register and Employment Survey (BRES) 2009 published in 2010.

3.2.2 Gross to Net Impact

The total of these effects is the gross impact. This needs to be converted to net impact by taking account of:

- leakage – this considers how much of the economic activity occurs in the study area. Leakage is accounted for by considering the geographical source of the impact. This study considers the economic impact for five different geographic areas:
 - Edinburgh and the Lothians;
 - the Scottish Borders;
 - Orkney;
 - Scotland; and
 - Dubai.
- displacement – this takes into account whether and to what extent the activity of the University has resulted in the reduction of activity elsewhere in the study area (e.g. would conferences hosted by the University have been held elsewhere in Edinburgh if the University did not exist, thus reducing the economic impact of other conference facility providers); and
- multipliers - these capture the effect of subsequent spending rounds as the initial expenditure is re-spent elsewhere in the economy. This is done by applying GVA and employment multipliers to gross GVA and employment. These were sourced from the Scottish Input Output Tables 2007, published in 2010.

The multipliers used in this report are for the Scottish economy as a whole. In order to use these multipliers for different geographical areas it is necessary to adjust them to reflect the relative size of the area concerned. The assumptions used to do this are presented in Table 3.1.

Table 3.1 - Direct Impact & Assumptions

	Ed & L	Borders	Orkney
% of Scottish multiplier	33%	20%	20%

Source: BIGGAR Economics assumptions based on previous experience.

3.2.3 Economic Impact Outside Scotland

This report considers the economic impact of Heriot-Watt University's activity in the United Arab Emirates (UAE). As reliable and comparable economic statistics for the UAE are not readily available, this is done by making the assumption that the impact of any given level of activity will be similar in the UAE to what it would be in Scotland. This means for example that the multipliers used for UAE are the same as those use for Scotland. This approach does not take account of differences in income or expenditure patterns between Scotland and Dubai and as such the results for the UAE are less robust than for the other study areas considered in this report. The results are however sufficiently robust to indicate the order of magnitude of University's impact in this part of the world.

4 CORE UNIVERSITY IMPACTS

This section describes the core economic impacts of Heriot-Watt University.

4.1 Direct Impact

The direct impact of an organisation can be measured by subtracting its total expenditure on goods and services from its total income. In 2010/11, the total income of Heriot-Watt University was £150.3 million and total non-staff expenditure amounted to £57.1 million. As the University shares the revenue generated by the Dubai campus with its infrastructure partner in the region, Eikon it is necessary to calculate the direct impact of the Dubai campus separately.

In 2010/11 the University received £11.6 million from the Dubai campus. This implies that the total revenue generated by the University's Scottish campuses was £138.8 million of which 95% is generated by the main Campus at Riccarton. Total non-staff expenditure of the Scottish campuses amounted to £57.1 million. so the direct GVA impact on the Scottish economy is £71.3 million. The direct impact of each of the Scottish campuses can be calculated by assuming that expenditure on supplies is proportionate to income generated.

The income received by the University for operations at its Dubai campus represents 50% of the total revenue generated. This implies that total revenue of the Dubai campus is £23.2 million. By assuming that the ratio of income to supplies is similar in Dubai as it is in Scotland, it can be estimated that approximately £10.4 million is spent on supplies for the Dubai campus. By subtracting this from the total income of the campus it can be calculated that the direct GVA impact of the campus is £12.8 million.

The University directly employs 1,555 fte staff in Scotland and 53 academic staff in Dubai. Other non-academic staff at the Dubai campus are employed by Eikon. Assuming that the ratio of academic to non-academic staff in Dubai is similar to Scotland, it can be estimated that a further 133 non-academic staff are employed in Dubai, bringing total direct employment at the campus to 186.

The direct GVA and employment impacts of each of the four campuses is summarised in Table 4.1.

Table 4.1 - Direct Impact & Assumptions

	Scotland	Ed & L	Borders	Orkney	Emirates
Total Heriot-Watt Income for 2010/11 (£000s)	138,750	132,284	6,129	336	23,218
% of total (Scottish) income by campus		95.3%	4.4%	0.2%	n/a
Total non-staff expenditure for 2010/11 (£000s)	57,058	n/a	n/a	n/a	n/a
Direct GVA (£000s)	71,271	67,950	3,149	172	12,798
Direct Employment (FTEs)	1,555	1,271	79	9	186

Source: BiGGAR Economics calculations based on data provided by Heriot-Watt University.

4.2 Supplier Impact

Supplier impact is a measure of the economic impact supported by an organisation's expenditure on goods and services. The starting point for estimating this impact is to consider the different types of supplies purchased by the University in a typical year to establish how much is spent in different sectors of the economy. It was then necessary to analyse the University's procurement records to ascertain how much expenditure is made in each of the various study areas.

In 2010/11 Heriot-Watt University recorded £57.1 million on non-staff expenditure. In addition, it was estimated above that £10.1 was spent on supplies for the Dubai campus. Analysis of the expenditure profile of the three Scottish campuses suggests that around 19% of total expenditure is spent in businesses based in Edinburgh and the Lothians, 1% is spent in businesses based in the Borders and less than 1% is spent in businesses in Orkney. This information is not available for the Dubai campus so it is assumed that the campus obtains the same proportion of supplies from businesses in Dubai as the Scottish campuses do from businesses in Edinburgh and the Lothians.

The number of jobs supported by this expenditure was then calculated by dividing the total expenditure in each category by an estimate of turnover/employee in that sector. The GVA impact of this expenditure was then calculated by multiplying the total number of jobs supported by each category of expenditure by an estimate of the GVA/employ in that sector. The indirect impact of this expenditure was then calculated by applying GVA and employment multipliers appropriate to each sector.

The direct impact of this expenditure in each area was calculated by multiplying the total impact by the proportion of expenditure that occurred in each area. The indirect impact of this expenditure in each area was estimated by adjusting the multipliers used in the initial calculation to reflect the relative size of each area.

In this way it can be estimated that the non-staff expenditure of Heriot-Watt University contributes £22.0 million GVA to the Scottish economy and supports 749 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 4.2.

Table 4.2 - Supplier Impact & Assumptions

	Scotland	Ed & L	Borders	Orkney	Emirates
Total non-staff expenditure 2010/11 (£000s)				57,060	10,420*
% of expenditure by location	46.8%	19.4%	1.1%	<0.1%	3.5%
Direct GVA	13,492	5,591	325	3	1,021
Indirect GVA	8,578	1,172	41	<1	649
Direct Jobs	487	202	12	0	37
Indirect Jobs	262	36	1	0	20
Total GVA (£000s)	22,070	6,763	367	3	1,670
Total Employment (FTEs)	749	238	13	0	57

Source: BIGGAR Economics calculations based on data provided by Heriot-Watt University.
*Estimated.

4.3 Staff Spending Impact

When staff employed by Heriot-Watt University spend their wages, this stimulates activity elsewhere in the economy. The first step in calculating the impact of this expenditure is to establish where Heriot-Watt employees live and what they are paid using data provided by the University.

In 2011 Heriot-Watt staff received a total of £58.6 million in wages and salaries. By using information held by the University about staff addresses it is possible to estimate where this expenditure goes. In addition to the spending by Heriot-Watt University, it is also necessary to include the salaries of staff employed by Eikon in Dubai. It was estimated above that Eikon employs 133 people in Dubai. By multiplying this number by the average salary of Heriot-Watt employees, it can be estimated that these employees are paid £4.8 million per year.

Next it is necessary to make assumptions about how much of their wages employees living in each area will spend in the area where they live, in the other study areas and elsewhere in Scotland. These assumptions are presented in Table 4.3.

Table 4.3 - Staff Spending Assumptions

Where staff live	Location of staff spending					
	Ed&L	Borders	Orkney	R- Scot	RUK	Emirates
Lothian	35%	5%	0%	30%	10%	0%
Borders	20%	25%	0%	25%	10%	0%
Orkney	0%	0%	40%	30%	10%	0%
Rest of Scotland	10%	0%	0%	60%	10%	0%
Rest of UK	0%	0%	0%	15%	65%	0%
Emirates	5%	0%	0%	15%	0%	70%

Source: BiGGAR Economics calculations based on data provided by Heriot-Watt University. *it is assumed that all overseas expenditure occurs in the Emirates.

Using these assumptions it is possible to estimate the total staff expenditure in each study area. Total expenditure in each study area is equivalent to additional turnover for businesses in each study area. By dividing this turnover by a turnover/employee for the whole economy, it can be estimated how many jobs are supported. The GVA of this expenditure can then be calculated by multiplying the number of jobs supported by an estimate of GVA/employee across the whole economy. The impact of subsequent spending rounds is then captured by applying multipliers appropriate to each area.

In this way it can be estimated that the spending of Heriot-Watt University staff contributes £22.7 million GVA to the Scottish economy and supports 658 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 4.4.

Table 4.4 – Staff Spending Impact

	Scotland	Ed & L	Borders	Orkney	Emirates
Direct GVA (£000s)	12,262	5,322	908	39	1,274
Indirect GVA (£000s)	10,423	1,493	154	7	1,083
Direct Jobs	330	143	24	1	34
Indirect Jobs	327	47	5	0	34
Total GVA (£000s)	22,684	6,814	1,062	45	2,358
Total Employment (FTEs)	658	190	29	1	68

Source: BiGGAR Economics calculations based on data provided by Heriot-Watt University. Columns may not add due to rounding.

4.4 Capital Projects Impact

Each year the University invests in capital projects such as new buildings. This expenditure is equivalent to turnover in the construction sector, which supports construction jobs and contributes GVA to the economy.

As capital expenditure can vary significantly from year to year, this impact is calculated using average capital expenditure over time. Records suggest that on average over the period 2007 – 2011, the University invested £9.7 million per year in capital projects; however, this excludes a number of very significant capital investment projects.

Over the past couple of years for example, the University has invested around £12 million replacing on-campus student accommodation at the Borders campus with a purpose built student village. The University will also be investing £20 million during 2011/12 in new student accommodation at the Riccarton Campus. The University and its partners also invested around £35 million in the development of the Heriot-Watt in Dubai and the Edinburgh Business School has recently invested around £1 million refurbishing the former residence of Adam Smith in the centre of Edinburgh. Taking account of these major projects brings the annual average capital expenditure over the past six years to £21 million per year.

Included within these figures are investments that the University has made in a recent co-location project with Borders College. This project involved developing new buildings and up-grading estate at the Borders campus but it is worth noting that the scale of the University's investment considerably underestimates the full impact of this £32 million project on the Borders economy.

The employment supported by capital expenditure is calculated by dividing expenditure by turnover/employee in the construction sector. The GVA of this is then calculated by multiplying the number of jobs supported by GVA/employee in the construction sector. The effects of subsequent spending rounds are then captured by applying GVA and employment multipliers appropriate to each study area.

In this way it can be estimated that Heriot-Watt University's expenditure on capital projects contributes £12.1 million GVA to the Scottish economy each year and supports 252 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 4.5.

Table 4.5 – Capital Projects - Impact & Assumptions

Impact/expenditure	Scotland	Ed & L	Borders	Orkney	Emirates
Capital Expenditure by campus (6 yr average £000s)	15,183	12,612	2,569	2	5,833
Direct GVA (£000s)	5,661	4,703	958	1	2,175
Indirect GVA (£000s)	6,454	1,769	218	<1	2,480
Direct Jobs	115	96	19	0	44
Indirect Jobs	137	38	5	0	53
Total GVA (£000s)	12,115	6,472	1,176	1	4,655
Total Employment (FTEs)	252	133	24	0	97

Source: BiGGAR Economics calculations based on data provided by Heriot-Watt University. Capital expenditure at the Dubai campus is undertaken by the University's partner in the region and is therefore excluded from this analysis. Columns may not add due to rounding.

4.5 Summary of Core Impacts

Taking the impacts discussed in this section together, it can be calculated that the core activity of Heriot-Watt University contributes around £128.1 million GVA to the Scottish economy each year and supports around 3,214 fte jobs. This impact is broken-down for each of the study areas in tables Table 4.6 and Table 4.7.

Table 4.6 – Summary of Core Impacts – GVA (£000s)

Type of Impact	Scotland	Ed & L	Borders	Orkney	Emirates*
Direct impact (£000s)	71,271	67,950	3,149	172	12,798
Supplier impact (£000s)	22,070	6,764	367	3	1,671
Staff spending Impact (£000s)	22,685	6,814	1,062	45	2,358
Capital projects impact (£000s)	12,115	6,472	1,176	1	4,655
Total Core Impacts (£000s)	128,141	88,000	5,754	222	21,481

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

Table 4.7 – Summary of Core Impacts – Employment (FTEs)

Type of Impact	Scotland	Ed & L	Borders	Orkney	Emirates*
Direct impact	1,555	1,271	79	9	186
Supplier impact	749	238	13	0	57
Staff spending Impact	658	190	29	1	68
Capital projects impact	252	133	24	1	97
Total Core Impacts	3,214	1,832	146	10	408

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

5 STUDENT IMPACT

This chapter estimates the impacts associated with students at Heriot-Watt University.

5.1 Student Spending Impact

Each of the students at each of Heriot-Watt University's four campuses spends money in the local economy on things like accommodation, food and socialising. This expenditure helps to generate GVA and support employment in businesses near the campuses and in the wider economy. In order to calculate this impact, it is necessary to establish:

- how much students spend;
- where they spend it; and
- what they spend it on.

The answer to the first of these questions depends on some extent on where students live while they are at university. Students who live in a privately rented flat for example can expect to spend considerably more than students who live at home with their parents. The first step in calculating this impact is therefore to establish how many students live in each area and what type of accommodation they stay in. Information for the Riccarton and Borders Campuses is summarised in Table 5.1.

Table 5.1 – Number of students in each campus by accommodation type

Assumption	Riccarton	Borders
Student Accommodation 40 week	1,239	200
Student Accommodation 51 week	361	0
Private Let	4,676	296
Living with parents	1,319	197
Total	7,595	693

Source: *Basic Student Budget – 2012/13, Heriot-Watt University*. Columns may not add due to rounding.

As there is no university owned accommodation on Orkney, it is assumed that all students at the campus live in privately rented accommodation. It is assumed that all students attending the Riccarton campus who live in privately rented accommodation, rent accommodation in Edinburgh and the Lothians but it is assumed that 75% of students attending the Edinburgh campus who live at home, live in Edinburgh and the Lothians. It is also assumed that 75% of students attending the Borders campus who live in privately rented accommodation, rent accommodation in Edinburgh and the Lothians and that 75% of students attending the Borders campus who live at home, live in Edinburgh and the Lothians. It is assumed that all of the others live somewhere else in Scotland.

Information about the accommodation choices of students in Dubai is not available to this study so it is assumed that 50% of students are normally resident in Dubai and continue to live at home during their studies. It is assumed that the

other 50% of students are normally resident elsewhere in the world and rent private accommodation in Dubai while they study.

Next it is necessary to calculate how much each type of student spends and what they spend it on. This can be done using information that the University provides to students about costs of living. This information is replicated in Table 5.2.

Table 5.2 – Student Costs of Living

Type of Expenditure	Living on Campus	Living in a Rented Flat
Hall fees/rent	£4,009	£3,900
Gas/electricity	n/a	£480
Food	£1,600	£1,440
Insurance	n/a	£90
Laundry	£120	n/a
Clothing	£300	£300
Travel	n/a	£360
Books & equipment	£250	£250
Socialising	£1,400	£1,260
Mobile phone	£300	£315

Source: *Basic Student Budget – 2012/13, Heriot-Watt University.*

It is assumed that students who live at home do not pay any rent, utility bills or food but that their other expenditure is the same as other students. As income from university owned accommodation has already been included as part of the core impacts described in the previous section, expenditure on accommodation by students who live on campus is excluded from this analysis in order to avoid double counting. It is assumed that students at the Dubai campus have a similar expenditure profile to students in Scotland.

Using this information it is possible to estimate how much students spend on different types of expenditure in each of the study areas. Each type of expenditure is then divided by an estimate of turnover/employee in the relevant sector in order to produce an estimate of the number of jobs supported. The number of jobs supported by each type of expenditure is then multiplied by an estimate of GVA/employee in the relevant sector to produce an estimate of the GVA generated by each type of expenditure. The number of jobs and GVA generated by each type of expenditure is then added together to produce an estimate of the total GVA and employment impact of student spending in each study area. The effects of subsequent spending rounds are then captured by applying appropriate multipliers.

In this way it can be estimated that spending by Heriot-Watt students contributes £30.5 million GVA to the Scottish economy and supports 940 fte jobs. A breakdown of this impact for each of the different study areas is provided in Table 5.3.

Table 5.3 – Student Spending Impact

	Scotland	Ed & L	Borders	Orkney	Emirates*
Direct GVA	22,742	21,318	1,031	48	6,720
Indirect GVA	7,773	2,404	70	3	2,297
Direct Jobs	624	569	37	1	189
Indirect Jobs	317	95	4	0	96
Total GVA (£000s)	30,515	23,723	1,101	51	9,017
Total Employment (FTEs)	940	664	41	2	286

Source: BiGGAR Economics calculations based on data provided by Heriot-Watt University. Columns may not add due to rounding.

5.2 Part-Time Student Employment Impact

Students also have an impact on the economy where they live as a result of taking part-time employment, which contributes to the GVA of the businesses that employ them. A recent survey by the University suggests that around 44% of the student population of Heriot-Watt University work part-time during term time. This study relates only to students at the University's Scottish campuses.

No information is available about whether and to what extent students at the Dubai campus undertake part-time work while studying; however, consultations with staff in the region suggest that there are various cultural factors that will make this relatively uncommon. For this reason this section only considers the impact of part-time work undertaken by students at the three Scottish campuses.

Information about the number of hours worked by students can be obtained from a 2010 study undertaken by the National Union Of Students (NUS)¹. This study shows that 32% of students who work part-time while studying work for less than 10 hours a week, 49% work for between 10 and 20 hours a week, 14% work for between 20 and 30 hours a week and 3% work more than 30 hours a week. By combining these proportions it can be calculated that, on average, students with a part-time job work just over 14 hours a week. It is assumed that students in part-time jobs will be paid the national minimum wage of £6.08 per hour.

Using this information it can be calculated that students at Heriot-Watt University work a total of 2.1 million hours each year. This is equivalent to around 1,235 fte jobs. It is however possible that if students were not available to fill these jobs, some of them would be taken by other people in the labour market. In previous similar studies undertaken by BiGGAR Economics, it has been assumed that this displacement effect would be minimal since students often take low-paid jobs with irregular hours that may be unattractive to others in the labour market.

The current economic climate means that this may no longer be the case and that higher levels of unemployment may make these jobs relatively more attractive to non-student workers. For this reason, a 50% displacement factor has been applied – i.e. it is assumed that 50% of the part-time work undertaken by students would be undertaken by someone else if the students were not available. This means that part-time work undertaken by students at Heriot-Watt is equivalent to around 618 fte jobs. These assumptions are summarised in Table 5.4.

¹ National Union of Students (2010), Still in the Red.

Table 5.4 – Student Work Assumptions

Assumption	Value	Source
Proportion of students who work part-time	44%	Heriot-Watt University
Average number of hours worked	14.2	NUS
Hourly rate	£6.08	BiGGAR Economics assumption
Displacement effect	50%	
Additional fte jobs supported	618	BiGGAR Economics calculation

The turnover associated with these jobs is then calculated by multiplying the number of employees by the average turnover/employee in sectors that typically employ students (i.e. accommodation, food services, arts, entertainment and retail). The GVA of this expenditure is then calculated by multiplying the number of additional jobs by the average GVA per employee in those sectors.

The GVA and employment impact in each area is then calculated by multiplying the total GVA and employment impact by the proportion of students who live in each of the study areas. Appropriate multipliers for each study area are then applied in order to capture the effects of subsequent spending².

In this way it can be estimated that the part-time employment of Heriot-Watt University students contributes £13.0 million GVA to the Scottish economy and supports 673 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 5.5

Table 5.5 – Student part-time work Impact

Impact	Scotland	Ed & L	Borders	Orkney
Direct GVA	9,518,271	8,467,880	652,984	19,484
Indirect GVA	3,444,226	1,011,165	47,257	1,410
Direct Jobs	464	413	32	1
Indirect Jobs	209	61	3	<1
Total GVA (£)	12,962,496	9,479,045	700,241	20,894
Total Employment (FTEs)	673	474	35	1

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

5.3 Summary of Student Impacts

Taking the impacts discussed in this section together, it can be calculated that the expenditure of Heriot-Watt students and the part-time work they do during term time contributes around £43.5 million GVA to the Scottish economy each year and supports around 1,613 fte jobs. This impact is broken-down for each of the study areas in tables Table 5.6Table 5.7.

² As student expenditure has already been counted in the previous section, type 1 multipliers are used here as these only capture the supplier impact of subsequent spending rounds.

Table 5.6 – Summary of Student Impacts – GVA (£000s)

Type of Impact	Scotland	Ed & L	Borders	Orkney	Emirates
Student spending	30,515	23,723	1,101	51	9,017
Student work	12,962	9,479	700	21	n/a
Total student impacts	43,478	33,202	1,802	72	9,017

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

Table 5.7 – Summary of Student Impacts – Employment (FTEs)

Type of Impact	Scotland	Ed & L	Borders	Orkney	Emirates
Student spending	940	664	41	2	286
Student work	673	474	35	1	n/a
Total student impacts	1,613	1,138	76	3	286

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

6 TOURISM

This section considers the impact of tourism activity associated with Heriot-Watt University.

6.1 Sources of Tourism Impact

Tourism impacts are generated when people who are not normally resident in an area visit that area because of the University. These impacts are generated by:

- friends and family visiting students and staff;
- people attending conferences and events hosted at Heriot-Watt University;
- overseas visitors attending meetings with people at the University; and
- visiting international students attending seminars and graduation ceremonies.

6.1.1 Tourism Impact Approach

The starting point for estimating the economic impact of these visitors is to calculate how much each type of visitor spends while they are in Scotland. This expenditure is equivalent to additional turnover in the tourism sector so the number of jobs supported by this expenditure can be estimated by dividing total expenditure in each area by turnover/employee in the accommodation and food services sector. The GVA contributed by this expenditure is then calculated by multiplying the number of jobs supported by GVA/employee in the sector. The effect of subsequent spending rounds are then captured by applying multipliers appropriate to the study area. This approach is used for each of the different types of impact described in this section.

6.2 Visits from Friends and Family

Heriot-Watt University currently has a total of 10,082 students and staff, many of whom have moved away from their normal place of residence in order to attend the University. While working or studying at the University, it is expected that friends or family who are also not normally resident in the local area will visit many of these people – for example a large number of visitors come to Edinburgh each year to attend graduation ceremonies. The expenditure of these visitors generates GVA and supports jobs in the local tourism sector.

In order to calculate this impact it is first of all necessary to calculate how many visits students and staff of Heriot-Watt University receive. This is done using information compiled by VisitScotland on the total number of UK and overseas tourist who visit friends and family in Scotland every year. These numbers are then divided by the total population of Scotland to provide an estimate of the average number of UK and overseas visitors received by each resident of Scotland. The estimates are then multiplied by the number of staff and students at Heriot-Watt in order to estimate how many UK and overseas visitors come to Scotland to visit friends and family at the University.

VisitScotland also provides data about the average expenditure of UK and overseas tourists who come to Scotland to visit friends or family. The expenditure of these visitors can therefore be calculated by multiplying this expenditure by the number of UK and overseas visitors received by staff and students at each campus.

In this way it can be estimated that students and staff at Heriot-Watt University receive a total of 3,834 visits from friends and family each year and that these visitors spend around £921,000 in the Scottish economy.

Table 6.1 – Visiting Friends & Family Assumptions

Assumption	Value	Source
Annual number of VFR trips from UK	1,307,000	VisitScotland, Tourism in Scotland 2010
Annual number of VFR trips from Overseas	679,000	
Population	5,222,000	
Spend per UK VFR Trip	127	
Spend per Overseas VFR Trip	458	
Total Staff and Students	10,082	Heriot-Watt University

The impact of this expenditure is calculated using the method described in section 6.1.1. In this way it can be estimated that the expenditure of people visiting friends and relations at Heriot-Watt University contributes £0.5 million GVA to the Scottish economy and supports 39 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 6.2.

Table 6.2 – Visiting Friends & Family Impact

Impact	Scotland	Ed & L	Borders	Orkney
Direct GVA	420,810	369,088	27,577	1,130
Indirect GVA	100,994	29,232	1,324	54
Direct Jobs	26	23	2	<1
Indirect Jobs	13	4	<1	<1
Total GVA (£s)	521,805	398,320	28,901	1,185
Total Employment (FTEs)	39	26	2	<1

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

6.3 Conferences and Events

The Edinburgh Conference Centre is a dedicated conference centre owned by the University and located at the University's main campus at Riccarton, Edinburgh. Both internal and external clients use the Conference Centre. Internal clients include schools of the University hosting conferences and events and external clients range from private wedding parties, to other universities, groups of students from other universities and performers at the annual Edinburgh Festivals.

In 2011 the Conference Centre hosted events for more than 45,000 delegates. Analysis of the type of events hosted at the Conference Centre suggests that around 65% of the delegates are from the local area (i.e. close enough not to require an over night stay). Analysis of the University's on-site accommodation booking system suggests that around 500 of these delegates stayed in University owned accommodation. As revenue generated from this source is already included as part of the direct impact calculated in section 4.1, these delegates are excluded here.

It is assumed that all delegates who require over-night accommodation will stay in hotels in Edinburgh and that 10% of delegates will bring a partner with them for the trip. By applying these assumptions it can be calculated that each year more than 17,000 trips are made to Edinburgh by delegates attending conferences and events at the Heriot-Watt Conference Centre and their partners.

VisitScotland research shows that 63% of trips made to Scotland each year are made by residents of other areas of the UK and the remaining 37% are made by overseas visitors. The same research suggests that UK business visitors spend an average of £244 per trip while overseas business visitors spend an average of £682. By applying these assumptions to the number of trips calculated above it can be estimated that delegates attending events at the Heriot-Watt Conference centre spend an additional £6.9 million per year in Edinburgh. The assumptions used to calculate the impact of conferences and events are summarised in Table 6.5.

Table 6.3 – Conferences & Events Assumptions

Assumption	Value	Source
Total delegates attending conferences and events in the Conference Centre	45,862	HWU Conference Centre
Proportion of delegates who bring partner	10%	Biggar Economics Assumption
Delegates who stay in on-site accommodation	518	Biggar Economics analysis of information provided by Edinburgh Conference Centre
% of local delegates	65%	
Expenditure of UK business traveller (per trip)	£244.50	VisitScotland
Expenditure of UK business traveller (per trip)	£682.35	

The impact of these conferences and events can then be calculated using the method described in section 6.1.1. In this way it can be estimated that the expenditure of delegates attending conferences and events at Heriot-Watt University contributes £4.0 million GVA to the Scottish economy and supports 292 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 6.4.

Table 6.4 – Conferences & Events Impact

Impact	Scotland	Ed & L
Direct GVA	3,183,294	3,183,294
Indirect GVA	763,991	252,116.90
Direct Jobs	195	195
Indirect Jobs	97	32
Total GVA (£s)	3,947,285	3,435,411
Total Employment (FTEs)	292	227

Source: BIGGAR Economics economic impact model. Columns may not add due to rounding.

6.4 On-campus Accommodation

In addition to the conference and events space, Heriot-Watt also offers delegates the option of staying in University accommodation. During term time, the University has 165 rooms available to the public and outwith the university term, a further 795 rooms are available. This capacity represents a significant addition to the total tourist accommodation supply in Edinburgh.

Information provided by the Conference Centre suggests that around 16,600 nights accommodation are provided on-site for visitors to Edinburgh and the Lothians each year. Although the impact of income received for this accommodation has already been included as part of the core impacts discussed in section 4, the impact of any additional spending by these visitors on food and entertainment is not.

Data from VisitScotland suggests that business travellers from the UK spend an average of £88 per night and business travellers from overseas spend an average of £113 per night. The rack rate offered to visitors staying in Heriot-Watt University accommodation is £45.80 per night. This implies that on average, UK visitors staying in University owned accommodation, spend £43 on food and other items and overseas visitors spend £67. The total expenditure of visitors staying in University accommodation can be calculated by multiplying this by the annual number of bed-nights. This expenditure amounts to around £0.8 million per year.

The assumptions used to calculate the impact of conferences and events are summarised in Table 6.5.

Table 6.5 – On-Campus Accommodation Assumptions

Assumption	Value	Source
Annual bed-nights on-campus accommodation provided	16,607	Edinburgh Conference Centre
Cost of on-campus accommodation	£45.80	
Expenditure of UK business traveller (per night)	£88.36	VisitScotland
Expenditure of UK business traveller (per trip)	£244.50	
Expenditure of overseas business traveller (per night)	£112.62	
Expenditure of UK business traveller (per trip)	£682.35	

The impact of these conferences and events can then be calculated using the method described in section 6.1.1. In this way it can be estimated that the expenditure of delegates attending conferences and events at Heriot-Watt University contributes £0.5 million GVA to the Scottish economy and supports 36 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 6.6.

Table 6.6 – On-site Accommodation Impact

Impact	Scotland	Ed & L
Direct GVA	392,236	392,236
Indirect GVA	94,137	31,065
Direct Jobs	24	24
Indirect Jobs	12	4
Total GVA (£s)	423,301	486,373
Total Employment (FTEs)	36	28

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

6.5 Overseas Visitors

A defining feature of Heriot-Watt University is its international focus and this is reflected in the number of overseas visitors who come to the University each year for various purposes.

An important source of international visitors is the Edinburgh Business School (EBS), which has a particularly strong international focus. The vast majority of EBS students do not live in Scotland while they are studying so any visits made by these students or their friends and family have not already been counted in this report (visits to students who do live in Scotland while they are studying are included in section 6.2).

When EBS students do come to Edinburgh, they do so to attend intensive four-day seminars that are held throughout the year at the EBS. The vast majority of students who attend these seminars are not normally resident in Scotland so any expenditure they make while in the country makes a direct contribution to the turnover of the Scottish tourism sector.

Consultation with EBS suggest that around 200 international students visit Edinburgh each year to attend intensive seminars. Some of these students attend one seminar and some attend several but on average, each student will spend around six days in the city. During their stay, approximately 25% of students stay on-campus in accommodation owned by the University but the remaining 75% stay in hotels in Edinburgh. This equates to 900 additional bed-nights in Edinburgh hotels each year.

In addition to this, all of the Schools at the University receive numerous international visitors each year. It is estimated that on average, each school receives around 30 international visitors each year, that these visitors each stay two or three nights in the City and that around 75% of them stay in hotels in Edinburgh during their visit. In addition to this, the Orkney Campus receives around 15 visitors per month³, all of whom spend money in the Orkney economy.

Data from VisitScotland shows that overseas travellers visiting Scotland for business purposes spend an average of £113 per night. The expenditure of these students and other visitors can therefore be calculated by multiplying the number of additional bed-nights generated by average expenditure per night. In

³ Steve Westbrook (September 2011), Economic Impact Assessment of the Orkney Renewables Centre, HIE.

this way it can be calculated that international visitors to the University's three Scottish campuses spend more than £400,000 each year in the Scotland.

In addition to these visitors, around 1,000 people come to Edinburgh each year to attend EBS graduation ceremonies⁴. The vast majority of these visitors are not normally resident in the UK and as many come from a great distance, it is assumed that each guest stays for an average of 2 days. This equates to a further 2,000 additional bed-nights in Edinburgh hotels each year.

A large number of international visitors also come to Scotland to attend graduation ceremonies for students from each of the other seven schools in the University; however, because these students typically live in Scotland while studying the impact of their visitors is included in section 6.2. Visitors to EBS graduation ceremonies are included in this section because the vast majority of EBS students are not based in the UK while they are studying so the impact of people visiting these students has not already been counted elsewhere.

Data from VisitScotland shows that overseas travellers visiting Scotland for leisure purposes spend an average of £84 per night. The expenditure of these visitors can therefore be calculated by multiplying the number of additional bed-nights generated by average expenditure per night. In this way it can be calculated that people attending EBS graduation ceremonies contribute over £245,000 each year to the Scottish tourism sector.

Table 6.7 – International Visitor Assumptions

Assumption	Value
Annual visitors to Orkney Campus	180
Annual international visitors to all other schools	30
Average duration of stay (day)	2.5
Annual number of visiting international students.	200
Proportion of students who stay in hotels	75%
Annual number of other international visitors.	52
Number of guests attending EBS graduation ceremonies each year	1,000
Number of nights graduation ceremony visitors spend in Scotland	2
Expenditure of overseas business traveller (per night)	£112.62
Expenditure of overseas leisure traveller (per night)	£84.42

Source: VisitScotland and consultation with HWU staff and economic impact study of Orkney Renewables Centre.

The impact of all this expenditure is calculated using the method described in section 6.1.1. In this way it can be estimated that the expenditure of international visitors and visiting students contributes £0.2 million GVA to the Scottish economy and supports 16 fte jobs. A break-down of this impact is provided in Table 6.8.

⁴ The impact of graduation ceremonies for Scottish based students is included in section 6.2.

Table 6.8 – International Visitor Impact

Impact	Scotland	Ed & L	Borders	Orkney
Direct GVA	170,846	147,366	3,306	20,174
Indirect GVA	41,003	11,671	159	968
Direct Jobs	10	9	0	1
Indirect Jobs	5	1	0	0
Total GVA (£s)	211,849	159,038	3,465	21,142
Total Employment (FTEs)	16	10	0	1

Source: BiGGAR Economics economic impact model. Columns many not add due to rounding.

6.6 Summary of Tourism Impacts

Taking the impacts discussed in this section together, it can be calculated that tourism activity supported by Heriot-Watt University contributes around £5.2 million GVA to the Scottish economy each year and supports around 382 fte jobs. This impact is broken-down for each of the study areas in tables Table 6.9 Table 6.10.

Table 6.9 – Summary of Tourism Impacts – GVA

Type of Impact	Scotland	Ed & L	Borders	Orkney
Conferences & events	3,947,285	3,435,411	n/a	n/a
Visits from friends & family	521,805	398,320	28,901	1,185
On-site Accommodation	486,372	423,301	n/a	n/a
International visitors	211,849	159,038	3,465	21,142
Total tourism GVA impacts	5,167,311	4,416,070	32,366	22,327

Source: BiGGAR Economics economic impact model. Columns many not add due to rounding.

Table 6.10 – Summary of Tourism Impacts – Employment (FTEs)

Type of Impact	Scotland	Ed & L	Borders	Orkney
Conferences & events	292	227	n/a	n/a
Visits from friends & family	39	26	2	<1
On-site Accommodation	36	28	n/a	n/a
International visitors	16	10	<1	1
Total tourism employment impacts	382	292	2	1

Source: BiGGAR Economics economic impact model. Columns many not add due to rounding.

7 KNOWLEDGE EXCHANGE & COMMERCIALISATION

This section describes the impact of Heriot-Watt's work with industry.

7.1 Background

Heriot-Watt's heritage is rooted in the provision of education for working people and professionals. When the School of Arts was established in 1821 its purpose was to "address societal needs by incorporating fundamental scientific thinking and research into engineering solutions".

By the 1960s, Heriot-Watt University was expanding rapidly and a decision was taken to relocate from the centre of Edinburgh to a new green belt site to the west of the city where it would have room to grow. The objective of relocating to Riccarton was to use the space available to initiate new methods of transferring information and technology to the growing number of science-based companies in the area. In particular, it was considered important to address the needs of research-based organisations that required close and continuing collaboration with the academic research staff. To achieve this, the University decided to:

- make the resources and services of University departments and individual staff members available to industry on a professional basis;
- establish self-financing Technology Transfer Institutes in a range of disciplines that are exclusively devoted to co-operation with industry; and
- develop a Research Park, where companies may establish their activities within the University campus, thus enabling them to make maximum use of the services and facilities offered by the University, while retaining full control over the security and confidentiality of their operations.

Today Heriot-Watt University retains a strong focus on providing industry relevant research, education and training. This is translated into economic impact through two main routes, knowledge exchange and commercialisation. These categories cover a diverse range of activity that affects the Scottish economy in a variety of different ways. Although these terms are often used interchangeably, for the purposes of this report they are defined as follows:

- **knowledge exchange activity** refers to activities that enable the staff and students of the University to transfer the knowledge and skills they have gained through their research and studies into industry by collaborating directly with industry; and
- **commercialisation** refers to formal agreements between the University and businesses that grant the business involved permission to use intellectual property developed within the University for commercial gain.

7.2 Knowledge Exchange

As a result of this early strategic focus, Heriot-Watt University enjoys strong and well-established relationships with a wide range of industrial partners across a variety of sectors. These relationships are maintained with the help of a dedicated Business and Enterprise team, which helps academics and students at the University to transfer knowledge and skills developed in an academic

environment into the workplace. Embedding this knowledge in the workplace helps to raise the productivity of the businesses assisted, which in turn increases their GVA and employment.

Heriot-Watt University works with industry in a range of different ways including:

- undertaking joint research projects with industrial partners;
- providing consultancy support on specific projects to individual companies;
- facilitating student placements in industry;
- delivering customised workforce training programmes for particular sectors or companies; and
- providing companies with access to specialised facilities and equipment; and
- providing industry relevant education and encouraging entrepreneurialism amongst students and staff.

Each of these types of activity is discussed in further detail below

7.2.1 Collaborative Research

One of the ways in which academics at Heriot-Watt University transfer their skills and expertise into industry is by undertaking joint research projects with industry. The University is engaged in a wide variety of joint research projects across various sectors. The duration and cost of these projects varies considerably from project to project from short projects lasting a couple of months and costing a few thousand pounds to extensive projects costing hundreds of thousands of pounds and lasting a number of years. What all of the projects have in common is that they all involve personnel from both the University and the industrial partner, collaborating in a joint research effort.

In 2012, the University generated £6.7 million of contributions from industry toward joint research projects. Some of this was in the form of cash contributions and some was in the form of in-kind support. One of the University's industrial partners, Renishaw also contributed £0.5 million of equipment.

This revenue represents direct investment by private sector clients in R&D. As with any commercial investment decision, businesses take the decision about whether or not to proceed with a joint research project on the basis of a cost/benefit analysis.

Although the formality of this analysis will vary depending on the size of the project concerned, it is reasonable to assume that companies will only proceed with projects that they expect will at least break-even. This means that companies will only proceed with projects when they expect the result of the project to enable them to generate additional turnover that is *at least* equal to the cost of the project. This implies that the total income the University receives as contributions toward joint research is at least equal to the additional turnover that these projects will generate amongst client companies.

The number of jobs supported by this additional turnover can be calculated by dividing the total additional turnover by the average turnover generated per employee in the industries in which the joint research partners operate. The GVA impact of this employment can then be calculated by multiplying the number of jobs by an estimate of GVA/employee in those sectors. The effect of subsequent

spending rounds is then captured by applying appropriate GVA and employment multipliers.

Much of the joint research undertaken by Heriot-Watt University involves either the Institute for Petroleum Engineering (IPE) or the Innovative Manufacturing Research Centre (IMRC). These IPE works primarily with very large multi-national oil and gas companies while a high proportion of the IMRC's clients are based in England. For this reason much of the impact generated by these research projects will be outside Scotland. Analysis of this income suggests that this leakage may account for around 85% of the total impact of joint research.

In this way it can be estimated that joint research activity undertaken by academics at Heriot-Watt University contributes around £0.8 million GVA to the Scottish economy each year and supports 2 jobs.

Table 7.1 – Joint Research Impact

Impact	Scotland	Ed & L
Direct GVA	421,889	88,542
Indirect GVA	427,530	29,610
Direct Jobs	1	<1
Indirect Jobs	1	<1
Total GVA (£s)	849,419	118,152
Total Employment (FTEs)	2	<1

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

The nature of joint research projects is that at the beginning often neither party has a very clear idea of what the outputs of the project might be. This uncertainty makes it very difficult to quantify the impact of joint research and means that the long term impact of research projects can be much greater than expected. The approach taken in this section is conservative because it assumes that R&D investment will break-even in the long run however in reality investment in R&D is likely to generate a significant positive return. For this reason, the impacts identified in this section are likely to be an underestimate. We return to this issue in section 12.1.

7.2.2 Consultancy

Another way in which academics at Heriot-Watt University transfer their skills and expertise into industry is by undertaking consultancy projects on behalf of industry. Although the university is engaged in a wide variety of consultancy projects, the basic principle is that a company pays an academic to undertake a specific project on their behalf. The relationship between the two parties is a commercial one and although the academic involved may generate some research findings as a result of the work, these are not the main objective. Instead, the primary focus of these types of projects is to produce a report (or other output) for the company client.

Consultancy projects vary considerably in size and duration but in 2011/12, the University received just over £0.2 million from consultancy work. The total amount of consultancy revenue generated by Heriot-Watt University academics is however much higher than this because the University allows academics to retain 90% of any consultancy income they earn. This suggests that the total amount of

revenue generated from consultancy activity in 2011/12 was actually just over £2.5 million. Following the same logic described in section 7.2.1, this revenue can be regarded as equivalent to the amount of turnover that the client company ultimately expects the project to generate.

As above, the number of jobs supported by this additional turnover can be calculated by dividing the total additional turnover by the average turnover generated per employee. The GVA impact of this employment can then be calculated by multiplying the number of jobs by an estimate of GVA/employee. The effect of subsequent spending rounds is then captured by applying appropriate GVA and employment multipliers. As consultancy activity undertaken by academics at Heriot-Watt University includes projects in a wide variety of sectors, it is appropriate to use estimates of turnover/employee and GVA/employee and multipliers for the whole economy.

Data provided by the University's Schools suggests that around 24% of consultancy activity undertaken is commissioned by companies based in Edinburgh and the Lothians and a further 32% is commissioned by companies elsewhere in Scotland. These proportions can be applied to the total impact of consultancy activity in order to obtain an estimate of the impact of this activity in each of the study areas.

In this way it can be estimated that consultancy activity undertaken by academics at Heriot-Watt University contributes around £0.8 million GVA to the Scottish economy each year and supports 23 jobs.

Table 7.2 – Consultancy Impact

Impact	Scotland	Ed & L
Direct GVA	429,308	193,767
Indirect GVA	364,912	54,352
Direct Jobs	12	5
Indirect Jobs	11	2
Total GVA (£s)	794,219	248,119
Total Employment (FTEs)	23	7

Source: BIGGAR Economics economic impact model. Columns may not add due to rounding.

7.2.3 Workforce Training

Various Schools within Heriot-Watt University also provide training courses and continuous professional development (CPD) opportunities for industry. When companies pay for their staff to receive additional training they do so in the belief that it will help to make the employee more productive and enable them to add more value to the business in the future. For the same reasons discussed in section 7.2.1, the value added to a business by employees undertaking CPD can be considered as equivalent to the amount of money businesses invest in these courses.

In 2011/12 the University received £6.3 million for delivering CPD to companies and other organisations, 16% of which are located in Scotland. It is assumed that the break-down of this activity for each study area is similar to consultancy activity. The impact of this can be calculated in exactly the same way as described for consultancy activity (section 7.2.2).

In this way it can be estimated that consultancy activity undertaken by academics at Heriot-Watt University contributes around £0.3 million GVA to the Scottish economy each year and supports 10 jobs.

Table 7.3 – Workforce Training Impact

Impact	Scotland	Ed & L
Direct GVA	178,943	80,765
Indirect GVA	152,101	22,655
Direct Jobs	5	2
Indirect Jobs	5	1
Total GVA (£s)	331,044	103,420
Total Employment (FTEs)	10	3

Source: BIGGAR Economics economic impact model. Columns may not add due to rounding.

7.2.4 Student Placements

Heriot-Watt University strives to provide education and training that equips its students with industry relevant skills and maintaining close links with industry is central to achieving this. One of the ways in which this is achieved is through student placements, which involve current students spending some time working in industry on a specified project.

This is particularly common within the School of Engineering and Physical Sciences. Electrical engineering students on the MEng degree courses for example are required to undertake a six-month industry placement, students wishing to obtain a Diploma in Industrial Training are required to undertake a 10-month placement and physics students studying the MPhys course are required to spend a year undertaking research in a company.

In 2011/12, 170 Heriot-Watt under-graduates were required to undertake a formal placement as part of their degree programme, 90 under-graduates undertook optional placements and at least 90 post-graduates undertook placements. In addition, there are believed to be a significant number of informal arrangements in place where by students from various departments spend time working with industrial partners.

The impact of this activity can be estimated by assuming that students on placement make a similar contribution to the economy as other members of staff in the sectors they are working in for the time they are there. Although it could be argued that placement students may contribute less, because they are not fully trained and will require additional supervision from existing staff, it is assumed that there will be other benefits to the company that will counteract this. For example:

- many placement students are subsequently recruited by their host company. These students have some experience working in the company and will require less training and be more productive than other potential recruits;
- many companies use student placements as part of their recruitment process and will make recruitment cost savings if they subsequently employ the student; and
- the productivity of existing members of staff could be improved if staff learn something from the student while they are on placement.

It is assumed that, on average, student placements last for 43 weeks (10 months). This implies that Heriot-Watt students spend a total of 13,160 weeks on placement each year. The impact of this can be calculated by multiplying it by the average GVA/employee per week across the economy as a whole. In this way it can be estimated that student placements contribute £5.4 million GVA to the Scottish economy each year.

In addition to the student placements described above, the University also participates in the Government sponsored Knowledge exchange Partnerships (KTP) programme. This programme provides funding for long-term, typically up to three year, student placements.

Heriot-Watt University is currently involved in six KTPs and has completed a further two within the past three years. Seven of these KTPs occurred in Scotland and four of them occurred within the Lothians.

A strategic review of the KTP programme undertaken in 2010⁵ found that on average, KTPs undertaken in Scotland contributed £713,000 GVA to the Scottish economy, equivalent to an annual impact of £119,000. The same study found that on average, each KTP projects support the creation of three jobs.

By multiplying these findings by the number of KTPs supported by Heriot-Watt it is possible to estimate that these projects contribute almost £1.0 million GVA to the Scottish economy each year and support 24 jobs.

Taken together student placements and KTPs contribute to £6.3 million GVA to the Scottish economy each year and supports 21 jobs. This impact of Heriot-Watt University's student placement activity and the key assumptions used are summarised in Table 7.8.

Table 7.4 – Student Placement Impact & Assumptions

Assumption	Value	Source
Annual number of HWU student placements	350	HWU
Average duration of placements (weeks)	43	Assumption based on HWU website
Annual GVA impact of KTPs	£119,000	KTP Strategic Review, 2010
Jobs supported/KTP	3	
Impact	Scotland	Ed & L
Total GVA (£s)	6,314,236	2,949,805
Total Employment (FTEs)	21	12

Source: BIGGAR Economics economic impact model. Columns may not add due to rounding.

7.2.5 Facilities & Equipment

Heriot-Watt University has a range of laboratories, workshops and specialised equipment (ranging from a wind tunnel and a wave tank to a rail track test centre and a pilot brewery), which can be accessed by companies for their own use. This might be for experimental work, testing prototypes, data analysis or training

⁵ Regeneris Consulting (February 2010), Knowledge exchange Partnerships Strategic Review.

purposes. Each of these facilities are supported by technicians and specialist members of staff who can assist companies with the equipment and help them to interpret the results. Examples of the type of facilities and equipment available to industry include:

The use of University facilities and equipment is often negotiated as part of a wider programme of activity. For example, joint research projects often make use of University facilities while projects undertaken by students on industrial placements may involve the use of specialised equipment owned by the University. The cross cutting nature of this activity means that the impact of facilities and equipment is included within the other impacts considered in this section.

7.2.6 Start-up Companies

Teaching at Heriot-Watt University is designed to equip students with the industry relevant skills that will be useful to Scottish businesses. One consequence of this is to make Heriot-Watt graduates particularly attractive to potential employers but some graduates choose to use their skills more directly, by starting up a company of their own.

The Orkney campus has been a particularly significant source of start-up activity. A report commissioned by Highlands and Islands Enterprise in 2011⁶ identified 10 active start-up companies that had been established by former students and staff at the Orkney campus. Taken together these businesses are believed to employ 90 ftes, 88 of whom are based in Orkney.

This impact would be substantially higher if the University's initiative in putting forward the initial use and lobbying for the European Marine Energy Centre (EMEC) to be located in Orkney was also quantified in terms of net additional employment on the islands.

The report also identified the individuals responsible for creating each of the companies and concluded that the presence of Heriot-Watt was central to their reasons for living and remaining on in Orkney. Without the Orkney campus it is very unlikely that any of these businesses would be located on the islands today. Furthermore, it is likely that a high proportion of the businesses would never have been established at all. This is because if the Orkney campus did not exist, the founders of these businesses would probably be located elsewhere in Scotland in areas that may offer more employment opportunities and therefore fewer incentives to start-up independently.

Another significant source of start-up enterprises is the International Centre for Brewing and Distilling (ICBD). Now part of the School of life sciences, the centre began life in 1904 to provide evening classes for Edinburgh's highly successful brewing industry. In the first half of the 20th Century the centre developed strong links with industry and by the 1980s, it was believed that every major brewery in the UK employed a graduate from Heriot-Watt University.

Today the ICBD maintains the region's traditional association with the industry by being the only organisation in the UK to offer both Honours and Masters degrees in Brewing and Distilling. Following decades of decline, the brewing industry has witnessed something of a resurgence in recent years thanks to growing interest in

⁶ Steve Westbrook (September 2011), Economic Impact Assessment of the Orkney Renewables Centre, HIE.

traditional craft beer. This trend has led to the emergence of a number of small, independent breweries, many of which are located in and around Edinburgh.

Research undertaken to inform this study has identified three craft breweries in Edinburgh and the Lothians that have been started by graduates from the ICBD. Given the uniqueness of the courses provided by the ICBD it is reasonable to assume that these businesses would not exist if their founders had not had the opportunity to study at the centre. For this reason, the impact generated by these businesses can be attributed to Heriot-Watt University. Employment in Heriot-Watt start-ups is summarised in Table 7.5.

Table 7.5 – Heriot-Watt University Start-ups

Company	Sector	Employment
ScotRenewables Ltd	Renewable energy/Environmental Consultancy	15.0
Aquatera Ltd		13.5
Xodus Aurora		17.5
North Isles Environmental Ltd.		1.0
Credo Green		5.0
Opus Plus Ltd.	Marine/support services to the oil & gas sector	24.5
Sula Diving/Orkney Hyperbaric Unit	Tourism	8.5
Scapa Scuba Ltd.		3.5
Orkney Cruise Services		0.5
Digitata Ltd./Marram Studio	Textiles/arts	1.0
Brew Dog	Brewing	2.0
Stewart Brewing		11.0
Knops Brewery		1.0
Total		104.0

Source: Steve Westbrook (2011) and BiGGAR Economics research.

The economic impact of these businesses can be calculated by multiplying employment in each company by an estimate of the GVA/employee in the sector in which the company operates. The effect of subsequent spending rounds is then captured by applying appropriate multipliers. The impact in each area is calculated by taking account of where each company is based.

In this way it can be estimated that Heriot-Watt University start-ups contribute £16.1 million GVA to the Scottish economy each year and support 212 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 7.6.

Table 7.6 – Start-up Impact

Impact	Scotland	Ed & L	Orkney
Direct GVA	8,446,695	1,121,344	7,155,484
Indirect GVA	7,607,578	297,588	1,312,972
Direct Jobs	104	14	88
Indirect Jobs	108	7	17
Total GVA (£s)	16,054,273	1,418,932	8,468,456
Total Employment (FTEs)	212	21	105

Source: BiGGAR Economics economic impact model. Columns many not add due to rounding.

7.3 Commercialisation

There are two main ways in which intellectual property developed in a university can be utilised by industry. One is through licensing, whereby businesses are granted the legal right to use a particular patented technology or other type of intellectual property right (IPR) to generate additional sales, reduce costs or otherwise improve their profitability. The other is the creation of spin-out companies that are created specifically to exploit a particular technology developed in the University. Both are discussed below.

7.3.1 Licensing

The starting point for calculating the impact generated by licensing activity is to consider the royalties or licence fees that the University receives from licence holders as this reflects the value of the licence to the licence holder. In 2011/12, the University received just over £32,000 in royalty income. As licence holders retain a proportion of the income generated by the licence however this income only reflects a proportion of the total value of the technology. In order to estimate the full impact of the technology, it is first of all necessary to estimate how much turnover the licenses generate within the license holding company.

The relationship between the royalty paid for a technology and the turnover it generates depends on the details of the licensing agreement and can vary considerably from company to company. In order to agree a licence, negotiators must first form a view of how much the IP is worth to the prospective licensee. There are a wide variety of variables that may inform this judgement but a training manual issued by the World Intellectual Property Organisation⁷ states that a common starting point is the “well known and widely quoted” 25% rule.

The 25% rule is a general rule of thumb according to which the licensor should receive around one quarter to one third of the profits accruing to the licensee and has been used by IP negotiators for at least 40 years. The rule is based on an empirical study first undertaken in the 1950s and updated in 2002⁸. The study found that royalty rates were typically around 25% of the licensee’s profits, which equates to around 5% of sales from products embodying the patented technology. This implies that royalties paid for a technology typically represent around 5% of the total turnover generated by that technology.

⁷ Exchanging Value, Negotiating Technology Licensing Agreements: a training manual, World Intellectual Property Organisation, 2005.

⁸ Goldscheider, Use of the 25% rule in valuing IP, les Nouvelles, 2002.

By applying this to the amount of licence income received by Heriot-Watt University in 2011/12 it can be calculated that these technologies generated over £0.6 million of additional turnover for licence holding businesses, two thirds of which are located in Scotland.

The employment supported by this turnover can be estimated by dividing the additional turnover generated by an estimate of turnover per employee. The GVA of the licensing activity can then be calculated by multiplying employment by an estimate of GVA/employee. The effects of subsequent spending rounds are then accounted for by applying appropriate multipliers.

In this way it can be estimated that licencing agreements with Heriot-Watt University contributes £0.2 million GVA to the Scottish economy and support 5 fte jobs. This is summarised in Table 7.7.

Table 7.7 – Licencing Impact

Impact	Scotland
Direct GVA	129,220
Indirect GVA	71,071
Direct Jobs	3
Indirect Jobs	1
Total GVA (£s)	200,291
Total Employment (FTEs)	5

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

It might be noted that the impact of licensing activity at Heriot-Watt University is somewhat lower than some of the other impacts considered in this section. This is a reflection of the University’s collaborative approach to working with industry. In the past for example, the University has had a policy of not taking licence income from spin-out companies and in many areas, the University does not take royalty fees from companies that use its IP, providing the company invests in further joint research with the University. It should also be noted that the amount of royalty income received by the University has almost doubled in the last year and is expected to continue to grow over the next few years.

7.3.2 Spin-outs

One of the most obvious ways in which research activity is translated into economic activity is when new spin-out or start-up businesses are created in order to exploit research outputs commercially. Heriot-Watt University currently has 20 active spin-out companies, which together employ more than 200 people in Scotland. As none of these businesses would have been created were it not for the research activity at the Heriot-Watt University, all of the GVA they generate and jobs they support can be attributed to the University. These spin-outs are listed in Table 7.8.

Table 7.8 – Heriot-Watt University Active Spin-outs

Company	Location	Employees
2Ei	Edinburgh	2
Affective Media	Glasgow	4
Alba Photonics	Edinburgh	2
Aquapharm bio-discovery	Argyll	27
bryoactives	Edinburgh	1
Computer Application Services	Edinburgh	22
Edinburgh Instruments	Livingston	48
Epistemy	Edinburgh	3
Helia Photonics	Livingston	10
Hydrafact	Edinburgh	14
Hydrason	Glasgow	2
Nandi Proteins	Edinburgh	3
Nitech	East Kilbride	0
Optoscribe	Livingston	1
Petroc Technologies	Edinburgh	0
Power Photonic	Fife	9
See Byte	Edinburgh	45
Totally Textures	Edinburgh	0
Verbalis	Borders	0

Source: Heriot-Watt University Business & Enterprise Services

The impact of Heriot-Watt University spin-outs is calculated by multiplying employment in each company by an estimate of the GVA/employee in the sector in which the company operates. The effect of subsequent spending rounds is then captured by applying appropriate multipliers. The impact in each area is calculated by taking account of where each company is based.

In this way it can be estimated that spin-outs from Heriot-Watt University contribute £31.9 million GVA to the Scottish economy each year and support 342 fte jobs. A break-down of this impact for each of the different study areas is provided in Table 7.9.

Table 7.9 – Spin-out Impact

Impact	Scotland	Ed & L
Direct GVA	19,244,152	12,660,629
Indirect GVA	12,691,709	2,755,437
Direct Jobs	193	151
Indirect Jobs	149	38
Total GVA (£s)	31,935,861	15,416,067
Total Employment (FTEs)	342	189

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

7.4 Knowledge exchange and Commercialisation Summary

The knowledge exchange activity described in this section contributes £24.3 million GVA to the Scottish Economy each year and supports 259 jobs. Commercialisation activity contributes a further £32.1 million GVA per year and supports another 247 jobs. This brings the combined impact of Heriot-Watt University's knowledge exchange and commercialisation activity to £56.5 million GVA and 605 jobs. These impacts are summarised in tables Table 7.10 Table 7.11.

Table 7.10 – Knowledge exchange and Commercialisation Impact – GVA (£ millions)

Impact	Scotland	Ed & L	Orkney
Joint Research	0.8	0.1	n/a
Consultancy	0.8	0.2	n/a
CPD	0.3	0.1	n/a
Student Placements	6.3	2.9	n/a
Start-up Companies	16.1	1.4	8.5
Knowledge exchange Total	24.3	4.8	8.5
Licensing	0.2	<1	n/a
Spin-outs	31.9	15.4	n/a
Commercialisation Total	32.1	15.4	n/a
Total KT & commercialisation (£s)	56.5	20.3	8.5

Table 7.11 – Knowledge exchange and Commercialisation Impact – employment (FTEs)

Impact	Scotland	Ed & L	Orkney
Joint Research	2	<1	n/a
Consultancy	23	7	n/a
CPD	10	3	n/a
Student Placements	21	12	n/a
Start-up Companies	212	21	105
Knowledge exchange Total	259	40	105
Licensing	5	<1	n/a
Spin-outs	342	189	n/a
Commercialisation Total	347	189	n/a
Total KT & commercialisation (£s)	605	230	105

8 HERIOT-WATT UNIVERSITY RESEARCH PARK

This section considers the impact of the Heriot-Watt University Research Park.

8.1 Current Research Park Tenants

The objective of the Heriot-Watt University Research Park was to enable companies to establish their own research and development groups within the campus of the University. At present there are 25 active tenants in the Park, these are listed in Table 8.1

Table 8.1 – Heriot-Watt University Research Park - active tenants

Company	Jobs	Company	Jobs
Aptiv Solutions	4	Weatherford	130
Study Group	24	Company Net	3
APTUIT	20	Computer Application Services	13
Renishaw	12	Helica Systems	36
Aquapharm Biodiscovery	12	Scottish Business in the Community	3
Burdica	11	Scottish Water	18
SWRI	63	SEPA	23
Trig Avionics	24	Rospa	24
Quotient	130	Scottish Woodlands	7
Institute of Occupational Medicine	20	Quotient Medical	17
Abelon Systems	20	Tritech	23
Roccella	47	Weir LGE	160
C-MIST	3	Total	847

Source: Heriot-Watt University Research Park

As the Research Park would not have existed without Heriot-Watt University it is reasonable to attribute some of the economic impact generated by these tenants to the University. The extent to which this should be done however depends on how important co-location with the University was both to the companies' initial decision to locate to the research park and how important it has been to the subsequent success of the company.

For some companies, this effect is expected to be significant. The Institute of Occupational Medicine (IOM) for example, is a major independent centre of scientific excellence in the fields of occupational and environmental health, hygiene and safety. The activity undertaken by the IOM is closely related to academic expertise at Heriot-Watt so the proximity of Heriot-Watt is likely to have had a significant positive influence on the Institute's decision to relocate its headquarters to the research park.

For other companies, co-location with the University is likely to have been much less of a factor. Scottish Water and the Scottish Environmental Protection Agency (SEPA) for example are both public sector agencies. Although both organisations take advantage of statistical and hydrology expertise in the

university, the size of the organisations is in no way dependant on co-location with Heriot-Watt University. For this reason, the impact of both of these organisations is excluded from this analysis. It is also necessary to exclude tenants of the science park that are spin-outs of the university since the impact of these companies has already been counted in section 7.3.1.

8.1.1 Research Park Graduates

The Heriot-Watt University Research Park was designed to enable companies to benefit from being located close to academic expertise at the University. Some of the companies that chose to locate on the Research Park, were so successful that they out grew their original premises and have had to relocate to larger premises elsewhere in Scotland. Examples⁹ of Research Park Graduates include:

- Hyaltec - a biomedical company that provides hyaluronic acid (HA) medical solutions, was based on the Research Park for several years before moving to new premises in Livingston in 2009 in order to increase capacity and meet market demands. Hyaltec now has 60 employees.
- Westmont Systems - specialises in the supply of inspection and control solutions to industry and has now moved to larger premises in Inverkeithing. Westmont Systems now has 7 employees.

Both of these companies benefited from being located on the Research Park, close to the expertise of the University for several years prior to moving to their present locations. For this reason, it is appropriate to include some of their current impact in this study. This is done using exactly the same approach taken for existing Research Park tenants.

8.2 Impact of Research Park

The extent to which the impact of the remaining tenants can be attributed to the University can be assessed using evaluation evidence from similar research park elsewhere in the Lothians. The Pentlands Science Park (PSP) is a 22 acre science and technology park co-located with the Moredun Research Institute. Like the Heriot-Watt University Research Park, a key factor in the PSP's ability to attract tenants is the opportunity to co-locate with research expertise at the Moredun Research Institute. Like the Heriot-Watt University Research Park, the PSP is also a member of the Edinburgh Science Triangle.

An evaluation of the PSP undertaken by BiGGAR Economics in 2002¹⁰ found that 84% of PSP tenants believed that that the PSP had a positive impact on the performance of their organisation. Although not all of the tenants could quantify the extent of this impact, those who could stated that, on average 50% of their employment and turnover could be attributed to being based at PSP. On this evidence it could therefore be assumed that 42% of the economic impact arising from tenants at the Heriot-Watt University Research Park is attributable to Heriot-Watt University (i.e. 84% X 50%).

The impact of research park tenants can be calculated in exactly the same way as the impact of spin-out companies described above. First the number of jobs in

⁹ Edinburgh Instruments is another graduate of the Research Park but as the company is a spin-out of the University, its impact was considered in section 7.3.2.

¹⁰ Evaluation of Pentlands Science Park and Roslin BioCentre, BiGGAR Economics, 2002.

each company is multiplied by an estimate of the GVA/employee in the sector in which the company operates in order to obtain an estimate of GVA. For the reasons described above it is assumed that 42% of this impact can be attributed to Heriot-Watt University. The effect of subsequent spending rounds is then captured by applying appropriate multipliers.

In this way it can be estimated that the impact of tenants at the research park that can be attributed to Heriot-Watt University amounts to £44.9 million GVA to the Scottish economy and supports 440 fte jobs. A break-down of this impact is provided in Table 8.2.

Table 8.2 – Impact of Research Park Tenants

Impact	Scotland	Ed & L
Direct GVA (£000s)	28,651,827	28,651,827
Indirect GVA (£000s)	16,275,053	5,370,767.
Direct Jobs	287	287
Indirect Jobs	153	51
Total GVA (£s)	44,926,880	34,022,594
Total Employment (FTEs)	440	338

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

9 GRADUATE PREMIUM

In providing training and education, Heriot-Watt University is providing its students and graduates with the skills they will require to contribute effectively to the economy (and society) in the future. By enhancing the potential of graduates to contribute to the economy, Heriot-Watt University is not only improving the employability of its graduates but also increasing the productivity of the economy as a whole.

One method of measuring this productivity increase is to consider the graduate earning premium, that is the additional income that someone with a degree can expect to earn over their life-time compared to someone with two or more A-levels.

9.1 Quantifying the Graduate Premium

Evidence to quantify the graduate premium of Heriot-Watt University can be found in a 2007 study undertaken by Pricewaterhouse Coopers¹¹, which found that over a working lifetime a typical graduate earns around £160,000 more than an individual with two or more A-levels.

This study also provides estimates of the additional life-time earnings of graduates in particular subject areas. To estimate the graduate premium for Heriot-Watt University, the average additional lifetime earnings for each subject area (e.g. engineering – £243,730) was multiplied by the number of students currently in that subject area (engineering – 243). This was also carried out with post-graduates students, who are estimated to earn a further £70,000 life-time earnings. The totals for each subject area were then totalled together to estimate the gross additional earnings of the graduates. A summary of the assumptions used to calculate this impact is provided in Table 9.1.

Table 9.1: Graduate Premium - Assumptions by Subject

Subject	Annual graduates by subject area*		Undergraduate additional Lifetime Earnings per graduate (£) **
	Scottish campuses	Dubai Campus	
Engineering	243	30	£243,730
Physical/Env. Sciences	110	0	£237,935
Math/Comp. Sciences	167	0	£249,741
Business & Finance	256	76	£184,694
Social Sciences	30	0	£169,267
BioSciences	70	0	£111,269
European Languages	71	0	£96,281
Arts	115	0	£34,949
Other	180	9	£160,000
Post-graduate degrees	1,449	98	£70,000

Source: *Heriot-Watt University. **PWC (2007)

¹¹ PWC (2007), The Economic Benefits of a Degree.

In this way it can be estimated that the total graduate premium associated with graduates from Heriot-Watt University's Scottish Campuses amounts to £328.3 million and the graduate premium associated with graduates from the Dubai campus amounts to £29.6 million.

Given the international profile of Heriot-Watt University, many graduates from Scottish campuses will not remain in Scotland after they complete their study. It is therefore necessary to adjust the total Scottish impact to reflect this. Consultation with Heriot-Watt University alumni relations office suggests that around 31% of Heriot-Watt graduates remain in Edinburgh and the Lothians, 1% remain in the Scottish Borders and a further 18% remain elsewhere in Scotland.

Applying these proportions to the total graduate impact suggests that the total graduate premium associated with one year's graduates of Heriot-Watt University that is retained in Scotland amounts to £166.1 million. Of this, £101.8 million is retained in Edinburgh and the Lothians, £4.3 million is retained in the Borders and £0.7 million is retained in Orkney. Anecdotal evidence suggests that the starting salary for Heriot-Watt graduates is somewhat higher than that for other graduates. If this is the case then this impact may be higher than estimated above.

It is also worth noting that a high proportion of graduates from Heriot-Watt University are from disciplines such as engineering, physical sciences, mathematics, computer science, business and finance and a relatively low proportion of humanities and arts graduates. As physical sciences type subjects tend to be associated with higher graduate premiums, this means that the average premium associated with a degree from Heriot-Watt is around 14% higher than the average graduate premium across the UK.

10 SUMMARY OF QUANTITATIVE IMPACTS

This section summarises the total quantitative impact of the University on the Lothians, Orkney, the Borders, Scotland, the UK and the Emirates.

10.1 Summary of Heriot Watt University Impacts

Taken together total quantifiable economic impact of Heriot-Watt described in this report amount to:

- £179.9 million GVA and 3,829 jobs in Edinburgh and the Lothians;
- £7.6 million GVA and 223 jobs in the Borders;
- £8.8 million GVA and 119 jobs in Orkney;
- £278.2 million GVA and 6,254 jobs in Scotland; and
- £30.5 million GVA and 693 jobs in the Emirates.

In 2011 the total income of Heriot-Watt University was £150.4 million. This implies that every £1 of University income generates £1.85 GVA for the Scottish economy. Within this income, £34.4 million was received from the SFC. This implies that every £1 funding that the University received from the SFC generated £8.07 GVA for the Scottish economy.

Around two thirds of the impact of Heriot-Watt University is concentrated in Edinburgh and the Lothians. A further 3% is concentrated in the Borders and 3% in Orkney. Although the scale of the Universities impact in the two other Scottish campuses is small in comparison to its impact elsewhere in Scotland, these impacts have a disproportionate effect due to the relatively small size of the two local economies. For example, the Scottish Government estimate that the whole Orkney economy contributes £151.4 million GVA to the Scottish economy each year and provides employment for 5,900 people. It can therefore be calculated that Heriot-Watt University accounts for nearly 6% of the GVA by the Orkney economy and supports more than 2% of employment on the Islands.

After the direct impact of the University's day-to-day activity, the single largest source of impact is knowledge exchange and commercialisation activity, which contributes £56.5 million GVA to the Scottish economy each year and supports 605 jobs. The University also generates £43.5 million GVA and supports 1,613 jobs as a result of student expenditure and part time work. Visitors to the University and its students and staff generate a further £5.2 million GVA each year and support 382 tourism related jobs while the Heriot-Watt University Research Park generates £44.9 million GVA each year and supports a further 440 jobs.

In addition it is estimate that each year graduates living in Scotland earn £166.1 million of additional income as a result of possessing a degree from Heriot-Watt.

Heriot Watt University's quantifiable economic impact is summarised in Table 10.1 and Table 10.2.

Table 10.1 – Summary of Impacts – GVA (£m)

Type of Impact	Ed & L	Borders	Orkney	Scotland	Emirates
Direct	67.9	3.1	0.2	71.3	12.8
Supplier	6.8	0.4	<0.1	22.1	1.7
Staff Spending	6.8	1.1	<0.1	22.7	2.4
Capital Spending	6.5	1.2	<0.1	12.1	4.7
Total Core Impact	88.0	5.8	0.2	128.1	21.5
Student Spending	23.7	1.1	0.1	30.5	9.0
Student Work	9.5	0.7	<0.1	13.0	<0.1
Total Student Impacts	33.2	1.8	0.1	43.5	9.0
Visiting friends and family	0.4	<0.1	<0.1	0.5	n/a
Conferences and events	3.4	<0.1	<0.1	3.9	n/a
On-site accommodation	0.4	n/a	n/a	0.5	n/a
International Visitors	0.2	<0.1	<0.1	0.2	n/a
Total Tourism Impacts	4.4	<0.1	<0.1	5.2	n/a
Collaborative Research	0.1	<0.1	<0.1	0.8	n/a
Consultancy	0.2	<0.1	<0.1	0.8	n/a
CPD	0.1	<0.1	<0.1	0.3	n/a
Student Placements	2.9	<0.1	<0.1	6.3	n/a
Start-ups	1.4	<0.1	8.5	16.1	n/a
Licencing	<0.1	<0.1	<0.1	0.2	n/a
Spin-outs	15.4	<0.1	<0.1	31.9	n/a
Total KT &C Impacts	20.3	<0.1	8.5	56.5	n/a
Research Park Impacts	34.0	n/a	n/a	44.9	n/a
TOTAL	179.9	7.6	8.8	278.2	30.5
Annual graduate premium	101.8	4.3	0.7	166.1	29.6

Source: BIGGAR Economics economic impact model. Columns may not add due to rounding.

Table 10.2 – Summary of Impacts – Employment (FTEs)

Type of Impact	Ed & L	Borders	Orkney	Scotland	Emirates
Direct	1,271	79	9	1,555	186
Supplier	238	13	<1	749	57
Staff Spending	190	29	1	658	68
Capital Spending	133	24	<1	252	97
Total Core Impact	1,832	146	10	3,214	408
Student Spending	664	41	2	940	286
Student Work	474	35	1	673	-n/a
Total Student Impacts	1,138	76	3	1,613	286
Visiting friends and family	26	2	<1	39	n/a
Conferences and events	227	n/a	n/a	292	n/a
On-site accommodation	28	n/a	n/a	36	n/a
International Visitors	10	<1	1	16	n/a
Total Tourism Impacts	292	2	1	382	n/a
Collaborative Research	<1	<1	<1	2	n/a
Consultancy	7	<1	<1	23	n/a
CPD	3	<1	<1	10	n/a
Student Placements	12	<1	<1	21	n/a
Start-ups	21	<1	105	212	n/a
Licencing	<1	<1	<1	5.0	n/a
Spin-outs	189	<1	<1	342	n/a
Total KT Impacts	230	<1	105	605	n/a
Research Park Impacts	338	n/a	n/a	440	n/a
Total	3,829	223	119	6,254	693

Source: BiGGAR Economics economic impact model. Columns may not add due to rounding.

11 KNOWLEDGE SERVICE EXPORTS

This section considers the value of knowledge services and related activity that Heriot-Watt provides to the rest of the UK and overseas.

11.1 Scotland's International University

A key defining feature of Heriot-Watt University is the high level of international activity it undertakes. Half of the overseas students who are awarded a Scottish degree each year, obtain it from Heriot-Watt University and the University is committed to the strategic target of doubling income from international activities over the next seven years.

11.1.1 Dubai Campus

Heriot-Watt University has been operating in Dubai since 2005 when it was approached by the government who invited the University to establish a presence in the Emirate. In 2008 the University opened its first overseas campus in the new Dubai International Academic City (DIAC), a government initiative that established a free trade zone for international universities. The DIAC aims to establish Dubai as a regional destination for higher education providers in order to develop the region's talent pool and establish the UAE as a knowledge-based economy. Heriot-Watt is now one of 27 international institutions located at the DIAC and is by far the largest provider.

Initially educational provision at the Dubai campus focused mainly on engineering subjects but now includes programmes from every school at both the Riccarton and Borders campuses. Student numbers have also grown very substantially, increasing from around 120 students in October 2005 to more than 2,700 today. As demand for Heriot-Watt programmes has increased, the University has also been able to increase fees. As a result, in 2011 Heriot-Watt University earned £11.6 million income from the Dubai Campus, virtually all which was from tuition, graduation and exam fees.

The University intends to continue to develop its operations in Dubai over the next few years by increasing student numbers and developing research activity. It is anticipated that student numbers will reach 3,000 by September 2012 and could continue to increase to around 4,000 students over the next few years. As student numbers increase, so to will the value of export earnings generated by the University.

11.1.2 Proposed Malaysia Campus

The success of the Dubai campus encouraged Heriot-Watt to consider the possibility of establishing another overseas campus. Following extensive research, in October 2011 the University court gave its approval for the University to proceed with the detailed planning and other work required to establish a new campus in Malaysia. In November 2011, the University announced that it had been successful in an international tender run by the Malaysian government to develop a £20 million campus.

The new, purpose-built campus will create opportunities for up to 4,000 undergraduate and postgraduate students to study a range of courses in science, engineering, business, mathematics and design, with a view to gaining a UK-recognised degree. The capacity of the new Malaysia campus will be similar to that of the Dubai campus. If the campus succeeds in generating a similar level of

income as the Dubai campus, within a few years it could be contributing around £12 million per year in export earnings to the Scottish economy.

Heriot-Watt already secures a high proportion of its income from sources outside Scotland. The impact of these earnings is included in the previous chapters but this chapter separates international income and income from outside Scotland in order to quantify the value of this activity.

11.1.3 Approved Learning Partners

In addition to its campus in Dubai, Heriot-Watt University also reaches international students through its network of approved learning partners (ALPs) around the world. ALPs provide overseas students with an opportunity to study for a Heriot-Watt degree in an institution in their home country. This approach is aimed at students who either want a UK degree but can not afford to come to the UK, who may be unable to come to the UK or who simply prefer to stay in their home country.

The network currently consists of 50 ALPs in 30 countries around the world from the US to the Ukraine and from China to Trinidad and Tobago. Although the detailed arrangements of each partnership vary, generally the ALP is responsible for all non-academic matters related to the programme and Heriot-Watt University is responsible for academic matters such as course materials, exams and assessments. Students are registered with both the ALP and Heriot-Watt but pay fees to the ALP. The ALP then pays a proportion of the fee to Heriot-Watt University.

11.1.4 Distance Learning

Heriot-Watt University also caters for around 12,000 students through a variety of independent learning programmes. These programmes enable students anywhere in the world to purchase course materials for self-study. Students are then able to take exams, set and marked by Heriot-Watt University, in their home country at one of the ALPs described above.

11.2 RUK and Overseas Income

The income that Heriot-Watt University earns from overseas sources makes a direct contribution to the export earnings of the Scottish economy. It is estimated that in 2011/12 the University earned a total of £43.2 million from overseas sources. This represents 10% of the total value of Scotland's annual educational exports. In 2011/12 Heriot-Watt University had 8,305 full and part time students, which represents just over 3% of the total number of students enrolled in Scotland's 20 higher education institutes. This suggests that Heriot-Watt University is punching considerably above its weight in this area. A break-down of Heriot-Watt University's international income is provided in Table 11.1

Table 11.1 – Overseas income

Source of Income	Value (2011/12)
Overseas tuition fees	32,420,000
Tuition fees from (not-UK) EU students	2,721,000
Earnings from ALPs	6,000,000
EU research grants	2,061,000
Total	43,202,000
Overseas income (% of total University income)	43,202,000 (29%)

Source: Heriot-Watt University Annual Accounts 2011 and International Strategy.

In addition to the income that Heriot-Watt University generates from overseas, it also generates a substantial amount of income from the rest of the UK. Although this is not included within the Scottish Government's export figures, this income does represent an important inflow to the Scottish economy. Sources of income from the rest of the UK (RUK) include student tuition fees and income from Research Councils based outside Scotland. In 2011/12 this income amounted to £13.7 million or 9% of the University's total income. This is summarised in Table 11.2

Table 11.2 – RUK income

Source of Income	Value (2011/12)
Tuition fees from RUK ¹²	2,288,118
Research council grants	11,447,000
RUK (% of total University income)	13,735,118 (9%)

Source: Heriot-Watt University Annual Accounts 2011 and BiGGAR Economics Analysis.

It should be noted that in future years tuition fees from students from RUK will be considerably higher than at present due to the introduction of higher tuition fees. From 2012 students from England, Wales and Northern Ireland will pay £9,000 per year for under-graduate programmes.

The direct impact of Heriot-Watt University was considered in section 4. This impact considered the impacts generated directly as a result of the University's direct employment and income. The tables above suggest that approximately 29% of the University's income comes from overseas and a further 9% comes from overseas.

By applying these proportions to the direct impact calculated in section 4 it can be estimated that the income that the University receives from overseas each year contributes £20.4 million GVA to the Scottish economy and directly supports 447 jobs. It can also be calculated that income that the University receives from elsewhere in the UK contributes £6.5 million GVA to the Scottish economy each year and supports 142 jobs. This is summarised in Table 11.3.

¹² Estimated based on total student tuition fees multiplied by proportion of students domiciled in RUK.

Table 11.3 – Overseas and RUK income & economic impact

	Overseas	RUK	Total
Turnover	43,202,000	13,735,118	56,937,118
Direct GVA (£s)	20,478,003	6,510,527	26,988,530
Direct employment (ftes)	447	142	589

Source: BiGGAR Economics economic impact model.

11.3 RUK and Overseas Student Spending

In addition to income directly earned by Heriot-Watt, the University is also responsible for attracting a significant number of students from overseas and the RUK, all of whom spend money in the Scottish economy while they are here. As these students would not be in Scotland if it were not for the University, the money they spend while they are here can be directly attributed to Heriot-Watt.

Section 5 of this report described the impact of student spending on the Scottish economy. In 2011, 51% of students studying at Heriot-Watt's Scottish campuses were not ordinarily domiciled in Scotland and 38% were not normally domiciled in the UK. This means that a high proportion of student spending impact is generated from income from outside Scotland.

In order to estimate what proportion of the student spending impact can be attributed to students from outside Scotland it is first of all necessary to consider where these students live while they are in Scotland. As all of these student's home addresses are outside Scotland, it is assumed that 30% of live in University accommodation and the remaining 70% stay in privately rented accommodation.

By applying these assumptions to the student spending assumptions provided in Table 5.2, it can be estimated that overseas students at Heriot-Watt spend £22.4 million in the Scottish economy and students from the rest of the UK spend a further £7.4 million.

This represents 47% and 16% of the total expenditure of Heriot-Watt students in the Scottish economy respectively. By applying these proportions to the total student impact estimate calculated in section 5.1 it can be estimated that expenditure by overseas students at Heriot-Watt University contributes £22.3 million GVA to the Scottish economy each year and supports 400 jobs. It can also be estimated that the expenditure of Heriot-Watt students from the rest of the UK contributes £4.3 million GVA to the Scottish economy each year and supports 133 jobs. This is summarised in Table 11.4

Table 11.4 – Impact of overseas and RUK student expenditure

	Overseas	RUK	Total
Turnover	22,382,860	7,449,058	29,831,918
Direct GVA (£s)	12,925,130	4,301,507	17,226,637
Direct employment (ftes)	400	133	533

Source: BiGGAR Economics economic impact model.

11.4 RUK and Overseas Tourism Income

Section 6 of this report described the tourism impacts associated with Heriot-Watt and found that visitors associated with Heriot-Watt University spend £8.9 million each year in the Scottish economy. Using the information presented in Section 6, it can be calculated that approximately two thirds of this expenditure was made by visitors from overseas and around one third was by visitors from the RUK.

By applying these proportions to the total tourism impact, it can be estimated that overseas tourism supported by Heriot-Watt University contributes £3.2 million GVA to the Scottish economy each year and supports 240 jobs. It can also be estimated that tourism from the rest of the UK generates a further £1.8 million GVA and supports a further 134 jobs. This is summarised in Table 11.5.

Table 11.5 – RUK & overseas tourism activity

	Overseas	RUK	Total
Turnover	5,705,607	3,183,370	8,888,977
Direct GVA (£s)	3,241,406	1,808,501	5,049,907
Direct employment (ftes)	240	134	374

Source: BiGGAR Economics economic impact model.

11.5 International R&D Income

In 2011/12 Heriot-Watt University received £6.7 million from industrial partners toward the cost of collaborative research. The impact of this expenditure was described in section 7.2.1. Analysis of this income suggests that only around 6%, or £0.4 million, was received from companies that are based in Scotland. A further £2.6 million (38%) was secured from companies based elsewhere in the UK and the remaining £3.7 (56%) million came from overseas companies.

Applying these proportions to the total impact of collaborative research calculated in section 7.2.1 suggests that R&D income received by Heriot-Watt University from industrial partners elsewhere in the UK contributes £0.5 million to the Scottish economy and supports 1 job. It can also be estimated that R&D income received by Heriot-Watt University from overseas industrial partners contributes £0.3 million to the Scottish economy and supports 1 job. This is summarised in Table 11.6.

Table 11.6 – RUK & overseas collaborative research income

	Overseas	RUK	Total
Turnover	2,574,998	3,744,895	6,319,893
Direct GVA (£s)	325,290	473,079	798,370
Direct employment (ftes)	1	1	2

Source: BiGGAR Economics economic impact model.

11.6 Summary of Export Earnings

This section suggests that, in 2011 Heriot-Watt University generated a total of £43.2 million in overseas earnings and a further £13.7 million income from the rest of the UK. This represents 29% of Heriot-Watt's total income and 10% of Scotland's £445 million educational exports.

In addition to direct income, the University also generated £29.8 million in expenditure by students from the RUK and overseas, £9.0 million tourism expenditure by visitors from RUK and overseas and £6.3 million in contributions toward collaborative research from companies based in the RUK and overseas.

Taken together these educational exports amount to £102.0 million.

Table 11.7 – value of RUK & overseas exports

	Overseas	RUK	Total
Income	43,202,000	13,735,118	56,937,118
Student spending	22,382,860	7,449,058	29,831,918
Tourism income	5,750,339	3,202,580	8,952,919
Collaborative R&D income	2,574,998	3,744,895	6,319,893
Total	73,910,197	28,131,651	102,041,848

Source: BiGGAR Economics economic impact model.

This income generates £50.1 million GVA for the Scottish economy each year and supports 1,499 jobs. This impact is summarised in Table 11.8 Table 11.9.

Table 11.8 – GVA impact of RUK & overseas exports

	Overseas	RUK	Total
Income	20,478,003	6,510,527	26,988,530
Student spending	12,958,728	4,312,689	17,271,416
Tourism income	3,266,826	1,819,418	5,086,244
Collaborative R&D income	325,290	473,079	798,370
Total	37,028,847	13,115,714	50,144,561

Source: BiGGAR Economics economic impact model.

Table 11.9 – Employment impact of RUK & overseas exports

	Overseas	RUK	Total
Income	447	142	589
Student spending	399	133	532
Tourism income	242	135	376
Collaborative R&D income	1	1	2
Total	1,088	411	1,499

Source: BiGGAR Economics economic impact model.

12 WIDER IMPACTS

This section describes the non-quantifiable economic impacts of Heriot-Watt University.

12.1 Contribution to Scottish Competitiveness

One of the distinctive strengths of Heriot-Watt University is its approach to working with industry. The approach is distinctive because the focus is very much on knowledge exchange (i.e. helping to embed knowledge and expertise within businesses and sectors) rather than commercialisation (i.e. creating new companies and licensing agreements). As the main aim of this approach is to help businesses to grow, it is likely to be a more effective approach in terms of generating economic impact; however the results of this approach are also much more difficult to measure.

This is because much of the activity undertaken in support of knowledge exchange is part of long-term programmes of activity, which often span several years and involve several different research partners. This means that the full impact from any given project is likely to take a number of years to realise and may be only partially attributable to Heriot-Watt University.

In recent years Heriot-Watt University has significantly increased the amount of work it does with industry. This has been made possible as a result of £6.5 million funding received from the European Regional Development Fund (ERDF) in 2009. A recent evaluation of this activity found that seven of the companies assisted expected that their combined turnover would increase by £8.2 million as a result of the assistance provided. Another 11 companies expected turnover to increase but were unable to quantify by how much. The companies estimated that £1.6 million of the anticipated £8.2 million increase could be directly attributed to the business development team at Heriot-Watt University.

Even the impact recorded by this evaluation is likely to underplay the full impact of Heriot-Watt's industry engagement since it captures only the impact on individual companies rather than entire sectors. Research undertaken by Heriot-Watt University that is relevant to one company within a sector is likely to be relevant to several others. As companies are usually quick to learn from each other, this means that it can be expected that knowledge successfully transferred to one company will soon be transferred across an entire industry.

In section 7 it was estimated that each year Heriot-Watt University contributes £24.1 million GVA to the Scottish economy as a result of knowledge exchange activity. For the reasons described above, the long-term value of this activity is likely to be much higher. To demonstrate this it is worth considering some of the ways that Heriot-Watt University is currently working with the priority sectors identified by the Scottish Government.

12.1.1 Energy

Heriot-Watt University contributes to the growth and development of Scotland's energy sector through the Energy Academy, a pan-university initiative that aims to consolidate energy research activities and facilitate interdisciplinary programmes, both within the university and with other HEIs.

The Academy has strong links with industry through dedicated Business Development Executives who are tasked with matching the needs of industry,

business and government with the Energy Academy's range of skills. This has led to numerous collaborative projects, which enable academic expertise within the University to be applied to real world challenges faced by industry. Projects span a range of research areas that are relevant to the Scottish (and international) energy industry.

Heriot-Watt University is for example currently participating in a major study, co-funded by government and industry to investigate the potential for carbon capture and storage. If properly developed it is estimated that carbon capture and storage could create 13,000 jobs in Scotland by 2020. Although this impact will take many years to realise and will not be entirely attributable to Heriot-Watt University, it serves to illustrate that the long-term impact of knowledge exchange activity is likely to be significantly higher than estimated in section 7.

12.1.2 Finance

Heriot-Watt University is also contributing to the future development of the Scottish financial services sector through the work of the Scottish Financial Risk Academy (SFRA). The SFRA was established in April 2010 by a consortium of founder members led by the Maxwell Institute for Mathematical Sciences. It is funded by the SFC and contributions by founder members including the Actuarial Profession, Aberdeen Asset Management, Barrie & Hibbert, Lloyds Banking Group, the Maxwell Institute and Scottish Financial Enterprise.

The Academy aims to promote knowledge-exchange between industry and academia with the aim of reducing the Scottish financial services sector's vulnerability to financial risk. It achieves this by running a series of Knowledge Exchange activities including a biannual Risk Colloquia, knowledge exchange workshops, placements for MSc and PhD students and postgraduate course modules taught by industry professionals.

Although the impact of this activity is impossible to quantify, events of 2008/9 illustrate the consequences of underestimating risk. If the work undertaken by the SFRA plays even a small role in helping to avert future financial crisis this will be of great value to the Scottish economy.

12.1.3 Food and Drink

One of the main contributions that Heriot-Watt University makes to the future development of the food and drink industry in Scotland is through the activities of the International Centre for Brewing and Distilling. The Centre is the only institute in the UK to offer both Honours and Masters degrees in Brewing and Distilling, which means that it plays an important role in helping to ensure that breweries and distilleries across the UK are able to recruit suitably qualified staff. Although the impact of this is difficult to quantify, the fact that the spirits industry contributes £2,145 million GVA to the Scottish economy each year suggests that the impact is likely to be significant.

Another notable contribution that the University made to the Scottish food and drink industry is as a result of a joint research project with industry that investigated the use of ultrasound to improve the quality and nutritional value of bakery products. The aim of the project is to introduce a new platform technology that aids the bakery products supply chain. One of the outcomes of this process will be to make production more energy efficient and therefore cheaper.

Although it is too early to quantify the impact of this project, evidence from a recent evaluation¹³ suggests that the outputs of the project are expected to be relevant to commercial bakeries throughout the UK, which would be very significant.

12.1.4 Tourism

Section 6 of this report estimated that Heriot-Watt University contributes £5.1 million GVA to the Scottish tourism sector and supports 376 tourism related jobs. In addition to this impact, the University also helps to support the sector by providing additional accommodation during peak periods of demand. For example, during the summer months the University frequently hosts groups who are performing in one of the Edinburgh Festivals. During peak periods, accommodation in Edinburgh is scarce so if Heriot-Watt University did not provide accommodation, then some potential visitors may not be able to visit the city. This would damage the competitiveness of Edinburgh's tourism sector and reduce the economic impact of the Festivals.

12.1.5 Creative Industries

Heriot-Watt University contributes to the growth and development of Scotland's creative industries sector through the work of the Scottish Academy of Fashion. The Academy aims to help Scotland become a global centre of excellence in fashion-related learning and commercially relevant research by building on the expertise of the School of Textiles to undertake collaborative industrial and academic research, knowledge exchange and networking.

12.1.6 Universities

In a review of the Scottish Economic Strategy published in 2011, the Scottish Government identified universities as a priority growth sector for the Scottish economy. Section 13 of this report describes Heriot-Watt University's aspirations for future growth and their potential economic value. By realising these aspirations the University will contribute to the growth of the Scottish universities sector but the distinctive approach taken to achieve this growth means that the University will also contribute to the sector's development.

For example, a recent evaluation of the University's work with industry has found that the approach taken by the University (described in section 12.1) is particularly effective at generating long-term economic impact. Importantly, this approach has been noted by other Scottish universities, which are keen to replicate its success. If this happens then Heriot-Watt University will have helped to improve the effectiveness of knowledge exchange activity across the Scottish universities sector.

Another distinctive feature of Heriot-Watt University is the extent of its international activity. Much of this has been made possible by the University's very successful distance learning model. This approach was first pioneered by the Edinburgh Business School, was then extended to all the other schools of the University and was an important factor in helping the University to establish its campus in Dubai.

Section 11 of this report found that this activity not only generates a significant amount of income for the University but also makes a substantial contribution to Scotland's export earnings. This is likely to be of interest to other Universities,

¹³ BiGGAR Economics (2012), Evaluation of Converge/Working with Industry Project.

which may seek to replicate Heriot-Watt University's success, which would help to increase the value of educational exports from Scotland.

12.2 Contribution to Sustainable Economic Development

The primary objective of the Scottish Government is to increase sustainable economic development. To measure progress toward this objective, the Government has identified 50 national performance indicators. Heriot-Watt University directly contributes to eight of these indicators but indirectly contributes to many others. The indicators that the University particularly contributes to:

- **Increase the Number of Businesses** – Heriot-Watt contributes to this by supporting the creation of new start-ups and spin-outs (sections 7.2.6 and 7.3.2) and by supporting the development of companies at the Heriot-Watt University Research Park (section 8);
- **Increase Exports** – Section 11 estimated that Heriot-Watt University is already responsible for around 10% of Scotland's education exports and intends to double income from international activity over the next seven years;
- **Improve Scotland's Reputation** – Heriot-Watt helps to achieve this by raising awareness about Scotland and the quality of Scottish education and research through its distance learning activity and overseas campus (e.g. the University hosts an annual highland games in Dubai);
- **Improve the Skill Profile of the Population** – Heriot-Watt contributes to this by providing industry relevant education and training;
- **Improve levels of Educational Attainment** – the University contributes to this indicator by helping almost 3,000 people a year to achieve graduate and post-graduate qualifications;
- **Increase the Proportion of Graduates in Positive Destinations** – Heriot-Watt contributes to this by maintaining close links with industry and providing industry relevant education and training for its students;
- **Increase Physical Activity** – the University contributes to this through its Centre for Sport and Exercise, which runs a variety of programmes designed to encourage students, staff and members of the wider community to take more exercise; and
- **Reduce Scotland's Carbon Footprint** – Heriot-Watt contributes to this through the activity of the Energy Academy (section 12.1.1). In May 2011 the University also launched a major project, Transition Heriot-Watt, designed to reduce the carbon foot-print of the University.

13 FUTURE IMPACTS

This section considers what the future impact of Heriot-Watt University might be.

13.1 Strategic Growth

From the analysis presented so far in this report it is possible to identify two distinctive strengths of Heriot-Watt University, namely the range of work that the University does with industry and its focus on internationalisation. Both of these areas have been identified by the University as strategic priorities for the future and have received significant investment as a result. The nature of strategic investments is that they generally take some time to generate results. For this reason, this report does not capture the impact of much of the activity that is currently underway to support these strategic priorities. This section seeks to rectify this.

13.2 Internationalisation

In 2011 Heriot-Watt University published an ambitious strategy to increase international activity. The objectives of this strategy are to:

- increase international recruitment to the UK campuses;
- build on and foster further international research links;
- continue to grow and develop the Academic Partner network;
- increase student numbers and introduce new programmes at the Dubai campus; and
- develop a new campus in Malaysia.

Achieving these objectives will require the University to **double its current international activity and income over a 7-year period.**

This would increase the number of overseas students on campus in Scotland, which would significantly increase the impact of student spending and part-time work as well as tourism impacts. By assuming that the number of overseas students doubles over the next seven years it can be calculated that the impact of:

- student spending would increase from £30.5 million GVA and 940 jobs across Scotland to £46.7 million GVA and 1,382 jobs;
- part-time student employment would increase from £13.0 million GVA and 673 jobs across Scotland to £19.2 million GVA and 998 jobs; and
- visits from friends and family would increase from £0.5 million GVA and 39 jobs across Scotland to £0.7 million GVA and 51 jobs.

In total, this amounts to an additional contribution of £22.7 million GVA per year to the Scottish economy and 779 jobs.

In addition to this it is reasonable to assume that the University would take on additional staff to teach the new students, spend more on equipment and supplies and perhaps make additional capital investment in things like new student accommodation and teaching space.

Perhaps more significantly, this activity will also increase the value of exports from Heriot-Watt University by £61.1 million per year, to a total of £135.0 million.

13.3 Working with Industry

In 2009 funding from the ERDF enabled Heriot-Watt to significantly increase its industry engagement activity. As discussed in section 12.1, it will take some time before the results of this activity can be fully realised but, ultimately it is expected to lead to a significant increase in licencing, consultancy, collaborative research and CPD income as well as the number of student placements supported. Estimates of the level of improvement expected can be found in the University's recent Outcome Agreement submission to the SFC. Some of the key elements from this submission are summarised below:

Table 13.1 – Heriot-Watt University Knowledge exchange Targets

Output Measure	Target (by 2014)
Collaborative research income	+20%
Income from CPD	+10%
Income from Consultancy	+7%
Income from licencing	180
Student placements	+20%
Start-up companies supported	30

Source: HWU submission to SFC, Outcome Agreement 2012.

The potential impact of achieving these targets can be calculated by applying the target increase in each of the outputs listed in Table 13.1 to the current value of that activity and recalculating the impact as described in section 7.2. In this way it can be estimated that by 2014 knowledge exchange and commercialisation activity undertaken by Heriot-Watt University will contribute £93.1million GVA per year to the Scottish economy and support 926 jobs. This represents an increase of £36.6 million GVA and 321 jobs in 2 years.