DTZ Pieda Consulting

Scottish Enterprise Edinburgh and Lothian

Evaluation of SE Funding to ISLI – Final Report

26 January 2005

Private and Confidential

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INTRODUCTION

DTZ Pieda Consulting was commissioned by Scottish Enterprise (SE) Edinburgh and Lothian in September 2004 to evaluate the funding agreement between SE and System Level Integration Ltd. (SLI Ltd) for the provision of funding towards the Institute for System Level Integration (ISLI). The evaluation will assist SE in establishing the economic benefits derived from the continued support of ISLI and to determine the value for money of the investment.

The key outputs of the study are to provide and assessment of:

- The extent to which ISLI has achieved its vision;
- The performance of ISLI against its objectives and the extent to which issues raised in the previous evaluation of 2001 have been addressed;
- The performance of ISLI against the measures set out in the business plan of 2002;
- The extent to which the business model of ISLI is appropriate in meeting its objectives;
- The key challenges for ISLI in the current operating environment and how these challenges should be addressed; and
- The performance and economic benefit to Scotland of ISLI and an assessment of the rationale for its continued existence.

BACKGROUND TO ISLI

ISLI is a contractual joint venture between the Edinburgh, Glasgow, Heriot-Watt and Strathclyde Universities, SLI Ltd and SE. The operation of the Institute is governed by a Members' Agreement between SLI Ltd and its members and by Services' Agreements between the universities and SLI Ltd. Scottish Enterprise channels revenue support funding into the Institute through SLI Ltd. It has committed a total budget of £6.6m from the launch of the Institute in 1997 up to August 2004. In addition to the six legal members there are a number of key stakeholders that contribute to the wider concept of ISLI whose engagement in ISLI impact upon its success including industry, students and other development agencies and research partners.

The vision for ISLI as set out in the Business Plan of 2001 is as follows:

> *"The Institute aims to become a world-class centre of excellence in System on Chip research, education and training with a focus on new systems, products and applications."*

The Business Plan also sets out the mission of ISLI:

> *"The Institute's mission is to provide education and training in System Level Integration at undergraduate, graduate and professional levels, to stimulate System on Chip research by its member Universities and enhance their capacity to design complex silicon systems, and to stimulate the uptake of System on Chip technology by industry through technology transfer, commercialisation and partnership activities."*

PERFORMANCE ASSESSMENT

MSc Programme

In the 3 academic years since 2001/02, there have been 102 students on the MSc programme which was largely on target. The programme attracts a large number of overseas students thus attracting higher fees and fitting with the Scottish Executive's Fresh Talent initiative. Over this period, two companies have sponsored students and 49 projects have been supplied by industry. 41% of graduates have gone on to take up employment within Scotland. In 2003/04, income was lower than expected due to a fall in student numbers on the previous year.

When direct income and expenditure is taken into account for 2003/04, the MSc programme ran with a gross profit of £157k. However, taking into account all costs on a fully absorbed basis, the programme resulted in a loss of £305k mainly due to salary costs of both teaching staff and SLI Ltd staff allocate to the programme. The fall in student numbers in 2004/05 of 37 from an expected 57 will have implications for the budgeted income figure.

EngD Programme

A total of 23 students have enrolled on the EngD programme since 2001/02 which is similar to the projected numbers for student intake. More than half of the students originate from Scotland. These students spend time placed in industry for the majority of their course and 26 companies have sponsored students to date. When the costs of running the programme are fully absorbed, the EngD operated at a loss of £45k in 2003/04.

CPD and Training

Over the part four years, 531 delegates from 85 organisations have participated in CPD in the UK. This includes the MSc by distance learning, Test Education courses and bespoke courses for industry. The CPD and training elements of ISLI have not performed as well as expected over the past few years. In 2003/04, the distance learning programme achieved just 47% of the expected income, the Test Education programme just over a third and the bespoke modules only a quarter of projected income.

Design Team

The Design Team has provided a range of assistance and support to around 20 companies ranging from technology advice and guidance to commercial contracts. According to ISLI, 95% of the companies assisted have been Scottish and 85% of these have been micro start-ups or SMEs. The Design Team activity has generated potential value to ILSI of around £1m, in the main in terms of IP and R&D activity.

Generic Activity

ISLI has attended a range of industry conferences and exhibitions to promote the Institute. The Institute has also been involved in a number of European Information Society Technologies project committees with a combined value to ISLI of over £500k. ISLI has a series of international linkages through R&D, training and advisory activity.

Summary of Financial Performance

Table 1 presents the overall financial picture for 2003/04 comparing actual income and expenditure with the budget. The overall income was £840k representing 68% of the budgeted income for 2003/04.

Table 1
ISLI Direct Income and Expenditure 2003/04

	Actual	*Budget*	*Actual as % of Budget*
Income	£1,370,010	£2,012,863	68%
Expenditure	£838,616	£1,388,540	60%
Gross Profit	£531,395	£624,323	85%
Total overheads	£1,758,796	£1,776,982	99%
Net Profit	-£1,227,401	-£1,152,659	106%
Source: ISLI Management Accounts			

Summary of Outputs and Impacts

Table 2 summarises the outputs, outcomes and impacts from ISLI from 1999/00 to 2004/05. Appendix D sets out the assumptions made in calculating the outputs, outcomes and impacts. (Appendix E presents an economic appraisal of the potential future impacts of ISLI from 2005/06 to 2008/09.) The impacts have been converted into Gross Value Added (GVA) to the Scottish economy.

Table 2
Summary of Outputs, Outcomes and Impacts 1999/00 – 2004/05

Outputs	Outcomes	Impacts*
Postgraduate and professional education and training		
118 non-Scottish students enrolled on the MSc	£600,000 in student fees and sponsorship	£460,000 GVA associated with off-campus expenditure by non-Scottish students
127 MSc graduates	62 MSc graduates remaining in Scotland	£1,642,000 GVA associated with productivity savings made by Scottish companies recruiting ISLI graduates
398 individuals in Scotland receiving CPD		£156,000 GVA associated with efficiency savings to Scottish companies
Industry-based R&D and support services		
13 non-Scottish students enrolled on the EngD		£154,000 GVA associated with off-campus expenditure by non-Scottish students
10 EngD graduates	At least 2 EngD graduates remain in Scotland	
Design Team activity	£60,000 of Design Team commercial contracts £750,000 of IP agreements £140,000 of R&D support	Enhancement of the Scottish electronics research base
	4 spin-out companies assisted	
	23 Research Engineers placed in industry	Productivity gains or cost savings made by industry
	230 jobs maintained in Design Operations	£183,373,000 GVA or 465 FTE jobs maintained
Pre-competitive research		
Research activity	Leverage of £3.5m research funding and £500,000 EU funding	£4,536,000 GVA or 16 FTE jobs per annum
Other		
ISLI turnover		£13,913,000 GVA or 31 FTE jobs per annum
* Direct, indirect and induced impacts net of additionality and displacement.		

CONCLUSIONS AND RECOMMENDATIONS

In terms of assessing the extent to which ISLI has achieved this vision, ISLI is a centre of excellence in SoC research, education and training but the Institute could have a far greater profile with students, academia and industry.

ISLI has five strategic objectives that form the basis of the evaluation of performance. The performance of ISLI against each of these objectives is assessed below.

- Marketing and Promotion – to promote Scotland as a world class centre of excellence in SLI. Assessment of progress - we conclude that ISLI has met this objective.

- Research – to create internationally recognised research activities. Assessment of progress – we conclude that ISLI has met this objective.

- Education and Training – to develop high quality education and training initiatives to enable and encourage the development of SLI expertise in Scotland. Assessment of progress – we conclude that ISLI has met this objective and should concentrate in the future on its MSc and EngD programmes.

- Commercialisation – to encourage commercial activity to enhance the Scottish economy. Assessment of progress – whilst there has been good progress towards this objective, we find the evidence unconvincing that ISLI has achieved maximum potential in this area.

- Profitability – to trade profitably. Assessment of progress – ISLI has clearly not met this objective and whilst we would not expect ISLI to trade profitably we feel that much could be done to reduce the levels of deficit funding required from SE thus improving its value for money.

DTZ Pieda Consulting undertook an interim evaluation of ISLI in 2001. A number of issues and recommendations were identified in this evaluation and each of these points is addressed in turn below:

- Improvements to MSc and EngD - we are impressed by the progress that has been made in terms of both MSc and EngD. They are supported by industry and feedback from students has been positive.

- "Buy-in" from Member Universities – commitment from the Member Universities is strong and the universities recognise the benefits of collaboration under ISLI as independently they do not have sufficient strengths and "the whole is greater than the sum of the parts."

- Staff Resourcing – the large number of academic staff involved in teaching, supervision and research is difficult to administer centrally. However, the ability of ISLI to draw upon such a wide base of specialist experience is recognised as a key strength of the collaboration and it is felt by many to be desirable to continue with this arrangement.

- Structure and Management – whilst the complexity of ISLI may have been reduced since the last review, its structure is still over-complicated and does not provide for a cohesive senior management team.

- Financial Reporting – The full absorption accounts have been in development for some time and we recognise the achievement of ISLI in developing a useable model. In this sense, this objective has been fully addressed but we would like to see wider circulation of these accounts amongst a senior management team.

- Cost Savings and Operational Efficiencies – We did not find evidence of cost savings or operational efficiencies apart from a recognition that efficiencies would be gained as the number of students increased.

The current business model for ISLI is a contractual joint venture between four universities, SLI Ltd and SE. SLI Ltd, as a legal entity, has its own board with representatives from each of the members. Whilst it has brought independence, the business model has brought with it several disadvantages. The most significant disadvantage is the non-eligibility of SLI Ltd for HE funding streams directly and whilst ISLI is eligible for this funding through the universities there are problems associated with routing the funding in this way. Secondly, ISLI's independent position has meant that the universities perceive ISLI as 'not being their own'. Thirdly, the independence from the universities has led to a whole range of added costs in setting up finance, IT, marketing, HR, property management systems plus high rent and rates. All of these could be achieved more cost-effectively through a university.

Our view is that as well as restructuring the staffing structure of ISLI, the business model should be amended. A range of new models might be considered, but our view is that the most straightforward would be a joint venture between the four universities. We do not see the advantages of SLI Ltd being retained as a legal entity. Location is a separate issue to the business model and it may be deemed appropriate that the ISLI continues to exist in its present location or moves to one or more of the campuses of the universities.

ISLI is currently receiving public subsidy in the order of £1 million per annum. Given the high cost nature of its activities, and the public good elements of what it does, some level of subsidy would be expected. The question is to what extent is the subsidy justified. From our discussion with stakeholders and in particular with the Director of ISLI a number of areas are identified which could lead to significant savings. These savings are based on data from the management accounts. The areas are set out in Table 3.

Table 3
Potential Net Savings

Expenditure area	***Potential net saving***
Facilities	£100k
University overpayment	£128k
Premises cost	£177k
Staffing	£150k
Total	**£555k**

In conclusion, our view is that ISLI is making a worthwhile contribution to the Scottish economy. It is running courses that are of value to industry and are supporting retention of a design capability in Scotland. Numbers of students attending these courses are increasing but they are expensive to run. It is supporting research in relevant areas with a relatively modest sum of around £162k per annum, which is levering in large amounts of research funding through the different universities.

However, despite its worthwhile contribution, ISLI offers poor value for money and we have set out above where we believe considerable savings could be made. To achieve these savings requires urgent dialogue between ISLI, SE and the universities and will involve addressing structure and staffing, funding arrangements with the universities and property issues on the Alba Campus.

1 Introduction

BACKGROUND

1.1 DTZ Pieda Consulting was commissioned by Scottish Enterprise (SE) Edinburgh and Lothian in September 2004 to evaluate the funding agreement between SE and System Level Integration Ltd. (SLI Ltd) for the provision of funding towards the Institute for System Level Integration (ISLI). The evaluation will assist SE in establishing the economic benefits derived from the continued support of ISLI and to determine the value for money of the investment.

STUDY OBJECTIVES

1.2 ISLI has five strategic objectives that form the basis of the evaluation of performance:

- **Marketing and Promotion** – to promote Scotland as a world class centre of excellence in SLI;
- **Research** – to create internationally recognised research activities;
- **Education and Training** – to develop high quality education and training initiatives to enable and encourage the development of SLI expertise in Scotland;
- **Commercialisation** – to encourage commercial activity to enhance the Scottish economy; and
- **Profitability** – to trade profitably.

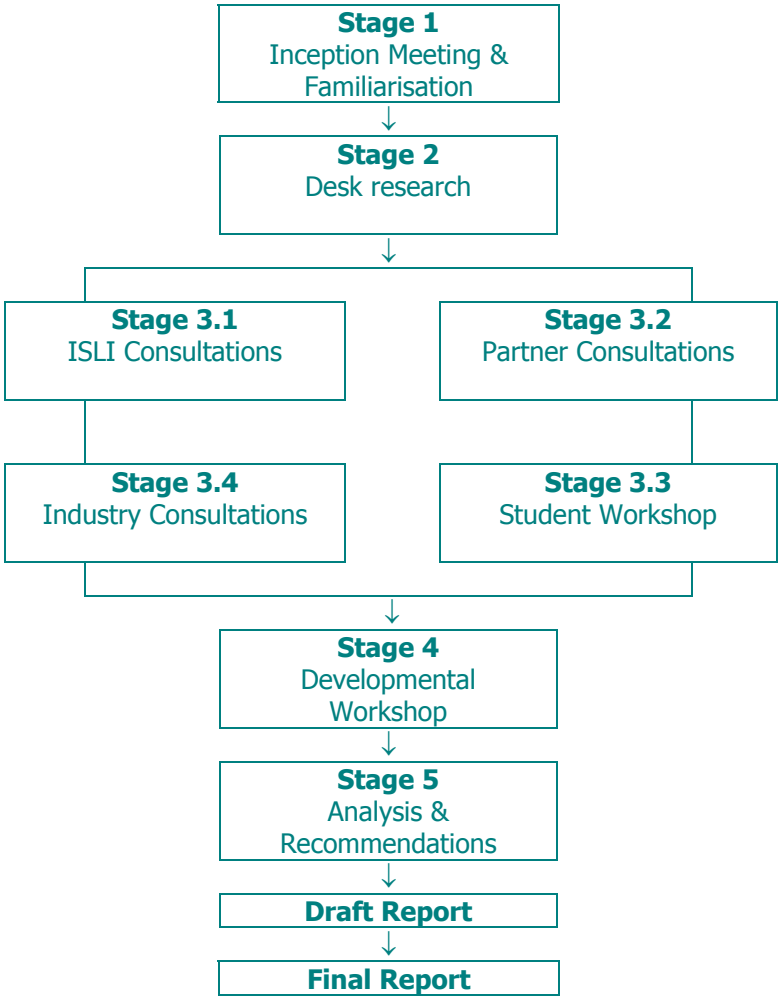
1.3 The key outputs of the study are to provide and assessment of:

- The extent to which ISLI has achieved its vision;
- The performance of ISLI against its objectives and the extent to which issues raised in the previous evaluation of 2001 have been addressed;
- The performance of ISLI against the measures set out in the business plan of 2002;
- The extent to which the business model of ISLI is appropriate in meeting its objectives;
- The key challenges for ISLI in the current operating environment and how these challenges should be addressed; and
- The performance and economic benefit to Scotland of ISLI and an assessment of the rationale for its continued existence.

METHODOLOGY

1.4 The methodological approach to the study was split into three main research elements and a final overarching analytical and reporting stage. The study methodology is set out in Figure 1.1.

Figure 1.1 - Methodology



REPORT STRUCTURE

1.5 The remainder of the report is structured as follows:

- Section 2 sets out the context to ISLI in terms of the previous DTZ Pieda Consulting evaluation and the ISLI Business Plan;
- Section 3 assesses the performance of ISLI both from an activity angle and a financial assessment. The impact of the ISLI is then considered from the perspective of the Member Universities, the students and industry.
- Section 4 presents our conclusions and recommendations.

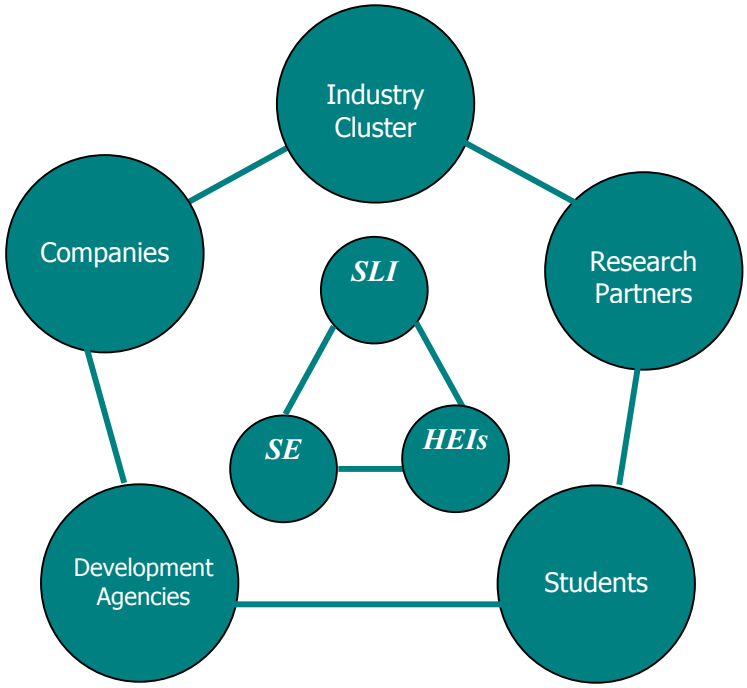
2 Background to ISLI

INTRODUCTION

2.1 ISLI is a contractual joint venture between the Edinburgh, Glasgow, Heriot-Watt and Strathclyde Universities, SLI Ltd and SE. The operation of the Institute is governed by a Members' Agreement between SLI Ltd and its members and by Services' Agreements between the universities and SLI Ltd. Scottish Enterprise channels revenue support funding into the Institute through SLI Ltd. It has committed a total budget of £6.6m from the launch of the Institute in 1997 up to August 2004.

2.2 In addition to the six legal members there are a number of key stakeholders that contribute to the wider concept of ISLI whose engagement in ISLI impact upon its success. Figure 2.1 illustrates the wider concept of ISLI.[1]

Figure 2.1 – The ISLI Concept



[1] Figure 1 modified from the Interim Evaluation, DTZ Pieda Consulting 2001

PREVIOUS EVALUATION

2.3 DTZ Pieda Consulting undertook an interim evaluation of ISLI in 2001. A number of issues and recommendations were identified in this evaluation including:

- **Improvements to MSc and EngD -** A series of suggestions for improvements to the MSc and EngD programmes were put forward to enhance their content, delivery and management.
- **"Buy-in" from Member Universities –** The Interim Evaluation found that the majority of academics had not "bought into" ISLI.
- **Staff Resourcing –** The need to recruit a smaller and more concentrated team of specialists to teach the programmes was recognised.
- **Structure and Management –** The structure of ISLI was felt to be too complex with too many committees leading to an ineffective decision-making process.
- **Financial Reporting –** It was recommended that a management accounting system be developed to enable the contribution of the different product areas to be determined.
- **Cost Savings and Operational Efficiencies –** It was suggested that efforts be made to manage costs more effectively and to identify possible cost savings.

2.4 The progress made by ISLI against these recommendations is assessed in Section 4.

SLI LTD BUSINESS PLAN

2.5 Following the Interim Evaluation, a Business Plan[2] was prepared to cover the period 2002 to 2006.

Vision

2.6 The vision for ISLI as set out in the Business Plan is as follows:

> *"The Institute aims to become a world-class centre of excellence in System on Chip research, education and training with a focus on new systems, products and applications."*

Mission

2.7 The Business Plan also sets out the mission of ISLI:

> *"The Institute's mission is to provide education and training in System Level Integration at undergraduate, graduate and professional levels, to stimulate System on Chip research by its member Universities and enhance their capacity to design complex silicon systems, and to stimulate the uptake of System on Chip technology by industry through technology transfer, commercialisation and partnership activities."*

[2] *System Level Integration Ltd Business Plan December 2001 Version*

Products

2.8 The Business Plan states that *"ISLI's principal business is in education, research and the provision of design and other technical services in relation to these activities."* This is defined in terms of the following "products":

- MSc in System Level Integration (SLI) and System on Chip (SoC) technology and the EngD in SLI;
- Courses for Professional Development (CPD) including the part-time MSc and a range of bespoke courses based on the Test Engineering requirements of SLI/SoC technology;
- Basic research leading to the development of new intellectual property in partnership with the Universities;
- A range of services to industry including development of projects for industrial customers and consultancy work in SLI/SoC through the Design Team; and
- Small company incubator services and provision of conference and meeting facilities.

2.9 This product definition has been developed into a cluster approach for the 2004 Business Plan.

Financial Projections

2.10 The Business Plan sets out a series of financial projections covering the period 2001/02 to 2005/06 to provide the context for the subsequent financial analysis in Section 3. The projections are summarised in Table 2.1.

Table 2.1
ISLI Business Plan financial Projections

	2001/02	*2002/03*	*2003/04*	*2004/05*	*2005/06*
Total income	£887,428	£1,579,673	£2,831,160	£3,659,999	£4,076,571
Total direct costs	£835,315	£1,838,801	£2,165,153	£2,469,795	£2,613,120
Other costs	£1,335,594	£1,213,068	£1,260,813	£1,310,640	£1,362,700
Net income	-£1,283,481	-£1,472,196	-£594,805	-£120,436	£100,750
Capital equipment	£73,500	£77,175	£81,034	£85,085	£89,340
Cumulative cash inflow	-£2,231,684	-£3,781,055	-£4,456,894	-£4,662,415	-£4,651,005
Cash requirement from 2001/02	-£1,356,981	-£2,906,352	-£3,582,191	-£3,787,713	-£3,776,302
Current assets as of 31st July 2001	£1,543,000				
Additional funding required	0	-£1,363,352	-£2,039,191	-£2,244,713	-£2,233,302
Source: ISLI Business Plan					

3 Performance Assessment

INTRODUCTION

3.1 This Section of the report assesses the performance of ISLI by means of an analysis of each of the components of ISLI's activity namely the following:

- MSc programme
- EngD programme
- Distance Learning
- Test Education
- Bespoke CPD Modules
- Design Team
- Facilities Hire

3.2 Each of the components is analysed in turn in terms of:

- An assessment of activity from 2001/02 to date;
- An assessment of the outputs from 2001/02 to date;
- A financial assessment of the 2003/04 actual and budget figures; and
- Comment on the budget for 2004/05.

3.3 Following the assessment of the performance of the individual components of ISLI, the overall impact is considered from the following perspectives:

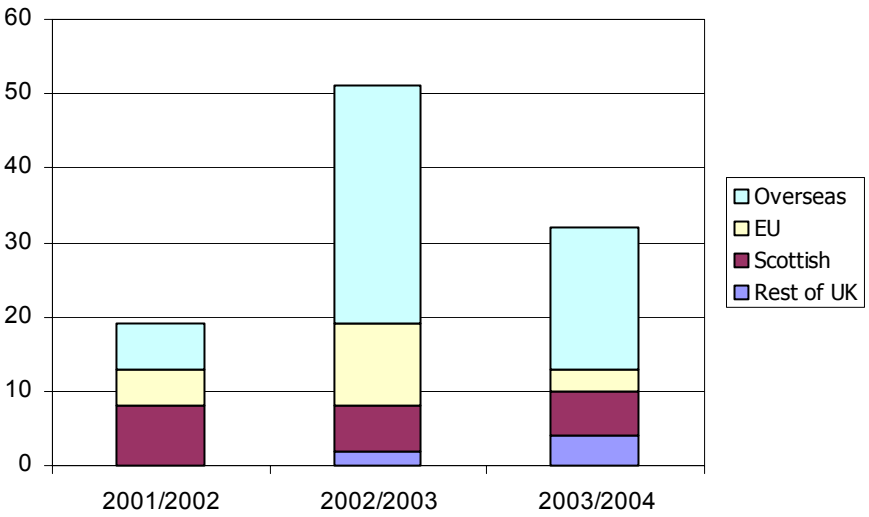
- Member Universities;
- Students; and
- Industry.

MSC PROGRAMME

Activity Assessment

3.4 The number of students enrolling on the MSc programme over the last 3 years is shown in Figure 3.1. Overall, there have been 102 students on the programme, which is close to the target figure in the Business Plan of 109. There was an unexpected rise in student numbers in 2002/03 (51 students in total) anecdotally due to a cohort of Indian students choosing ISLI rather than the US for their studies. The decision to come to the UK rather than the US was driven by the world security situation following the 9/11 attacks on the US. This higher intake was not continued into 2003/04 when number fell back to 32 students. Furthermore, while 57 students had registered to attend the 2004/05 MSc programme, only 37 have enrolled at the start of term with a significant drop-out from overseas students. Despite the drop-out, this number still represents growth of 15.6% on the previous year and an ongoing upward trend in numbers.

Figure 3.1 Number of MSc Students 2001/02 - 2003/04



3.5 The majority of the students on the MSc programme originate from outside Scotland. One in five students are from Scotland with a further 6% from the rest of the UK and 19% from the EU. The majority of students are from overseas (55%).

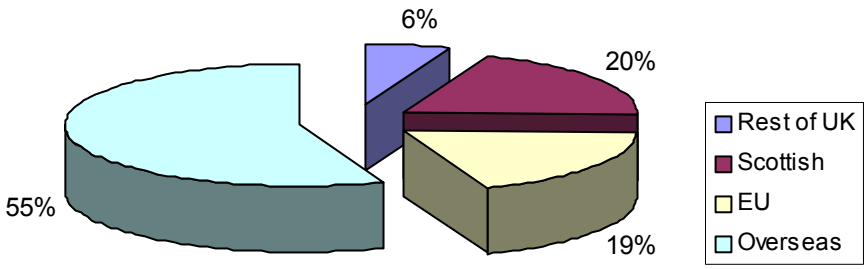
3.6 This issue could be interpreted as a matter for concern given the SE funding being invested in ISLI as it might be the case that students attending the course from outside of Scotland will not remain in Scotland on completion of the course and will take the skills away with them. Evidence from ISLI shows that up to 2003, around 50% of MSc graduates remained in Scotland either in employment (41%) or to undertake further study (8%). The employment destination of the MSc graduate is discussed in greater detail below under the Output Assessment.

3.7 It should be noted that the overseas students pay higher fees and in the past this extra income has been used to cross-subsidise home students through the provision of bursaries. Through Glasgow University Collaborative Training Account (CTA) ISLI has now secured scholarships for home and EU students from EPSRC.

3.8 Furthermore, the attraction of overseas students fits well within the Scottish Executive policy context under the Fresh Talent Initiative. The Fresh Talent Initiative was launched in February 2003 and is aimed at attracting people from the UK and overseas to live and work in Scotland.

3.9 The Scottish Executive has reached an agreement with the Home Office that will allow overseas graduates from Scottish Universities, who express the intention of living and working in Scotland, to stay on for two years beyond the completion of their studies to seek employment. Students will be allowed to remain in Scotland and seek any type of work during this time. After two years or earlier, graduates can switch into work permit employment or other legal migration routes for which they qualify.

Figure 3.2 Origin of MSc Students 2001/02 - 2003/04



3.10 There is industry involvement in the MSc through the sponsorship of students. A total of 2 companies have sponsored students to undertake the MSc.

- 2001/02 – 1 company sponsored 6 students (Motorola)
- 2002/03 – 2 companies sponsored 3 students (Motorola and A2E)
- 2003/04 – no company sponsorships

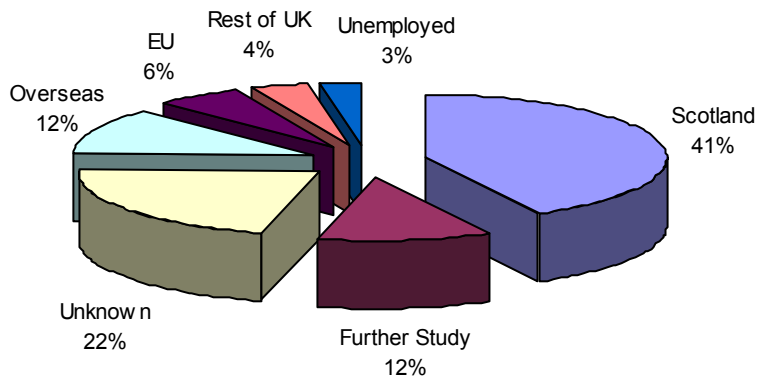
3.11 Around half of the MSc projects are supplied by industry. A total of 49 projects have been supported in the last 3 academic years:

- 2001/02 – 7 projects by 2 companies (Motorola and Honeywell)
- 2002/03 – 30 projects by 10 companies (Critical Blue, Micrel, BAE Systems, A2E, Motorola, Specialist Electronic Services Ltd, Clyde Broadcast, Salent, Design Team at SLI Ltd – 20 projects)
- 2003/04 – 12 projects by 6 companies (ARM, Philips Research, 4i2i, Agilent, Cadence and Design Team at SLI Ltd – 6 projects).

Output Assessment

3.12 Figure 3.3 shows the employment destinations of the MSc students upon graduation (based on 78% of graduates 1999-2003). Around 1 in 8 of the graduates commenced further study. The majority of graduates go on to employment (63%).

Figure 3.3 Employment Destinations of MSc Students 1999-2003



3.13 As described above, 41% of graduates from the MSc course up to 2003 have gone to take up employment within Scotland. This suggests that there has been a net gain within the industry with graduates who originated from outside Scotland taking up employment within Scottish companies. Examples of employment destinations in Scotland include:

- Motorola – 8 graduates (5 UK, 2 overseas and 1 EU) employed within Motorola, Motorola GSG and Motorola NCSG;
- Scantura Technologies – system design company set up by 6 graduates from India;
- Spiral Gateway – company set up by Professor Arslan at Edinburgh University employing 2 graduates from Pakistan;
- Cadence – 2 UK graduates employed by Cadence at the Alba Campus; and
- A range of companies employing graduates from the UK, EU and overseas including Xilinx, Linn Products, Epson, Atmel and Agilent.

3.14 Whilst there is no evidence of whether or not these companies would have recruited the same number of graduates in the absence of ISLI, it does appear to be the case that many are finding employment in the areas of SLI and SoC design within Scotland, indicating a steady level of demand for graduates from the MSc.

Financial Assessment

3.15 The income and expenditure for the MSc programme in 2003/04 is shown in Table 3.1a. The actual income was £280k compared to a budgeted income of £466K. This represents a variance of 40% and is likely to be partly due to the fall in student numbers on the programme from the previous year.

Table 3.1a
MSc Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
MSc Programme	£279,636	£465,889	£122,811	£256,458
Actual as % of Budget	60%		48%	
Source: ISLI Management Accounts				

3.16 The Management Accounts for 2003/04 show the MSc running with a gross profit of £157k. This figure only takes into account direct expenditure, which in the case of the MSc is largely money that comes in then goes out again as student stipends. When the remainder of the expenditure including staffing, property costs and other overheads are allocated across the range of activities of ISLI a different picture emerges.

3.17 When the remainder of costs have been fully absorbed the MSc actually ran with a deficit of £305k in 2003/04 as shown in Table 3.1b. The majority of expenditure relates to salary costs of both the teaching time from the Member Universities and the share of the SLI Ltd staff allocated to the MSc programme. Premises and computers also represent significant costs.

Table 3.1b
MSc Financial Assessment – Fully Absorbed Expenditure 2003/04

Income	£279,636
Direct Expenditure	£122,811
Gross Profit	**£156,825**
Salaries	£216,450
Premises	£93,776
Library	£31,677
Computer	£73,928
Marketing	£7,624
Depreciation	£38,152
Total Expenses	**£461,608**
Profit	**-£304,783**
Source: ISLI Full Absorption Accounts	

3.18 In 2003/04, there were 32 students on the MSc programme. Direct expenditure on the MSc programme over this period was £123k. Therefore, the cost per student was £3,838.

Budget 2004/05

3.19 When the full absorption method is applied to the budget for 2004/05 the MSc is forecast to result in a loss of £246k for the coming year. The budgeted income for 2004/05 is 28% higher than the actual income for 2003/04. As only 37 of the

anticipated 57 MSc students have enrolled in the new academic year this will have serious implications for the income figures.

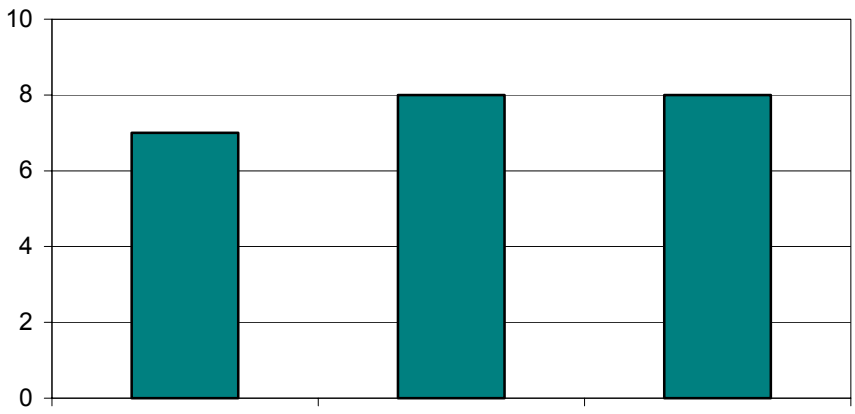
Table 3.1c MSc Financial Assessment – Fully Absorbed Expenditure 2004/05	
Income	£359,000
Direct Expenditure	£107,000
Gross Profit	**£252,000**
Salaries	£212,095
Premises	£113,316
Library	£35,472
Computer	£74,028
Marketing	£5,920
Depreciation	£57,190
Total Expenses	**£498,021**
Profit	**-£246,021**
Source: ISLI Full Absorption Accounts	

EngD Programme

Activity Assessment

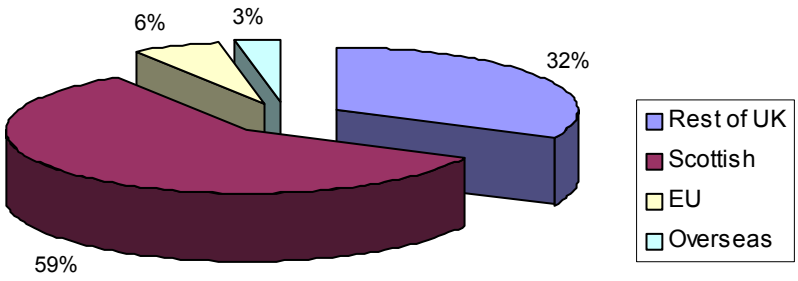
3.20 Figure 3.4 shows the number of EngD students having enrolled on the programme in each year since 2001/02. A total of 23 students have enrolled over the 3-year period, which is fairly consistent with the projected numbers in the Business Plan.

Figure 3.4 Number of EngD Enrolments 2001/02 - 2003/04



3.21 Unlike the MSc programme, the majority of the EngD students (59%) originate from Scotland as shown in Figure 3.5. Just under a third of the remaining students are from the rest of the UK.

Figure 3.5 Origin of EngD Students 1999/00 - 2003/04



Output Assessment

3.22 The first cohort of students from the EngD graduated in summer 2004. Four students were awarded the doctorate. A further 6 graduates are expected in 2004/05. Two of the four EngD graduates are now employed by their sponsor companies in Livingston (Motorola and Micrel) while the other 2 graduates are seeking employment.

3.23 In the first year of the EngD programme the students take modules from the MSc course at ISLI and business and management modules with the Member Universities. Since 2001/02, 23 students have completed this training.

3.24 Another output of the EngD is the placement of students within industry. The students spend three years working in industry undertaking research projects within their sponsor company. Therefore, in addition to completing the training described, the 23 students from 2001/02 to 2003/04 have spent time placed in industry.

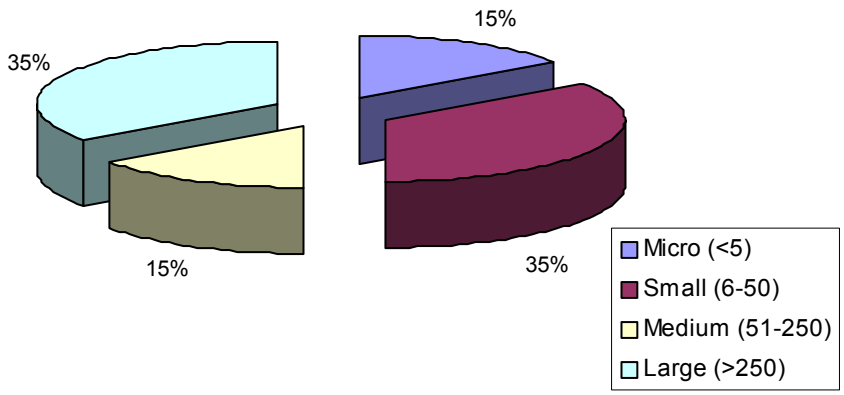
3.25 There have been 26 companies sponsoring EngD students to date with some companies sponsoring more that one student. 85% of these companies are located within Scotland with the remainder in the rest of the UK. Given only 59% of students originated from Scotland, this suggests that there has been a net gain within the industry with students who originated from outside Scotland (mostly the rest of the UK) taking up sponsorship within Scottish companies. Scottish companies who have sponsored EngD students include:

- Motorola – 5 students;
- Cadence – 2 students;

- Epson – 2 students;
- Micrel – 2 students;
- SLI Ltd – 2 students; and
- A range of companies sponsoring individual students including Xilinx, Thales, ST Microelectronics, Salent Technology, Nallatach, Navsys, MED, Kymata, Kelvin Institute, Critical Blue, Clyde Broadcast, A2E, Aliathon, Atmel and 4i2i.

3.26 Figure 3.6 profiles the Scottish sponsoring companies by size. Half of the companies sponsoring EngD researchers are small or micro companies with less than 50 employees.

Figure 3.6 Scottish EngD Sponsoring Companies by Size (number of employees) 1999/00 - 2003/04



Financial Assessment

3.27 The 2003/04 income and expenditure for the EngD programme is shown in Table 3.2a. The actual income was £633k and represented 84% of the budgeted income for 2003/04.

Table 3.2a
EngD Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
EngD Programme	£633,280	£757,149	£398,628	£468,324
Actual as % of Budget	84%		85%	
Source: ISLI Management Accounts				

3.28 The EngD is funded through EPSRC with match funding from the sponsoring companies. As described above, a total of 26 companies have sponsored EngD students to date. The cost to the companies is £43k over the 4 years of the EngD which is split as follows:

	Top-up	EngD Centre Support	Annual Total
Year 1	£5k	£5k	£10k
Year 2	£5.5k	£5k	£10.5k
Year 3	£6k	£5k	£11k
Year 4	£6.5k	£5k	£11.5k
Total	**£23k**	**£20k**	**£43k**

3.29 UK-based students receive funding for the EngD through EPSRC. The funding for 2004/05 is broken down as follows:

	2004/05
EPSRC Student Stipend	£12,000
Training (aggregate)	£3,288
Travel	£679
Academic Fees	£3,025
Total	**£18,992**

3.30 The EngD is reported as operating with a gross profit of £235k in 2003/04 according to the Management Accounts. When the total costs of ISLI are fully absorbed into the activity headings as described in the MSc section above, the EngD actually made a loss of £45k. Salary costs comprise the largest proportion of the overall expenditure.

Table 3.2b EngD Financial Assessment – Fully Absorbed Expenditure 2003/04	
Income	£633,280
Direct Expenditure	£398,628
Gross Profit	**£234,652**
Salaries	£190,434
Premises	£24,215
Library	£25,441
Computer	£17,448
Marketing	£15,249
Depreciation	£6,937
Total Expenses	**£279,724**
Profit	**-£45,072**
Source: ISLI Full Absorption Accounts	

3.31 The EngD programme had 34 students in total in 2003/04, which represents a cost per student of £11,460 in 2003/04.

Budget 2004/05

3.32 When the full absorption method is applied to the budget for 2004/05 the EngD is forecast to result in a deficit of £53k. The budgeted income for 2004/05 is 23% higher than the actual income for 2003/04. This raises questions as to the likelihood of ISLI meeting this budgeted income.

Table 3.2c EngD Financial Assessment – Fully Absorbed Expenditure 2004/05	
Income	£776,000
Direct Expenditure	£542,000
Gross Profit	**£234,000**
Salaries	£189,203
Premises	£29,260
Library	£27,588
Computer	£18,240
Marketing	£11,840
Depreciation	£10,398
Total Expenses	**£286,529**
Profit	**-£52,529**
Source: ISLI Full Absorption Accounts	

CONTINUED PROFESSIONAL DEVELOPMENT & TRAINING

Activity Assessment

3.33 According to the *ISLI Impact Assessment,* over the past four years, 531 delegates have participated in Continued Professional Development (CPD) in the UK, which includes the MSc by distance learning, Test Education courses and bespoke courses for industry. This represents 88% of the total participants with 8% originating in the EU and a further 3% overseas.

3.34 There were an average of 6 delegates per organisation for all UK participants with 7 delegates per organisation when Scottish organisations are considered separately. Of the 56 Scottish organisations participating in CPD, 38% were classed as small organisations, 30% as medium and 14% as large. The remainder were academic organisations. However, 41% of the delegates from Scotland were from a large organisation.

3.35 The CPD and training elements of ISLI have not performed as well as expected over the past few years. The financial performance of each of these activities is assessed in turn below.

Output Assessment

3.36 Over the past four years, under the CPD programme a total of 85 UK organisations have undergone training run by ISLI with 56 of these organisations based in Scotland. There have been a total of 531 individuals trained, 398 of whom were based in Scotland.

3.37 One major company reported that having an organisation like ISLI delivering CPD on their doorstep was a benefit and had led to the company holding training courses in Scotland and bringing staff from other locations where previously UK staff would have been sent to the US to undertake this training.

3.38 ISLI has been involved in a multi university programme, Continuing Education in Electronics Systems Integration (CEESI). The programme received EPSRC funding and aimed to address industry's need for flexible training in electronics systems integration by establishing a "pool" of training modules at postgraduate level, accessible partly via the internet. CEESI modules can be studied on their own as short courses for CPD or they can form part of a programme leading to a postgraduate qualification.

3.39 The CEESI partners are: Bolton Institute, University of Bradford, University of Manchester, Northumbria University, University of Southampton and the University of Surrey. Industrial supporters include ARM, Infineon Technologies, Sony SDE, National Semiconductor, Cypress Semiconductors, Philips Semiconductors, National Microelectronics Institute, Motorola and Atmel. The programme has now come to an end.

DISTANCE LEARNING

Financial Assessment

3.40 The distance learning programme only reached 47% of its budgeted income in 2003/04, bringing in just over £50k as shown in Table 3.3a. However, the actual direct expenditure on the programme was significantly less than budgeted at only £8k of a budget of £59k.

Table 3.3a
Distance Learning Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
Distance Learning	£50,255	£107,000	£8,312	£58,785
Actual as % of Budget	47%		14%	
Source: ISLI Management Accounts				

3.41 When the total expenditure is apportioned to distance learning the programme effectively made a loss of £29k in the last financial year. This compares to the Management Accounts presentation of a gross profit of £42k.

Table 3.3b Distance Learning Financial Assessment – Fully Absorbed Expenditure 2003/04	
Income	£50,255
Direct Expenditure	£8,312
Gross Profit	**£41,943**
Salaries	£45,923
Premises	0
Library	£641
Computer	£1,995
Marketing	£15,249
Depreciation	£6,937
Total Expenses	**£70,743**
Profit	**-£28,800**
Source: ISLI Full Absorption Accounts	

Budget 2004/05

3.42 The budget for 2004/05 for distance learning is 23% higher than the actual income for 2003/04, which may prove to be ambitious given the performance of the distance learning programme to date. This would result in a loss of £44k.

Table 3.3c Distance Learning Financial Assessment – Fully Absorbed Expenditure 2004/05	
Income	£62,000
Direct Expenditure	£30,000
Gross Profit	**£32,000**
Salaries	£51,137
Premises	0
Library	£647
Computer	£1,767
Marketing	£11,840
Depreciation	£10,398
Total Expenses	**£75,790**
Profit	**-£43,790**
Source: ISLI Full Absorption Accounts	

TEST EDUCATION

Activity Assessment

3.43 The Test Education programme has been severely affected by the downturn in the semiconductor manufacturing sector and there was an effective freeze on conventional training between June 2001 and autumn 2002.[3]

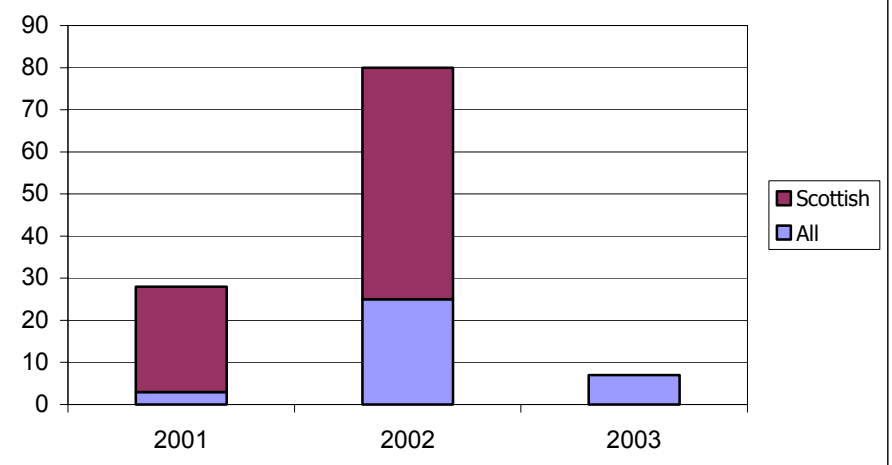
[3] *Test Education Programme – Review August 2003* ISLI

3.44 There has been support shown for the Test Education programme from the Member Universities in the form of the placement of students on courses although this has not been financial support as the places were provided free of charge.

3.45 There has also been support from academia and industry for the Test Summer Schools in the form of the provision of guest speakers.

3.46 The Test Engineering summer schools achieved reasonable numbers in the years 2000 to 2002. In 2003, the decision was made to present the summer school at Southampton University rather than the Alba Centre. This led to a dramatic drop in numbers as shown in Figure 3.5.

Figure 3.5 Number of Test Education Summer School Participants 2001 - 2003



Financial Assessment

3.47 The Test Education programme significantly under performed in relation to the budgeted income for 2003/04, achieving just over a third of the anticipated income. The corresponding expenditure on the programme was significantly lower in proportion to the income.

Table 3.4a
Test Education Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
Test Education	£48,805	£134,300	£9,672	£125,150
Actual as % of Budget	36%		8%	
Source: ISLI Management Accounts				

3.48 The allocation of expenditure across the activities results in the Test Education programme operating at a loss of £47k in the last financial year with most of the expenditure allocated to staffing.

Table 3.4b **Test Education Financial Assessment – Fully Absorbed Expenditure 2003/04**	
Income	£48,805
Direct Expenditure	£9,672
Gross Profit	**£39,133**
Salaries	£65,142
Premises	£2,862
Library	£640
Computer	£1,992
Marketing	£15,249
Depreciation	0
Total Expenses	**£85,884**
Profit	**-£46,751**
Source: ISLI Full Absorption Accounts	

Budget 2004/05

3.49 The 2004/05 budget forecasts an income of £169k, which equates to three and a half times the income achieved in 2003/04. The extent to which this represents a realistic target is questionable given the demand for Test Education in 2003/04. If this level of income was achieved, the Test Education programme would be close to breaking even under the full absorption model.

Table 3.4c **Test Education Financial Assessment – Fully Absorbed Expenditure 2004/05**	
Income	£169,000
Direct Expenditure	£76,000
Gross Profit	**£93,000**
Salaries	£77,106
Premises	£3,458
Library	£702
Computer	£1,917
Marketing	£11,840
Depreciation	0
Total Expenses	**£95,022**
Profit	**-£2,022**
Source: ISLI Full Absorption Accounts	

BESPOKE CPD MODULES

Financial Assessment

3.50 The bespoke training modules only delivered a quarter of the expected income in 2003/04 while costing nearly a third of the anticipated amount. When the direct income and expenditure are taken into account this would result in the bespoke training programme having made a profit of £6k in the last financial year.

Table 3.5a
Bespoke Modules Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
Bespoke Modules	£23,220	£93,000	£17,160	£54,800
Actual as % of Budget	25%		31%	
Source: ISLI Management Accounts				

3.51 Despite the poor performance, the bespoke modules only made a loss of £5k in 2003/04 when the overheads are allocated. Obviously there are no premises costs attached to the bespoke modules when delivered at the companies' locations.

Table 3.5b
Bespoke Modules Financial Assessment – Fully Absorbed Expenditure 2003/04

Income	£23,220
Direct Expenditure	£17,160
Gross Profit	**£6,060**
Salaries	£3,140
Premises	0
Library	£66
Computer	£205
Marketing	£7,624
Depreciation	0
Total Expenses	**£11,035**
Profit	**-£4,975**
Source: ISLI Full Absorption Accounts	

Budget 2004/05

3.52 The forecast income for the bespoke training modules in 2004/05 is more than five times the actual income achieved in 2003/04, which appears to be unrealistic given the relatively low levels of demand for the product experienced to date.

Table 3.5c **Bespoke Modules Financial Assessment – Fully Absorbed Expenditure 2004/05**	
Income	£117,000
Direct Expenditure	£71,000
Gross Profit	**£46,000**
Salaries	£6,463
Premises	0
Library	£111
Computer	£304
Marketing	£5,920
Depreciation	0
Total Expenses	**£12,798**
Profit	**£33,202**
Source: ISLI Full Absorption Accounts	

DESIGN TEAM

Activity Assessment

3.53 The Design Team has provided a range of assistance and support to around 20 companies ranging from technology advice and guidance to commercial contracts. According to ISLI, 95% of the companies assisted have been Scottish and 85% of these have been micro start-ups or SMEs.

Output Assessment

3.54 The nature of the activity undertaken by the Design Team is presented in Table 3.6. The Design Team activity has generated potential value to ILSI of around £1m, in the main in terms of IP and R&D activity.

Table 3.6 **Design Team Projects**		
Companies	*Type of support*	*Value to ISLI*
F7 Technology and Optos	Commercial contracts	£60k
Motorola, Oxford Semiconductor and Cadence	IP development	Potentially >£750k
Salent, Freescale, Elonics, Dynamic Innovations	R&D	Potentially >£140k
Colonsay, Power 1, XiPower, NewCo 1, A2E, Spiral Gateway, Honeywell, I-Dare Innovations and Wearable Technology	Technology Guidance	Complimentary
Scantura	Nurtured start up	10% ownership
Source: ISLI Impact Assessment		

Financial Assessment

3.55 The income from the Design Team in 2003/04 was just under £100k, that is two-thirds of the budgeted income. When the direct income and expenditure is taken into account, that is the figures presented in the Management Accounts, the Design Team activity resulted in a gross profit of £23k in the last financial year.

Table 3.7a
Design Team Projects Financial Assessment – Direct Income and Expenditure 2003/04

	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
Design Team Projects	£96,951	£147,100	£74,197	£127,250
Actual as % of Budget	66%		58%	
Source: ISLI Management Accounts				

3.56 There are significant salary costs attached to the Design Team and when this expenditure is taken into account with the other overheads allocated to this area of activity, the Design Team is shown to have made a loss of £120k in 2003/04.

Table 3.7b
Design Team Financial Assessment – Fully Absorbed Expenditure 2003/04

Income	£96,951
Direct Expenditure	£74,197
Gross Profit	**£22,754**
Salaries	£111,649
Premises	£12,107
Library	£1,076
Computer	£3,351
Marketing	£7,624
Depreciation	£6,937
Total Expenses	**£142,744**
Profit	**-£119,990**
Source: ISLI Full Absorption Accounts	

Budget 2004/05

3.57 The budgeted income for the Design Team in 2004/05 is 46% higher than the income achieved in 2003/04. However, given the size of the Design Team this does not seem to be an unreasonable target. Indeed, given the resource involved in terms of salary costs, it could be argued that the target should be increased, as the current budget for 2004/05 would still result in a significant deficit of just under £100k.

Table 3.7c **Design Team Financial Assessment – Fully Absorbed Expenditure 2004/05**	
Income	£142,000
Direct Expenditure	£76,000
Gross Profit	**£66,000**
Salaries	£126,483
Premises	£14,630
Library	£1,098
Computer	£2,999
Marketing	£5,920
Depreciation	£10,398
Total Expenses	**£161,529**
Profit	**-£95,529**
Source: ISLI Full Absorption Accounts	

FACILITIES HIRE

Financial Assessment

3.58 Table 3.8a shows that the hire of facilities at ISLI brought in more than expected in terms of income in 2003/04 and the Management Accounts show a gross profit of £18k based on the direct expenditure.

Table 3.8a **Facilities Hire Financial Assessment – Direct Income and Expenditure 2003/04**				
	Income		*Direct Expenditure*	
	Actual	*Budget*	*Actual*	*Budget*
Facilities Hire	£30,889	£20,000	£12,614	£8,000
Actual as % of Budget	154%		158%	
Source: ISLI Management Accounts				

3.59 However, it is important to note that this assessment does not account for the significant costs attached to these facilities. Table 3.8b shows that when the property costs are taken into account the facilities hire activity did not break even but actually made a loss of more than £100k in the last financial year.

Table 3.8b **Facilities Hire Financial Assessment – Fully Absorbed Expenditure 2003/04**	
Income	£30,889
Direct Expenditure	£12,614
Gross Profit	**£18,275**
Salaries	£14,963
Premises	£92,455
Library	£324
Computer	£1,009
Marketing	£7,624
Depreciation	£3,468
Total Expenses	**£119,845**
Profit	**-£101,570**
Source: ISLI Full Absorption Accounts	

Budget 2004/05

3.60 The budgeted income from the hire of facilities in 2004/05 is less than the income achieved in the last financial year. This would result in a significant loss of nearly £120k given the premised costs.

Table 3.8c Facilities Hire Financial Assessment – Fully Absorbed Expenditure 2004/05	
Income	£34,000
Direct Expenditure	£12,000
Gross Profit	**£22,000**
Salaries	£15,637
Premises	£111,720
Library	£325
Computer	£888
Marketing	£5,920
Depreciation	£5,199
Total Expenses	**£139,689**
Profit	**-£117,689**
Source: ISLI Full Absorption Accounts	

GENERIC ACTIVITY

Activity Assessment

3.61 ISLI is involved in a range of other activities that do not fall under the headings above. This activity includes:

- Support for SE initiatives including visits and trade missions
- Membership of a number of industry organisations' Boards
- Involvement with EPSRC and Sector Skills Council

3.62 ISLI attendance at industry conferences and exhibitions over the period 2001 to date have included the following:

- International Test Conference 2001 and 2002
- DATE 2001, 2002 and 2003
- IMSTW (mixed-signal test workshop) 2002

3.63 In addition, ISLI has attended a number of Graduate Fairs including Liverpool, Edinburgh, Newcastle, Manchester and Glasgow in 2004.

3.64 The Institute has been involved in a number of European Information Society Technologies (IST) project committees including:

- TAMES-2 – Testability of Analogue Macrocells Embedded in System-on-Chip programme involving Dolphin Integration (France), IMSE-CNM (Spain), AMI (Belgium) and Lancaster University with ISLI acting as a subcontractor to Lancaster University;
- MACROS – programme involving Dolphin Integration (France), ST Microelectronics (Italy) and Lancaster University to develop new MEMS models. ISLI acted as a subcontractor to Lancaster University in this case also;
- PATENT – A Network of Excellence in the area of modelling and test of MEMS structures and packaging with a range of European academic partners. ISLI won the contract to manage the network training programme;
- SYDIC-Training – a Europe-wide consortium of trainers and industry leaders working to deliver high quality, flexible, design-related training. The project was managed by ECSI (France) with the following participants ISLI, ARM (UK), Cadence (UK), MBDA (France), Mentor Graphics (UK), IMEC (Belgium), Linkoping University (Sweden) and Technische Universitat Munchen (Germany).

3.65 These projects have had a combined value to ISLI of more than £500k.

3.66 ISLI has a number of international linkages through R&D, training and advisory activity. Organisations with whom ISLI has an established relationship include:

- Canadian Microelectronics Corporation
- Industrial Technology Research Institute, Japan
- SYMMID Corporation, Malaysia
- Nanyang Technological University, Singapore

Output Assessment

3.67 ISLI's involvement in European programmes has led to strategic partnership opportunities with universities and industry in Europe. ISLI has also built links with industry, government and academia internationally.

3.68 Number of graduate enquiries

- MSc enquiries 2002 – 316
- MSc enquiries 2003 – 355
- MSc enquiries 2004 – 318

SUMMARY OF FINANCIAL PERFORMANCE

3.69 Each of the activities and products of ISLI has been analysed in detail above. Table 3.9 presents the overall financial picture for 2003/04 comparing actual income and expenditure with the budget. The overall income was £840k representing 68% of the budgeted income for 2003/04.

Table 3.9
ISLI Direct Income and Expenditure 2003/04

	Actual	*Budget*	*Actual as % of Budget*
Income	£1,370,010	£2,012,863	68%
Expenditure	£838,616	£1,388,540	60%
Gross Profit	£531,395	£624,323	85%
Total overheads	£1,758,796	£1,776,982	99%
Net Profit	-£1,227,401	-£1,152,659	106%
Source: ISLI Management Accounts			

IMPACT ASSESSMENT

Students

3.70 The ability to attract quality students to ISLI is fundamental to the generation of economic impact further down the line. Feedback from former MSc students indicates that the main reasons attracting students to ISLI as a place of study were that the course content of the MSc fitted with students' intended career goals and the linkage with industry was seen as evidence that the course was designed to give students the specific knowledge and skills required by industry thus implying good job prospects on completion of the course.

3.71 Some of the students had the opportunity to work on a project supplied by industry and recognise the benefits of receiving industry supervision in addition to the academic supervision on the course.

3.72 The MSc has assisted the graduates in their chosen career path and testimonies include:

> *"The MSc has given me relevant knowledge, not only on the theory of SoC systems but a greater understanding of the future of electronics."*

> *"The MSc gave me the opportunity to deepen my understanding of SoC design and gave me skills that enables a good change in my career path."*

> *"ISLI put me in contact with a consultancy company, through which I got my current job. They also helped me to search for sponsorship to do the EngD, which I will be starting shortly."*

> *"My background is in FPGA design – as these devices get larger they now require system level design techniques, such as have been covered by the MSc. The breadth of material covered by the MSc will be an asset in my intended move to a technical team lead role."*

"The MSc is a true industry focussed course. The skills and knowledge obtained from the MSc allowed me to quickly get going in my initial assignment when I started employment. The knowledge base gained from the MSc proved very effective in my career progression."

"Essentially, I wouldn't be able to do the job I am currently doing has I not studied the MSc. Many of the topics covered on the course are directly relevant to my work. As a rough estimate, I would say that it would take 3-4 years of working in industry to equal what I learned from the MSc, without considering that the course teaches a much broader range of topics that most people see in their everyday work. I feel that it has therefore accelerated my career progress and future prospects."

"Through my involvement with my industry sponsor throughout the year I was able to get a better insight into the industry in which I was starting my career. At interviews I felt the subjects I had taken were suitable detailed enough that I gained a valuable edge against other candidates that did not take the course."

3.73 The graduates were asked to consider the main benefits to their current employer from their attainment of the MSc and responses included the following:

"Understanding the theories behind the industry trends, having an introduction to must of the typical stages (and the tools used) in a SoC design methodology, having a basic skill level of a range of subjects which would othereise require separate training and a higher level of professionalism."

"My detailed understanding in key application areas – design, verification and methodology."

"In my opinion, the biggest benefit was in my ability to quickly get up to speed with the rest of the more experienced engineers."

"These include a wide range of knowledge and an understanding of how the evolution of the electronics industry will affect my employer."

3.74 There is positive evidence from the former MSc students of the value of the MSc to their career development but the news that 20 of the 57 anticipated students for the 2004/05 programme have not enrolled points to the strong need for effective communication and marketing of the benefits of the programme to potential students to ensure commitment to the MSc in the future.

3.75 ISLI has introduced a number of measures to try to avoid this situation. These measures include:

- Greater effort into marketing and communication with students than many Universities;
- Hard and short deadlines for accepting offers; and
- Requirement of a deposit payment from overseas students.

3.76 It is important to use the experiences and perceptions of the MSc graduates to help shape the programme in the future to present the most attractive product to potential students. Suggested improvements to the MSc from the graduates included:

- Less academic assessment and more industrial related modules;
- More practical exercises using tools on some of the modules;
- Consideration of an Edinburgh or Glasgow location with student accommodation; and
- Greater promotion of the MSc and ISLI to key employers in the UK and elsewhere.

3.77 In terms of the EngD, evidence from ISLI suggests that companies have filed at a minimum, 2 Patents as a direct result of research activity of sponsored EngD students.

Universities

3.78 One of the main aims of ISLI is to support research capability in SLI and SoC within the Member Universities. There is evidence to suggest that the sponsorship of academic positions within the universities has allowed the departments to recruit academics in relevant areas that would have been very difficult to justify in the absence of ISLI support.

3.79 These appointments have facilitated the growth of research in areas of direct relevance to ISLI and significant research activity has been undertaken and funding attracted to support this activity. The universities recognise the benefits of collaboration under ISLI as independently they do not have sufficient strengths and the whole is greater than the sum of the parts. A summary of the research activity in the four Member Universities is presented below.

3.80 Evidence from the **University of Edinburgh** suggests ISLI has paid a key role in building research capability. In the School of Engineering and Electronics, Professor Arslan was recruited in 1998 as a Senior Lecturer, promoted to Reader and then on to Personal Chair in 2004. He was returned in 2001 in the RAE exercise and, as a research active member of the 5* rated department and secured the associated QR SHEFC funding appropriate to this RAE score or rating. Further, he has attracted to the University of Edinburgh almost 20 PhD students with the majority of these paying overseas fees. In addition, at the University of Edinburgh, he has secured £1.35m of direct research funding as a principal investigator and £0.65m of further funding as a co-investigator.

3.81 The ISLI has thus had a major impact in enabling University of Edinburgh to secure high quality academic staff who contribute to their research profile, attract significant SHEFC QR support, bring to the University £½m of student fee income and almost £2m of direct support for research activities. Professor Arslan has

further secured SE support for a completed a PoC funded award which resulted in spin-out company (Spiral Gateway) and is also involved in Platform Systems - a second company. In addition, a former PhD student of Professor Arslan set up a company, Critical Blue.

3.82 In conclusion, the University of Edinburgh is of the opinion that the support for academic salary via ISLI has been multiplied many times through attracting other external support for leading edge research on campus. In addition to the research undertaken in the School of Engineering and Electronics there is research activity in the School of Informatics through the sponsoring of Dr Jackson. Tables 3.10 and 3.11 provide further details of some of this research activity in both of the Schools.

Table 3.10
University of Edinburgh – ISLI Sponsored Research Activity 2001/02 to date
Engineering and Electronics

Research Activity	System on Chip in particular Low Power IC designs
Funding	EPSRC, SHEFC, SE/RSE Ent Fellowships, SE PoC etc. Recent awards include: Primitive computation, Prof Arslan – EPSRC c£500k Neural cells, Prof Murray – EPSRC £460k Spiking neurons, Prof Murray – EPSRC £320k
Project start/end dates	Several
Partner organisations	Glasgow Univ, ISLI etc.
Staff involved	Approx 25 in SEE @ UoE, 5 salaried researchers and 20 students studying for various Post Graduate degree programmes.
Outputs	Wide range of research publications including more than 10 journal articles and around 30 conference papers (see Appendix C for full details).
Role of ISLI in achievement of funding	Extremely high
Likelihood of project going ahead in absence of ISLI?	If UoE had not had the ISLI funding then this very significant research activity would NOT have happened at UoE or in Scotland.
Sustainability of research in absence of ISLI funding	ISLI salary support for Prof Arslan is key to the securing of the substantial student overseas fee and research contract support as well as all the Knowledge Transfer (KT) activity below.
Any other comments	UoE has significant KT activities through Critical Blue, a student start up company formed by Arslan's former PhD student, Spiral Gateway his own start up company, Platform systems (Prof Arslan assists by hosting) and new PoC applications for further new KT activities. UoE has more than 55 PhD students directly working in the area of SoC in the sub-groups of low power, communications, reconfigurable low-power SoC and evolvable hardware.

Table 3.11 **University of Edinburgh – ISLI Sponsored Research Activity 2001/02 to date** **Informatics**	
Research Activity	1: *Expression coverability analysis*: Using formal model checking tools to enhance hardware design verification methodologies. 2: Improving assertion-based verification methodology: Assertion based verification is a new methodology attracting much attention. This research aims at understanding its limitations and proposing extensions.
Funding	EPSRC, supporting EngD student at normal EngD rates.
Project start/end dates	Above activities started in Oct 2001. EngD funding finished in Sep 2004, though student doesn't expect to complete work until perhaps Sep 2005.
Partner organisations	Motorola
Staff involved	1 EngD student.
Outputs	1 international conference publication.
Role of ISLI in achievement of funding	High
Likelihood of project going ahead in absence of ISLI?	If the ISLI were to go away, it is likely that the EngD student will still complete his EngD work. Beyond the work done in conjunction with the EngD, future work on topic 1 is very unlikely. Future work on topic 2 might happen, but would be less likely.
Sustainability of research in absence of ISLI funding	The student is currently relying on demonstrating activities at ISLI to provide some income.

3.83 The **University of Strathclyde** recognises that the collaboration of the Member Universities under ISLI has enabled multidisciplinary teams to be brought together to undertake research and access research funding from additional sources. ISLI is used in attracting students to the University of Strathclyde. An example of this activity is the Design Cluster project, which attracted £$^{1}/_{2}$m of funding from SHEFC, and brought together all four universities. This activity is presented in greater detail in Table 3.12.

Table 3.12 **University of Strathclyde – ISLI Sponsored Research Activity 2001/02 to date** **Electronic and Electrical Engineering**	
Research Activity	Design Cluster for ISLI
Funding	SHEFC £500,000
Project start/end dates	1999-2002
Partner organisations	Seven Departments in the universities of Edinburgh, Glasgow, Heriot-Watt and Strathclyde (Strathclyde was the lead partner)
Staff involved	18 research staff and students
Outputs	The Project has led to several outcomes that provide benefits in terms of academic developments, significant gearing for research support,

	industrial collaboration and technology transfer. The research has led to 49 publications at major international conferences and in prestigious journals. Presentation at keynote conferences has promoted the profile of Scottish research internationally, and effected dissemination of important results. Training of over eighteen research staff and students working on SLI related projects and towards PhDs and other higher degrees. Such trained manpower is important for the growth and support of the SLI related industry in Scotland. The work has attracted seventeen further projects from other agencies including industry and research councils, thus SHEFC support has provided significant gearing that will ensure future sustainability of the Project. Technology transfer has also been effected by staff associated with the Project taking up positions in industry - such as Motorola, Microsoft Research, Xilinx, Nallatech, Scottish Design, secondment to Xerox Corporation, spin-out company Verilab. A prestigious dissemination event was held on 11 January 2002 for industrialists, government officers and academics where the results of the Project were presented to an audience of about 100. A CD-Rom has been produced on the outcomes of the Project.
Role of ISLI in achievement of funding	Without ISLI this project could not have been envisaged and funding awarded, as the Project relied on facilities, infrastructure and support at ISLI.
Likelihood of project going ahead in absence of ISLI?	Nil
Sustainability of research in absence of ISLI funding	Very difficult to surmise.

Table 3.13 University of Strathclyde – ISLI Sponsored Research Activity 2001/02 to date Electronic and Electrical Engineering	
Research Activity	Bluetooth implementation
Funding	French Government, University of Strathclyde, ISLI indirect support to the level of £35,000.
Project start/end dates	October 2002 –December 2003
Partner organisations	Please see above
Staff involved	Professor T S Durrani, One research student and two French Exchange students.
Outputs	Project Reports, Contribution to PhD Thesis
Role of ISLI in achievement of funding	Essential. Facilities and tools for the work are only available at the ISLI.

Likelihood of project going ahead in absence of ISLI?	Nil
Sustainability of research in absence of ISLI funding	Nil

3.84 The **University of Glasgow** regards ISLI as fundamental to transform the electronics industry in Scotland and continue to support he strong UK presences in electronic design. The only way for the Scottish Universities to maintain their profile and compete with Oxford and Cambridge is through collaboration and ISLI is critical to this. The ISLI support by means of the sponsorship of a lecturers post enables an appointment to be made that would be difficult to justify otherwise. This strengthens the Department through the generation of new research activity.

3.85 ISLI has been a catalyst for a number of research ideas including the IDEAS (Integrated Diagnostics for Environmental & Analytical Systems) project funded by SHEFC to develop a low-power micro-instrumentation capsule for medical, veterinary and environmental use.

3.86 **Heriot-Watt University** interaction in the ISLI programmes has been 'spread' over a number of colleagues and spans the period in which the university undertook a radical restructuring which saw fundamental changes in its basic organisation. Crucially, the department in the former structure that was at the focus of HWU links to ISLI– namely the Department of Computing and Electrical Engineering was divided.

3.87 The computing 'division' became a part of the School of Mathematics and Computing Sciences while the Electrical Engineering component fell within the School of Engineering and Physical Sciences. This major upheaval of the structural teaching and research organisation had a major effect on all their activities (including ISLI linkages) during the transition period.

3.88 In the period prior to restructuring, the principal HWU staff contributing to ISLI activities were Drs Julian Dynes and Steve Mowbray – both of whom devoted the majority of their time to ISLI related activity – in teaching and research. In fact, Dr Dynes conducted a large fraction of research activity from the ISLI premises and was closely integrated into ISLI linkages to industry. Both Dr Dynes and Dr Mowbray left Heriot Watt at about the time of the major university re-organisation to further their careers in other employment.

3.89 In the following years, HWU contributions to teaching have been shared by a number of colleagues, with the main linked research activity that lead by Dr Marc Desmulliez, who has a strong and well-funded activity in microsystems and electronics packing technologies of direct relevance to system level integration. The majority of Dr Desmulliez's work is supported by EPSRC in partnership with a number of UK and EU companies. He has been awarded several grants at the level of 300k – where ISLI linkages are very important.

3.90 Most recently Dr Desmulliez has been part of the proposed Scottish Consortium in Integrated Micro-Photonic Systems (led from Strathclyde University and also involving bio-systems at Glasgow and Professor Hall's group at HWU) and including staff from ISLI which is seeking SRDG funding from SHEFC, and has now been invited to bid in the Final Round of this competition. This programme seeks to address a critical dichotomy at the interface between microelectronics and micro-photonics – where system level integration and control is needed in advanced photonics-based micro-instrumentation.

Industry

3.91 DTZ Pieda Consulting was given a list of 27 potential companies to approach to discuss their relationship with ISLI and any resulting impacts from this relationship. Thirteen companies were consulted, three of which felt they had no relationship with ISLI and therefore could not participate in the consultation exercise.

3.92 The nature of the relationship with ISLI and the impact from the relationships varied considerably amongst the remaining 10 companies consulted and ranged from full engagement to general awareness of ISLI. Some of the companies consulted were not clear on what ISLI is doing and what its aims are and its remit is.

3.93 Criticism of ISLI was focussed on the lack of relevance of the research and teaching focus to many companies in Scotland. Furthermore, there is some confusion as to the nature of the research undertaken. There is a strong feeling that ISLI needs to better communicate itself to industry.

3.94 At the other end of the spectrum, both Cadence and Motorola Technology Centre report that ISLI acts as an anchor for their operations at the Alba Campus and helps to justify their presence because of the reputation of ISLI. The 2 operations employ a total of around 230 staff and ISLI is critical in maintaining this employment in Scotland.

3.95 Further examples of impacts and benefits attributable to ISLI from industry include:

- Research activity undertaken through student sponsorship that has in some cases led to products in the marketplace although it is not possible for the companies concerned to quantify this impact;

- Employment of students from the MSc or EngD programmes who are generally felt to be of high quality although not generally additional positions but part of ongoing recruitment;
- Sourcing of CPD courses locally with employees brought from other locations to Scotland to participate;
- Turnover increase of $50-60k in one company as a direct result of work undertaken by the ISLI Design Team with additional softer impacts in terms of learning effects within the company from working in collaboration;
- The achievement of a critical mass of expertise at ISLI with the involvement of the 4 Member Universities that is attractive to industry.

3.96 The companies consulted had a range of views on the future direction of ISLI. Some common themes to emerge included the need for the following:

- More focussed research;
- Coverage of mixed signal and analogue design in the MSc course;
- Concerted effort to attract UK participants; and
- The establishment of ISLI as a centre of excellence internationally.

3.97 There is a feeling from industry that this would help to enhance the development of the microelectronics cluster in Scotland. There is a general goodwill in industry to ISLI with a few exceptions and companies would like to have an ongoing relationship with ISLI and would like to see it flourish in the future. However, there is a recognition that ISLI may have to refocus to achieve this success and that it has to address the needs of Scottish industry as a priority.

3.98 The Motorola Technology Centre at Alba Campus is planning a major initiative involving ISLI in the future. Motorola Inc. has a requirement for design services across its different design teams and there are plans to create a team at the Technology Centre to service this requirement. ISLI's role in this would be threefold:

1. To supply trained people for the new team.
2. To build a Design Services Group that could undertake work contracted out from the Technology Centre team.
3. To train other engineers within Motorola Inc by distance learning and CPD.

3.99 The scale of the requirements is likely to be the creation of a team of 25 engineers based at the Technology Centre at Alba and around 100 people in India and China to participate in distance learning. The potential knock-on effects of this work are huge. This initiative could not be sold within the company without ISLI to support it as it provides the venture with credibility and reliability. If successful, this initiative could be of great importance to the future of ISLI.

EngD Industry Sponsorship

3.100 Feedback from a selection of companies involved in sponsoring EngD Research Engineers has indicated a high level of additionality with regard to the research activity with most companies stating they would not have undertaken the research in the absence of the sponsored RE.

3.101 In terms of quantifiable outputs for the company, these have tended to be increased knowledge, which was then used in product development. The companies have not been able to quantify this output in financial terms with the exception of one company who equated the value to 3 months of an engineer's time. In another case there it is expected that the outputs will be of value in the future.

3.102 Again, while some of the companies had undertaken further activity as a direct result of the research undertaken by the RE, this had not yet translated into hard impacts but there is potential for this in the future in some cases.

3.103 Comments offered by the sponsoring companies included:

> *"The RE has considerable expertise from previous employment. He is working directly on tasks from which we can envisage short –term benefits. Neither of these would have been likely with a PhD student."*

> *"Our experience has been entirely positive, because of the quality of the RE, because of the quality of the work he has been able to do for us, and because it has freed the industrial supervisor to drive and manage, rather than carry out the investigations the RE has done. We do not expect quantifiable benefits for another 18 to 24 months, but we do envisage that there will be such benefits."*

> *"We hired the first EngD so that is a good benefit."*

> *"In terms of the benefits of sponsoring an EngD at ISLI compared to a PhD elsewhere, the benefits include more practical orientation, help with product development research as opposed to pure research and more control over what the student does."*

> *"The EngD has more of a practical value rather than pure bluesky."*

> *"The academic supervision of the students has been very poor resulting in both my REs having to change supervisors during the course of the programme."*

3.104 In summary, while the companies generally view the sponsorship as beneficial to their business, they find it difficult to quantify the outputs of the research although in some cases this is down to the timescale and direct impacts are expected in the future.

Wider Image

3.105 ISLI attracts a large number of students from overseas so clearly has a recognised identity outwith the UK in terms of its presence as an academic location. The website is crucial in this area of marketing with general trends pointing to increasing numbers of potential students sourcing information online. However, there is clearly a picture emerging from the industry consultations within Scotland that ISLI needs to communicate more clearly its remit and its achievements.

3.106 Press coverage since 2002 is presented below. Much of the coverage is in specialist publication *Electronics Weekly* with some coverage in the national press.

'ISLI runs course on design for micro and nano manufacture'. **Electronics Weekly**, 01 September 2004, p20.

'EngD graduation'. **Electronics Weekly**, 14 July 2004, p4.

'Software graduates top of the world'. **Sunday Herald Business**, 04 July 2004, p3.

'Former ISLI students set up document scanner firm'. **Electronics Weekly**, 24 March 2004, p1.

'Bridging an Ocean to Enable Research Collaboration across Canada and the World — CMC Demonstrates Trans-Atlantic Test of Virtual Lab'. **Canadian Microelectronics Corporation Annual Report** 2003, http://www.cmc.ca/news/success_stories/virtual_lab.pdf

'Scotland the winner as start-up award goes to Indian students'. **Sunday Herald**, 23 November 2003.

'Boost for Scottish SoC research'**. New Electronics** on Campus, Autumn 2003, p6.

'ISLI expands summer courses'. **Electronics Weekly**, 06 August 2003, p3.

'Researchers win grant to give mobiles a boost'. **Scotsman**, 25 June 2003

'UK university link-up wins £500,000 for SoC system'. **Electronics Weekly**, 25 June 2003, p3.

'Scottish Alba to play lead role in Government's IC centre scheme'. **Electronics Weekly**, 19 March 2003, p1.

'Forward planning Alba campus looks to the long term'. **Scotsman**, 08 March 2003, p6.

'Pioneering new degree course graduates in city'. **Edinburgh Evening News**, 04 December 2002.

'Excellence in design'. **Electronics Weekly**, 27 November 2002, p24.

'Students flock to study at ISLI'. **EE Times,** 14 October 2002, p3.

'Filling the talent pool'. **Electronics Weekly**, 09 October 2002, p48.

'Institute for System Level Integration adds design for test and verification to course'. **Electronics Weekly**, 02 October 2002, p21.

'Learning @ a distance'. Knivett, V **New Electronics**, 24 September 2002, p66.

'Providing ideas for an innovative future'. **Sunday Herald**, 21 July 2002, p5.

'Alba Campus powers ahead'. **Scotsman,** 18 June 2002, p4.

'Race is on to provide quality test engineering' **Business AM Special report**, 18th March 2002, pVII

'Scottish ISLI makes a DATE to put Master's degree online'**. Electronics Weekly,** 27 February 2002, p5.

SUMMARY OF OUTPUTS AND IMPACTS

3.107 Table 3.14 summarises the outputs, outcomes and impacts from ISLI from 1999/00 to 2004/05. Appendix D sets out the assumptions made in calculating the outputs, outcomes and impacts. (Appendix E presents an economic appraisal of the potential future impacts of ISLI from 2005/06 to 2008/09.) The impacts have been converted into Gross Value Added (GVA) to the Scottish economy.

Table 3.14
Summary of Outputs, Outcomes and Impacts 1999/00 – 2004/05

Outputs	Outcomes	Impacts*
Postgraduate and professional education and training		
118 non-Scottish students enrolled on the MSc	£600,000 in student fees and sponsorship	£460,000 GVA associated with off-campus expenditure by non-Scottish students
127 MSc graduates	62 MSc graduates remaining in Scotland	£1,642,000 GVA associated with productivity savings made by Scottish companies recruiting ISLI graduates
398 individuals in Scotland receiving CPD		£156,000 GVA associated with efficiency savings to Scottish companies
Industry-based R&D and support services		
13 non-Scottish students enrolled on the EngD		£154,000 GVA associated with off-campus expenditure by non-Scottish students
10 EngD graduates	At least 2 EngD graduates remain in Scotland	
Design Team activity	£60,000 of Design Team commercial contracts £750,000 of IP agreements £140,000 of R&D support	Enhancement of the Scottish electronics research base
	4 spin-out companies assisted	
	23 Research Engineers placed in industry	Productivity gains or cost savings made by industry
	230 jobs maintained in Design Operations	£183,373,000 GVA or 465 FTE jobs maintained
Pre-competitive research		
Research activity	Leverage of £3.5m research funding and £500,000 EU funding	£4,536,000 GVA or 16 FTE jobs per annum
Other		
ISLI turnover		£13,913,000 GVA or 31 FTE jobs per annum
* Direct, indirect and induced impacts net of additionality and displacement.		

3.108 In summary, ISLI has had the following impacts to date:

- £614,000 GVA associated with off-campus expenditure of non-Scottish MSc and EngD students
- £1,624,000 GVA associated with savings to companies employing ISLI graduates
- £156,000 GVA associated with savings to companies from ISLI CPD

- £183,373,000 GVA or 465 direct, indirect and induced jobs (net) associated with 230 direct jobs maintained in Design Operations
- £4,536,000 GVA or 16 direct, indirect and induced jobs (net) per annum associated with leveraged research funding
- £13,913,000 GVA or 31 direct, indirect and induced jobs (net) per annum associated with turnover of ISLI

3.109 Table 3.14 demonstrates some of the synergies that have emerged from ISLI's activities in industry, academia and the economy in general. However, there are still questions over the value for money of ISLI. We conclude that the evidence outlined in the section above indicates that ISLI currently offers poor value for money. Section 4 suggests a number of areas in which changes could be made to improve the value for money position.

OTHER ISSUES EMERGING

3.110 From the consultations undertaken, a number of issues emerged which help to put the findings on activity and impact into context. These issues are summarised below.

- **Strategic vacuum** – there is a feeling from ISLI that there is a lack of direction from SE in terms of where ISLI should be headed. This lack of direction is seen to be both current and historic. There is a feeling that SE needs to give more detailed consideration to where ISLI fits within its current strategy and to endorse its position and fit with other existing and planned initiatives. There is a sense in which ISLI is looking to SE for more guidance than it currently receives. Whether this is appropriate is a point of debate but there is a clear need for more high-level dialogue on where ISLI fits.

- **Board commitment** – from our consultations with board members it is clear that there are varying levels of engagement amongst the board. The board is firmly non-executive (though the Chairman is providing an important support role in a number of areas) and there is an expectation that the ISLI director will highlight the relevant issues for discussion rather than the board taking a strategic role.

- **Lack of cohesive management team** – there are a large number of senior management staff but we did not detect a cohesive management team with much of the key financial information being available to the Director alone. The 2002 business plan sets out a fairly complex structure for ISLI and alludes to the appointment of a deputy chief executive who might have addressed the cohesiveness issue. There is also the issue of who manages SLI staff and a need for stronger line management. This point is brought into context in Section 4 where we discuss the need for a stronger and more coherent management team at an executive level.

- **Mismatch between ISLI expertise and industry needs** – our research pointed to a potential mismatch between ISLI's focus of expertise on system on chip and the issues faced by many of Scotland's electronic firms who would value support in mixed signal and analogue design. This is an issue which would benefit from further investigation as it may be that these companies can access

such support elsewhere. However, there was clearly a view that ISLI was not working in areas relevant to many of the Scottish electronics companies.

- **ISLI direction** – an issue which emanates from some of the above points is that we detected a lack of focus at ISLI and would take the view that it is doing too many things. Clearer direction from SE, the Board and the management team would resolve this problem and our view is that ISLI should look carefully at rationalising what it does within the context of a refined structure.

- **Accountability** – an issue which emanates again from the points above is the issue of managing the University inputs to ensure value for money in provision of teaching to ISLI courses. It took some 'digging' on the part of the research team to discover that funds are still allocated to the universities according to the original formula established at the set up of ISLI. This formula does not take account of the time inputs made by the university so potentially results in over or underpayments. A new formula has been devised that could result in substantial savings, but it is not clear at what stage of implementation this formula is at.

- **VFM** – a final issue is that of value for money. As the performance and economic impact sections show, there are questions as to whether ISLI should be costing £1m per annum. Section 4 discusses this issue in more detail.

4 Conclusions and Recommendations

INTRODUCTION

4.1 This Section of the report sets out our conclusions and recommendations based on the results of the research set out earlier in the report. Scottish Enterprise is particularly interested in determining the benefits that have resulted from its financial investment in ISLI and the extent to which this investment represents value for money. Our conclusions, therefore, focus particularly on the financial aspects of the review.

4.2 This section addresses the key outputs identified in the study brief namely:

- The extent to which ISLI has achieved its vision;
- The performance of ISLI against its objectives and the extent to which issues raised in the previous evaluation of 2001 have been addressed;
- The performance of ISLI against the measures set out in the business plan of 2002;
- The extent to which the business model of ISLI is appropriate in meeting its objectives;
- The key challenges for ISLI in the current operating environment and how these challenges should be addressed; and
- The performance and economic benefit to Scotland of ISLI and an assessment of the rationale for its continued existence.

VISION

4.3 The vision for ISLI as set out in the Business Plan was presented in Section 2:

> *"The Institute aims to become a world-class centre of excellence in System on Chip research, education and training with a focus on new systems, products and applications."*

4.4 In terms of assessing the extent to which ISLI has achieved this vision, the reminder of the Section will illustrate that ISLI is a centre of excellence in SoC research, education and training but the Institute could have a far greater profile with students, academia and industry.

PERFORMANCE AGAINST OBJECTIVES

4.5 As set out in Section 1 of the report, ISLI has five strategic objectives that form the basis of the evaluation of performance. The performance of ISLI against each of these objectives is assessed below.

- **Marketing and Promotion** – to promote Scotland as a world class centre of excellence in SLI;

- Assessment of progress – ISLI has had success in recruiting students from a variety of destinations worldwide e.g. MSc overseas fees in 2003/04 were £230k. Uptake on the MSc and EngD courses has been good and generally shows an upward trend. In this respect, we conclude that ISLI has met this objective.

- However ISLI has failed to convince much of the Scottish industry that it has a key role in the future of the industry. With the exception of a small number of companies with whom it has intensive dealings, awareness of ISLI is patchy and relevance ranges from very high to very low.

- **Research** – to create internationally recognised research activities;

- Assessment of progress – Through the Universities there has been substantial research activity that would not otherwise have been undertaken and there has been strong leverage of SE money leading to both research and commercial outcomes. We conclude that ISLI has met this objective.

- **Education and Training** – to develop high quality education and training initiatives to enable and encourage the development of SLI expertise in Scotland;

- Assessment of progress – The MSc and the EngD programmes are the main vehicles for ISLI in meeting this objective but the other educational and training activities, such as Test Education and CPD have been much less successful with uptake significantly lower than anticipated. We therefore conclude that ISLI has met this objective and should concentrate in the future on its MSc and EngD programmes.

- **Commercialisation** – to encourage commercial activity to enhance the Scottish economy;

- Assessment of progress – ISLI's commercial activities consist principally of the Design Team activity, company-sponsored research in the MSc and EngD, encouragement of spin-out companies. ISLI perceives itself as being a bridge between academia and industry. Whilst there has been good progress towards this objective, we find the evidence unconvincing that ISLI has achieved maximum potential in this area.

- **Profitability** – to trade profitably.

- Assessment of progress – There is a question as to whether or not this objective is appropriate for an organisation such as ISLI which exists to support an industry's development. ISLI has clearly not met this objective and has its requirement for deficit funding from SE has exceeded its Business Plan forecasts substantially even putting to one side the issue of the electronics market downturn. Whilst we would not expect ISLI to trade profitably we feel that much could be done to reduce the levels of deficit funding required from SE thus improving its value for money. This is the area where most urgent attention is required.

PROGRESS SINCE PREVIOUS EVALUATION

4.6 As set out in Section 2, DTZ Pieda Consulting undertook an interim evaluation of ISLI in 2001. A number of issues and recommendations were identified in this evaluation and each of these points is addressed in turn below:

- **Improvements to MSc and EngD -** A series of suggestions for improvements to the MSc and EngD programmes were put forward to enhance their content, delivery and management.

- Assessment of progress – we are impressed by the progress that has been made in terms of both MSc and EngD. Both appear to be successful and well-run courses with increasing numbers of students and amounts of sponsorship. They are supported by industry and feedback from students has been positive with suggestions for minor improvements as detailed in Section 3.

- **"Buy-in" from Member Universities –** The Interim Evaluation found that the majority of academics had not "bought into" ISLI.

- Assessment of progress – Commitment from the Member Universities is strong with some more committed than others in terms of the input they provide to the teaching and supervision on the courses and in the research undertaken. The universities recognise the benefits of collaboration under ISLI as independently they do not have sufficient strengths and "the whole is greater than the sum of the parts."

- **Staff Resourcing –** The need to recruit a smaller and more concentrated team of specialists to teach the programmes was recognised.

- Assessment of progress – This does not appear to have been addressed and the large number of academic staff involved in teaching, supervision and research is difficult to administer centrally. However, the ability of ISLI to draw upon such a wide base of specialist experience within the Member Universities is recognised as a key strength of the collaboration and it is felt by many to be desirable to continue with this arrangement. Subject to appropriate administrative procedures being put in place to ensure the effective running of the teaching and research programmes there is no reason why the current arrangements should not be maintained.

- **Structure and Management –** The structure of ISLI was felt to be too complex with too many committees leading to an ineffective decision-making process.

- Assessment of progress – whilst the complexity of ISLI may have been reduced since the last review, its structure is still over-complicated and does not provide for a cohesive senior management team. There are several 'senior managers' but we could find no member of the senior management who could set out for us the key aspects of financial performance other than the ISLI Director. We believe that a symptom of this lack of a cohesive management team is the poor record in ISLI of meeting its budgets. The business plan sets out in December 2001 an intention to recruit a deputy chief executive. We understand that this appointment was never made, presumably because of the poor financial position. A deputy chief executive role would help bridge the gap between the Director and the rest of the staff.

- **Financial Reporting –** It was recommended that a management accounting system be developed to enable the contribution of the different product areas to be determined.

- Assessment of progress – We were given full access to the ISLI accounts and they are clearly carefully prepared in a timely fashion. However, the monthly financial accounts are wrongly referred to as 'management accounts' and it was sometime until we were able to gain access to proper management accounts with full cost absorption through the ISLI Director. The full absorption accounts have been in development for some time and we recognise the achievement of ISLI in developing a useable model. In this sense, this objective has been fully addressed but we would like to see wider circulation of these accounts amongst a senior management team.

- These management accounts are the only way of alerting ISLI management and board to the issues that require careful scrutiny and urgent attention. Our review of the management accounts with the ISLI Director pointed to a number of areas which we highlight below.

- **Cost Savings and Operational Efficiencies –** It was suggested that efforts be made to manage costs more effectively and to identify possible cost savings.

- Assessment of progress - We did not find evidence of cost savings or operational efficiencies apart from a recognition that efficiencies would be gained as the number of students increased. Whilst we would not conclude that ISLI is necessarily inefficient in its activities per se, its constant failure to achieve budget in its business plan has led to a situation where there has always been an expectation of increased income to offset the high level of costs. We set out below a number of areas where we recommend cost savings be made.

4.7 One of the required outputs of this evaluation is an assessment of the performance of ISLI against its business plan. This is difficult to assess, as the number of clear measures against which to assess performance is limited. Section 3 assesses the activity of the MSc and EngD programmes against the projected student numbers in the business plan and concludes that the number of students secured to date is largely consistent with the predicted numbers in the business plan.

4.8 What is clear is that there is evidence of a consistent failure to meet targets relating to income. While the industrial downturn has continued beyond expectations making trading conditions difficult the variance between budget and forecast is substantial across all of ISLI's activities. In all cases except Facilities Hire, actual income has fallen far short of budget.

4.9 Whilst in previous years, this variance could be explained by the downturn in the electronics market, in the current and future years we would expect ISLI to set achievable targets for income. The 2003/04 budget figures are in most cases already revised downwards substantially from the original business plan prepared in 2001.

4.10 This consistent failure to achieve budget gives us little confidence in ISLI's ability to achieve its future business plan goals and suggests over-optimism and a lack of proper business planning by the ISLI management team.

4.11 The failure to appoint a deputy chief executive as outlined in the business plan may also have contributed to this situation, though we understand that in the current funding situation, making another appointment would be difficult to justify. Rather, we believe that there is a need for a more wholesale restructuring of the senior management team in order to streamline it.

ISLI Business Model

4.12 As set out in Section 2, the current business model for ISLI is a contractual joint venture between four universities, SLI Ltd and SE. SLI Ltd, as a legal entity, has its own board with representatives from each of the members. The original rationale for this business model was based upon, amongst other things, independence – not being seen to be the domain of any one University, and aiming to bring University research and teaching closer to industry needs.

4.13 Whilst it has brought independence, the business model has brought with it several disadvantages. The most significant disadvantage is the non-eligibility of SLI Ltd for HE funding streams. Although ISLI is eligible for this funding through the universities, there are problems associated with routing the funding in this way. This has caused a great deal of frustration to ISLI staff with a complex series of recharges being required to access funds.

4.14 Secondly, ISLI's independent position has meant that the universities perceive ISLI as 'not being their own'. The ownership of ISLI is perceived to lie with Scottish Enterprise. This lack of ownership is a more fundamental issue for the future and needs to be addressed. Thirdly, the independence from the universities has led to a whole range of added costs in setting up finance, IT, marketing, HR, property management systems plus high rent and rates. All of these could be achieved more cost-effectively through a university.

4.15 Our view is that as well as restructuring the staffing structure of ISLI, the business model should be amended. A range of new models might be considered, but our view is that the most straightforward would be a joint venture between the four universities. Given the success of the various research posts funded through ISLI and the links with industry, we believe that the advantages outweigh the costs. The position of SE could be either as a JV partner or simply as a funding contributor in return for economic development objectives. We do not see the advantages of SLI Ltd being retained as a legal entity. Location is a separate issue to the business model and it may be deemed appropriate that the ISLI continues to exist in its present location or moves to one or more of the campuses of the universities.

KEY CHALLENGES

4.16 ISLI is currently receiving public subsidy in the order of £1 million per annum. Given the high cost nature of its activities, and the public good elements of what it does, some level of subsidy would be expected. The question is to what extent is the subsidy justified. From our discussion with stakeholders and in particular with the Director of ISLI a number of areas are identified which could lead to significant savings. These savings are based on data from the management accounts. The areas are set out in Table 4.1.

Table 4.1
Potential Net Savings

Expenditure area	*Potential net saving*
Facilities	£100k
University overpayment	£128k
Premises cost	£177k
Staffing	£150k
Total	**£555k**

4.17 The Table shows that potential savings can be made in four areas as set out below.

- **Facilities** – ISLI currently rents the whole conference suite and manages it as a going concern. This facility makes a loss of £117k per annum. The saving is based on ISLI no longer renting the facility and assumes a cost (yet to be verified) of £17k per annum in renting alternative facilities when required. In addition, there would be an unknown capital cost in converting parts of the existing accommodation to house student teaching.

- **University overpayment** - As explained in Section 3, the universities are paid according to the original funding formula. The Director of ISLI has identified that potential savings of £128k could be made if universities were paid according to what they deliver rather than an out-dated formula. The universities have not responded to this figure as yet.

- **Premises cost** – ISLI occupies premises which are expensive, especially when compared to costs of academic buildings. This calculation is the difference between what ISLI currently pays and an estimate of what it would pay were it located on a university campus. It represents the premium for ISLI to be located on the Alba Campus and includes the fact that there is no rates rebate as is normal for educational buildings.

- **Staffing** – the final area of saving identified is on staffing. This saving is estimated by DTZ Pieda Consulting based on our view of the need to restructure ISLI's staffing. We estimate that 4 posts could be lost and replaced by staff on lower salaries. Some ISLI staff are paid quite high salaries and while this has added value in the set-up phase of ISLI, it raises questions of value for money in steady state.

4.18 In total, if ISLI were to remain at the Alba Centre the savings amount to £455k leaving an annual subsidy of £545k to run ISLI, while if ISLI were to move to University accommodation the savings amount to £378k. This level of subsidy is much more realistic and could be reduced further if the ISLI was to make use of university services and systems. At this level of subsidy, and with other changes ISLI would offer much better value for money.

ECONOMIC IMPACT

Students

4.19 Evidence from a sample of former MSc students suggests that the programme has had a major influence on their career paths and has helped graduated find suitable employment. A series of benefits to the employers of these graduates were identified in terms of the skills and knowledge gained from the MSc allowing graduates to "hit the ground running" to a greater extent than would otherwise be the case. Consultation with industry supported this finding with companies regarding ISLI as a training ground for quality engineers. This leads us to the conclusion that the teaching programmes offered through ISLI represent good value for money.

Research

4.20 There is strong evidence to suggest that the sponsorship of academic positions within the universities has allowed the departments to recruit academics in relevant areas that would have been very difficult to justify in the absence of ISLI support. Furthermore, these appointments have facilitated the growth of research in areas of direct relevance to ISLI and significant research activity has been undertaken and funding attracted to support this activity.

4.21 The information supplied to date by the universities points to a number of research projects that would not have gone ahead without the support provided through ISLI. In excess of £2.5m has been attracted in research funding for the projects detailed in Section 3. There have been a number of collaborative projects across the universities. In addition there have been a high number of outputs in the form of academic research papers and conference papers.

4.22 The money invested in the research capabilities of the Member Universities has been relatively small (c£160k per annum) but has helped the universities to leverage research funding from other sources such as SHEFC and EPSRC. In addition, to raising the profile of the universities and ISLI this activity has supported nearly 50 research posts. We would argue that the value for money is good for the research activity.

Industry

4.23 The impacts of ISLI in terms of safeguarding electronic design jobs in Scotland is significant with both Cadence and Motorola Technology Centre reporting that ISLI acts as an anchor for their operations at the Alba Campus and helps to justify their

continued presence in Scotland. The 2 operations employ a total of around 230 staff and ISLI is critical in maintaining this employment in Scotland.

4.24 Other impacts and benefits were harder to quantify but included a recognition that ISLI was a source of high quality graduates to support the industry and a local source of CPD courses that were attractive to a small number of companies. Reserch activity undertaken by sponsored students may lead to potential hard impacts in the future but companies were unable to quantify this at present. One company reported a tangible sales increase as a direct result of collaboration with the ISLI Design Team amounting to $50-60k.

4.25 Despite these achievements, several of the companies with whom we consulted were unclear as to the remit of ISLI, in particular its research focus. Some companies felt that ISLI was not aligned with industry needs of SMEs in Scotland. There is an identified need to raise the profile of ISLI within the industry and send out a clear message of the aims of the Institute that are clearly linked to the needs of industry. Taking this into consideration, we would question the value for money being achieved from the industry perspective.

FUTURE OF ISLI

4.26 In conclusion, our view is that ISLI is making a worthwhile contribution to the Scottish economy. It is running courses that are of value to industry and are supporting retention of a design capability in Scotland. Numbers of students attending these courses are increasing but they are expensive to run. It is supporting research in relevant areas with a relatively modest sum of around £162k per annum, which is levering in large amounts of research funding through the different universities.

4.27 However, despite its worthwhile contribution, ISLI offers poor value for money and we have set out above where we believe considerable savings could be made. To achieve these savings requires urgent dialogue between ISLI, SE and the universities and will involve addressing structure and staffing, funding arrangements with the universities and property issues on the Alba Campus.

APPENDIX A

PRIVATE & CONFIDENTIAL: CONSULTANTS BRIEF

EVALUATION OF SCOTTISH ENTERPRISE FUNDING TO THE INSTITUTE FOR SYSTEM LEVEL INTEGRATION

Introduction

Scottish Enterprise (SE) Edinburgh and Lothian wishes to appoint consultants to undertake Due Diligence and an evaluation of the funding agreement between Scottish Enterprise and System Level Integration Ltd. (SLI Ltd.), as the organisation administering the funding provided for the Institute for System Level Integration (ISLI). The purpose of the project is to determine the economic benefits derived from the provision of this funding towards the operation of ISLI.

This brief is for a desk-based review of existing research and other relevant data, a series of workshops, backed up by a limited interview programme with key individuals.

Background

Scottish Enterprise

Scottish Enterprise (http://www.scottish-enterprise.com/) is the principal economic development agency for Scotland, created in 1991 by an Act of Parliament. It is funded by grant-in-aid of around £450m per year from the Scottish Executive, the devolved government of Scotland. The Scottish Executive sets out the strategy by which we hope to increase the growth of the Scottish economy. This strategy, which is currently being updated, is titled Smart Successful Scotland, (http://www.scotland.gov.uk/library3/enterprise/sss.pdf). It sets out three strategic objectives and twelve themes for Scottish Enterprise to focus on.

Scottish Enterprise established The Alba Centre in 1997 with the overall purpose **to establish Scotland as a leading world centre for electronic product design and technology.**

To achieve this objective it is necessary to:

- increase the design and product development capability of existing firms;
- attract new investment in semiconductor research, design and development;
- increase the supply of design engineering talent and associated skills;
- create a unique quality campus environment which fosters collaboration and co-operation whilst still encouraging commercial competitiveness;
- enhance the research and teaching capability of Scottish academic institutions in related disciplines; and
- Place Scotland at the centre of world trade in virtual components.

The Institute for System Level Integration (ISLI) is a cornerstone solution in delivering this overall vision. It brings together 4 of Scotland's Universities with SE into a body focused on the teaching and research associated with System Level Integration (SLI). The university members are the University of Glasgow, University of Strathclyde, Heriot Watt University and Edinburgh University. ISLI delivers the world's first Masters and Doctorate programmes in SLI, concentrating on the understanding of the process of System on Chip (SoC) design, the use of Intellectual Property (IP) blocks and the architecture of modern electronic systems. The ISLI is also taking a thought leadership position in basic research leading to the development of new intellectual property in complex silicon design projects.

The ISLI was established in August 1998 and opened its main premises in Livingston, within The Alba Centre, in September 1998. ISLI was legally constituted in November 1998 and began its education activities in January 1999. System Level Integration Ltd (SLI Ltd) a company limited by guarantee whose members are the 4 universities and Scottish Enterprise has been established and is responsible for the financial operation of the Institute for System Level Integration. The ISLI is governed by a members agreement between its members and SLI Ltd and by service agreements between the four universities and SLI Ltd.

ISLI has five strategic objectives, namely:

- Marketing & Promotion - to promote Scotland as a world class centre of excellence in SLI;
- Research – to create internationally recognised research activities;
- Education and Training – to develop high quality education and training initiatives to enable and encourage the development of SLI expertise in Scotland;
- Commercialisation – to encourage commercial activity to enhance the Scottish economy;
- Profitability – to trade profitably.

This Project

Scottish Enterprise provides development funding to ISLI, cumulative funding to date of £6.6 million has been allocated. Initial funding as part of the overall Alba Initiative contributed £4.4 million to the establishment and development of the activities. This initial funding included a condition on ISLI to undertake an interim evaluation at year 3[1]. The results of that interim evaluation formed part of the basis for the development of a new business plan to cover the period 2002 – 2006, this was subsequently endorsed by ISLI board and submitted to SE for consideration. An exercise in due diligence[2] was carried out on the business plan submitted as part of the process of assessment of the case for support. In June 2002 a further £2.2 million of development funding was approved by SE board. ISLI are currently part way through the business plan cycle that this further funding was provided for. The current funding agreement provides financial drawdown of the grant to supplement income earned from the private sector through fees and sponsorship and further public funding from SHEFC – EPSRC and the member universities.

The current financial year ending July 2004 is forecast to have a total turnover of £2.86 million (including drawdown of £1.2 million) and expenditure of £2.9 million, it is clear that ISLI is still not near to a position of self funding status. It is vital that SE determine that the economic benefits derived from the continued support of ISLI merit the investment made. Equally it is important to highlight any learning outcomes from the operation of ISLI and any recommendations for future interventions of this nature. The evaluation and due diligence will be used to support any case for further funding requests.

It is envisaged that this evaluation will draw on the methodology applied at the interim stage to determine what progress has been made against the benchmarks, observations and recommendations at that stage. It is likely that the evaluation will require the consultants to undertake limited survey and workshops with relevant individuals from ISLI, the partner universities, the students and industry. Assessment of the financial information will require access to SLI Ltd accounts and records.

Context

ISLI has made significant progress against the strategic objectives set with the exception of trading profitably.

Against the remit of developing postgraduate education and professional training and research in System on Chip and related technologies ISLI is now the largest UK postgraduate school dedicated to the design of complex silicon systems. Graduation from the full time MSc course in academic year 2002-03 was the largest ever, with 53 students graduating. Current academic year has 38 students in full-time education. A developing Distance learning programme is also in operation with over 100 students undertaking modules towards the MSc.

Industry participation in the Eng D programme continues to be very supportive and has grown with currently 30 Eng D students being sponsored by 23 different companies.

The current operating environment for ISLI has been directly impacted by the worst downturn in the history of the microelectronics industry. This has had a notable impact on the demand

[1] DTZ Pieda Interim Evaluation of ISLI July 2001.

[2] PWC Due diligence on ISLI business plan 2002-2006

for student output at postgraduate level and has also impacted the demand from industry in Scotland for professional training services. The significant drop in levels of inward investment and the limited growth of existing investors have all reduced the opportunities for the output from the postgraduate and professional training services provided by ISLI. Equally the trends in globalisation with not only manufacturing but increasingly design related activities being pursed by Far East countries such as Taiwan, with substantive government funding to accelerate this trend. It is not clear that the UK position when Alba and ISLI were launched will ever be achieved again. It is therefore valid to assume that the original basis for ISLI to reach its objectives will not be realised. ISLI remains strategically important to SE in our approach to the microelectronic and optoelectronic cluster. The future direction of ISLI will be guided and determined by the policy of SE towards any extension of the funding agreement between SE and ISLI. It is clear that there needs to be a realignment of the level of activity undertaken by ISLI in relation to future demand from industry for graduate output and this will be directly impacted by the market conditions.

Alba and ISLI have made good progress towards the objective of Scotland being recognised as one of the world leading centres for microelectronic product design, development and technology. This has been substantiated by the House of Lords Science and Technology Committee report into the UK position on microelectronic design, in this and the government response to the reports call for further investment in this area, ISLI was cited as "a substantial educational institute for system on chip design".
Scottish Enterprise in partnership with ISLI and regional development agencies (RDAs) from other parts of the UK where microelectronics is a key industry, have collaborated on a submission to DTI in response to a call to action, under the technology programme for inter-enterprise computing. This submission aims to create a national knowledge transfer network for inter-enterprise computing linking companies, RDAs and academic institutions across the UK in Electronic Design via Grid computing. This proposal, if accepted by DTI would lead to a position in which ISLI would be come the lead UK institution for the development and delivery of microelectronic design related education and research with a number of associated nodes throughout the UK.

Project Management
This project will be managed by cluster team and supported by Knowledge Management of SE.

Outputs
Based on the desk research and limited interviews and surveys, the consultants will be expected to produce a report which will provide the following:

- To what extent has ISLI achieved its vision?
- Performance of ISLI against the objectives and benchmarks created from the previous evaluation 2001.
- Performance against the measures set out in the business plan submitted 2002.
- Is the business model of ISLI effective in meeting its objectives?
- What are the key challenges for ISLI in the current operating environment and how should these challenges be addressed?
- Performance and economic benefit to Scotland of ISLI, is there still a compelling rational for ISLI's existence.

Consultants
The consultants will require a good understanding of econometrics, monitoring and evaluation and of the challenges facing small regional economies operating in a global knowledge economy. They should also be aware of the strategic and policy framework under which SE undertakes its work. They should have significant understanding of Government economic statistics and other published sources. The day rates for this work

must be those approved by the Strategic Procurement Team as part of the consultancy framework agreement.

We believe that the following factors are critical to the success of this study and would expect that the successful consultants would also be able to demonstrate skills in these areas:

- Good planning;
- High level, appropriate contacts;
- Excellent communication skills;
- Effective team working;
- Identification of the 'right' information to collect;
- Processes designed to capture and share knowledge;
- Robust data analysis;
- Robust data presentation.
- Knowledge of cluster methodology

Content of Proposals
Proposals must include:

- A detailed methodology, outputs and timescale;
- Reporting arrangements;
- Role, time input and day/hourly rate for each team member;
- Relevant experience of the team members, consultancy company/companies, with indications of the time each team member will spend on the consultancy, the overall cost of that team member and their contribution to each discrete task of the project;
- Fees breakdown showing total costs (inclusive of all applicable VAT).
- Expenses breakdown (where practical or provide budget estimate), showing total costs (inclusive of all applicable VAT).
- Flow charts showing how the elements of the proposed work package will be organised
- A detailed time based schedule (or GANTT) which accurately shows the work to be performed and key milestones for review and against which payments can be released.
- Details of work previously carried out for Scottish Enterprise

Selection Procedure
Selection will be through a competitive tendering process, with the brief going to several consultancies. If appropriate, final selection will be by presentation and panel interview.

Scottish Enterprise standard terms of contract will apply to any contract awarded. All payments will be on completion of key milestones. There will be no advance payments.

Submission Details
Two copies of the proposal (1 bound copy, 1 unbound copy), plus in electronic format to be sent two hours after the deadline for printed copies, should be submitted no later than 12 noon on 16th August 2004 in sealed envelopes, marked clearly "Tender Documents" to:

Scottish Enterprise Edinburgh and Lothian
Alba Centre
Alba Campus
LIVINGSTON
EH54 7EG

APPENDIX B

SLI Ltd - Overhead costs allocated to departments 2003/04

	MSc	EngD	Test Ed	Distance L	Bespoke	Design	Dev Proj	Facilities	SYDIC	Inn & Ent	Misc	Research	Central	Total	
Income	£ 279,636	£ 633,280	£ 48,805	£ 50,255	£ 23,220	£ 96,951	£ -	£ 30,889	£ 55,202	£ 50,653	£ 101,120	£ -	£ -	£ 1,370,011	
Direct Costs	£ 122,811	£ 398,628	£ 9,672	£ 8,312	£ 17,160	£ 74,197	£ -	£ 12,614	£ 49,803	£ 53,869	£ 91,550	£ -	£ -	£ 838,616	
Gross Profit	**£ 156,825**	**£ 234,652**	**£ 39,133**	**£ 41,943**	**£ 6,060**	**£ 22,754**	**£ -**	**£ 18,275**	**£ 5,399**	**-£ 3,216**	**£ 9,570**	**£ -**	**£ -**	**£ 531,395**	
Expenses															
Salaries	£ 216,450	£ 190,434	£ 65,142	£ 45,923	£ 3,140	£ 111,649	£ -	£ 14,963	-£ 21,965	£ 2,103	£ 4,199	£ 202,555	£ 266,699	£ 1,101,292	1207061
Premises	£ 93,776	£ 24,215	£ 2,862	£ -	£ -	£ 12,107	£ -	£ 92,455	£ -	£ -	£ -	£ 660	£ 68,901	£ 294,977	294977
Library	£ 31,677	£ 25,441	£ 640	£ 641	£ 66	£ 1,076	£ -	£ 324	£ 36	£ 33	£ 65	£ 11,903	£ 1,723	£ 73,624	39676
Computer	£ 73,928	£ 17,448	£ 1,992	£ 1,995	£ 205	£ 3,351	£ -	£ 1,009	£ 111	£ 102	£ 204	£ -	£ 5,364	£ 105,708	33887
Communications	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ 10,434	£ 10,434	10434
Marketing	£ 7,624	£ 15,249	£ 15,249	£ 15,249	£ 7,624	£ 7,624	£ -	£ 7,624	£ -	£ -	£ -	£ -	£ -	£ 76,244	76244
Other	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ -	£ 27,149	£ 27,149	27149
Depreciation	£ 38,152	£ 6,937	£ -	£ 6,937	£ -	£ 6,937	£ -	£ 3,468	£ -	£ -	£ -	£ -	£ 6,937	£ 69,367	69367
Total expenses	£ 461,608	£ 279,724	£ 85,884	£ 70,743	£ 11,035	£ 142,744	£ -	£ 119,845	-£ 21,818	£ 2,238	£ 4,468	£ 215,118	£ 387,207	£ 1,758,796	1758795
Profit	-£ 304,783	-£ 45,072	-£ 46,751	-£ 28,800	-£ 4,975	-£ 119,990	£ -	-£ 101,570	£ 27,217	-£ 5,454	£ 5,102	-£ 215,118	-£ 387,207	-£ 1,227,401	

APPENDIX C

Appendix C
Research Publications

K.C. Tan, T. Arslan; *"Low Power Embedded Extension Algorithm for the Lifting-based Discrete Wavelet Transform in JPEG2000"*, IEE Electronic Letters, **37**, 22, 1328-1330

B.I. Hounsell, T. Arslan, R.J. Thomson; *"Evolutionary Design and Adaptation of High Performance Digital Filters within an Embedded Reconfigurable Falut Tolerant Hardware Platform"*, Soft Computing Journal, 2004

N. Aydin, T. Arslan, D.R.S. Cumming; *"A Direct Sequence Spread-Spectrum Communication System for Integrated Sensor Microsystems"*, IEEE Trans Inf Tech Biomed, 2004

M. Hasan, T. Arslan; *"Implementation of low power FFT processor cores using a novel order based processing scheme"*, IEE Proceedings Circuits, Devices and Systems

M. Hasan, T. Arslan, J.S. Thompson; *"A Novel Coefficient Ordering based Low Power Pipelined Radix-4 FFT Processor for Wireless LAN Applications"*, IEEE Transactions on Consumer Electronics

B.I. Hounsell, T. Arslan; *"Evolutionary Design and Adaptation of Digital Filters Within an Embedded Fault Tolerant Hardware Platform"*, Soft Computing Journal

Z. Khan, A.T. Erdogan, T. Arslan; *"Dual low power and crosstalk immune encoding scheme for on-chip data buses "*, IEE Electronics Letters, **39**, 20, 1436-1437, 2nd October 2003

A.T. Erdogan, M. Hasan, T. Arslan; *"Algorithmic low power FIR cores"*, IEE Proceedings Circuits, Devices and Systems, **150**, 3, 155-160, June 2003

A.T. Erdogan, E.P. Zwyssig, T. Arslan; *"Architectural trade-offs in the design of low power FIR filtering cores"*, IEE Proceedings Circuits, Devices and Systems, **151**, 1, 10-17, 5 Feb 2004

A.C. McCormick, J.S. Thompson, P.M. Grant, T. Arslan, A.T. Erdogan; *"Low Power Receiver Architechtures for Multi-Carrier CDMA"*, IEE Proceedings Circuits, Devices and Systems, **149**, 4, 227-233, August 2002

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A T Erdogan, E Zwyssig, T Arslan, Architectural Trade-offs in the Design of Low Power FIR Filtering Cores, IEE Proceedings - Circuits, Devices and Systems, Vol. 151, No. 1, 5 Feb. 2004, pp. 10-17.

A T Erdogan, M Hasan, T Arslan, Algorithmic low power FIR cores, IEE Proceedings - Circuits, Devices and Systems, Vol. 150, No. 3, June 2003, pp. 155-160.

M Hasan and T Arslan, Implementation of low power FFT processor cores using a novel order based processing scheme, IEE Proceedings - Circuits, Devices and Systems, Vol. 150, No. 3 , 6 June 2003, pp. 149-154.

Yiming Wang and T Arslan, A Novel Routing Algorithm for Specialised Long-lifetime Pico-Radio Networks, IEE Electronics Letters, Volume: 39, Issue: 9, 1 May 2003, Pages:744 - 745.

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Z Khan, T Arslan, A T Erdogan, A Dual Low Power and Crosstalk Immune Encoding Scheme for System-on-chip Buses, accepted in PATMOS 2004 International Workshop on Power and Timing Modeling,
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I Atluri and T Arslan, Reconfigurability-Power Trade-offs in Turbo Decoder Design and Implementation, IEEE Computer Society 2004 Annual Symposium on VLSI (ISVLSI'04), pp. 215-217, February 19-20, 2004, pp.
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2003, pp. 71-74.

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17-20, 2003, pp. 408-411.

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APPENDIX D

ISLI ECONOMIC IMPACT ASSESSMENT – 1999/00 TO 2004/05

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
Postgraduate and professional education and training	• 118 non-Scottish students enrolled on the MSc	• £600,000 in student fees and student sponsorship for all courses (MSc and EngD)	• £658,000 off-campus expenditure by non-Scottish MSc students (Off-campus spend per student source: Ursula Kelly, Richard Marsh, Iain McNicol "The Impact of Higher Education Institutions on the UK Economy – A Report for Universities UK." 2002, p 27) equivalent to a GVA of £296,000 (GVA to output ratio source: http://www.scotland.gov.uk/about/FC	£1,022,000 injected into Scottish economy from off-campus expenditure by non-Scottish MSc students equivalent to a GVA of £460,000 (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	• GVA is calculated from expenditure using the Scottish average ratio of GVA to output (45%) • The multiplier used is average of the Type II Output Multipliers for the following sectors - Bread, Biscuits, etc; Miscellaneous Foods; Spirits and Wines, etc; Tobacco; Wearing Apparel; Footwear; Soap and Toilet Preparations; Electrical Equipment nes; Hotels, Catering, Pubs, etc; Railways; Other Land Transport; Air Transport; Telecommunications; Banking; and Recreational Services (1.554)

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			SD/OCEA/00014713/2001_IO_IxI.xls)		
Postgraduate and professional education and training	• 127 MSc graduates • 34 Scottish MSc graduates	• 62 MSc graduates remaining in Scotland	£2,083,000 productivity savings made by Scottish companies recruiting ISLI graduates (rather than other graduates) because of their higher skill set equivalent to GVA of £1,062,000 (GVA to output ratio source: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft))	• £3,185,000 injected into the Scottish economy from productivity savings made by Scottish companies recruiting ISLI graduates (rather than other graduates) because of their higher skill set equivalent to GVA of £1,624,000	• Each graduate saves recruiting company £40,000 in the first year after recruitment (and £0 thereafter) Source: ISLI Business Plan, Nov 2004, p.9 • GVA is calculated from savings made by companies using the electronic design sector ratio of GVA to output (51%) • Type II Multiplier used is the output multiplier associated with the Electronic Components sector (1.529)
Postgraduate and professional education and training	• 398 individuals in Scotland receiving CPD training • Representatives from 56 Scottish companies		• £200,000 efficiency savings to Scottish companies from ISLI CPD	• £306,000 injected into the Scottish economy from efficiency savings to Scottish companies from ISLI CPD (Type II	• Type II Multiplier used is the output multiplier associated with the Electronic Components sector (1.529) • GVA is calculated

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
	receiving training			Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls), equivalent to GVA of £156,000 (GVA to output ratio source: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft))	from savings made by companies using the electronic design sector ratio of GVA to output (51%)
Industry-based R&D and support services	• 13 non-Scottish students enrolled on the EngD		• £220,000 off-campus expenditure by non-Scottish students (Off-campus spend per student source: Ursula Kelly, Richard Marsh,	• £342,000 injected into the Scottish economy from off-campus expenditure by non-Scottish students equivalent to a GVA of £154,000 (Type II Multipliers Source: *2001 Input-Output*	• Non-Scottish students remain students in Scotland for 3 years • GVA is calculated from expenditure using the Scottish average ratio of GVA to output (45%) • The multiplier used is average of the Type II Output Multipliers for

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			Iain McNicol "The Impact of Higher Education Institutions on the UK Economy – A Report for Universities UK." 2002, p 27) equivalent to a GVA of £99,000 (GVA to output ratio source: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls)	*Tables and Multipliers for Scotland* http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	the following sectors - Bread, Biscuits, etc; Miscellaneous Foods; Spirits and Wines, etc; Tobacco; Wearing Apparel; Footwear; Soap and Toilet Preparations; Electrical Equipment nes; Hotels, Catering, Pubs, etc; Railways; Other Land Transport; Air Transport; Telecommunications; Banking; and Recreational Services (1.554)
Industry-based R&D and support services	• 10 EngD graduates (including 6 that will graduate at the end of the academic year 2004/05)	• At least 2 EngD graduates stay in Scotland			
Industry-based R&D and support services		• £60,000 of Design Team commercial	• Enhancement of the Scottish		

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
		contracts • £750,000 of IP Agreements (Design Team) • £140,000 of R&D Support provided by the Design Team	electronics research base		
Industry-based R&D and support services		• 4 spin out companies assisted			
Industry-based R&D and support services		• 23 Research Engineers placed in industry	• Productivity or cost gains made from EngD REs		
Industry-based R&D and support services		• 230 jobs maintained in Design Operations	• £119,930,000 GVA associated with jobs maintained	• £183,373,000 injected into Scottish economy from GVA associated with jobs maintained equivalent to a total of 465 FTE jobs (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OC	• Additionality is 100% • Type II Multipliers used are the output and employment multipliers associated with the Electronic Components sector (1.529 and 2.022 respectively)

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
				EA/00014713/2001_IO_multipliers.xls)	
Pre-competitive Research		• Leverage of £3.5m research funding Leverage of £500,000 of EU funding	• Equivalent to £2,800,000 in GVA (GVA to output ratio source: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls) or 70 FTE jobs.	• A total injection (net of additionality) of £4,536,000 in GVA or 16 FTE jobs per annum (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	• GVA as a proportion of output calculated for the Education sector • Type II Multipliers used are the output and employment multipliers associated with the Education sector (1.620 and 1.331 respectively) • Additionality is 100%
Other			• ISLI Turnover of £13,112,000 (Source: ISLI Audited Financial Statements and ISLI Business Plan, Nov 2004) resulting in and an equivalent GVA of	• Additional direct, indirect and induced GVA of £13,913,000 • This creates additional direct, indirect and induced employment in ISLI of 31 FTEs per annum	• Continuation of existing employment situation • GVA as a proportion of output is the average of that for the education sector and the design sector • Type II Multipliers used are the output and employment

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			£8,588,000 (GVA to output ratio sources, Education Sector: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls. Design Sector: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft)) • This creates direct employment in ISLI of 23 FTEs per annum		multipliers associated with the Education sector (1.620 and 1.331 respectively) – no output or employment multipliers are available for the design sector • Additionality is 100%

* displacement assumed to be 0% throughout

SUMMARY OF TOTAL QUANTIFIABLE NET IMPACTS

£614k GVA associated with off-campus expenditure of non-Scottish MSc and EngD students
£1,624,000 GVA associated with savings to companies employing ISLI graduates
£156k GVA associated with savings to companies from ISLI CPD
£183,373,000 GVA or 465 direct, indirect and induced jobs (net) associated with 230 direct jobs maintained in Design Operations
£4,536,000 GVA or 16 direct, indirect and induced jobs (net) per annum associated with leveraged research funding
£13,913,000 GVA or 31 direct, indirect and induced jobs (net) per annum associated with turnover of ISLI

EQUIVALENT TO A TOTAL OF £204,216,000 GVA or 512 direct, indirect and induced FTE jobs

APPENDIX E

ISLI ECONOMIC APPRAISAL – 2005/06 TO 2008/09

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
Postgraduate and professional education and training	110 non-Scottish students enrolled on the MSc (Student numbers source: ISLI Business Plan, Nov 2004. p. 36)	• £2,200,000 in student fees and student sponsorship (between **2004/05** to 2008/09)	• £840,000 off-campus expenditure by non-Scottish MSc students (Off-campus spend per student source: Ursula Kelly, Richard Marsh, Iain McNicol "The Impact of Higher Education Institutions on the UK Economy – A Report for Universities UK." 2002, p 27) equivalent to a GVA of £378,000 (GVA to output ratio source: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/20	• £1,305,000 injected into Scottish economy from off-campus expenditure by non-Scottish MSc students equivalent to a GVA of £587,000 (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	• 10 MSc students per year are Scottish • GVA is calculated from expenditure using the Scottish average ratio of GVA to output (45%) • The multiplier used is average of the Type II Output Multipliers for the following sectors - Bread, Biscuits, etc; Miscellaneous Foods; Spirits and Wines, etc; Tobacco; Wearing Apparel; Footwear; Soap and Toilet Preparations; Electrical Equipment nes; Hotels, Catering, Pubs, etc; Railways; Other Land Transport; Air Transport; Telecommunications; Banking; and Recreational Services (1.554)

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			OCEA/00014713/2001_IO_IxI.xls)		
Postgraduate and professional education and training	• 190 MSc graduates • 51 Scottish MSc graduates	• 93 MSc graduates remaining in Scotland	• £3,116,000 productivity savings made by Scottish companies recruiting ISLI graduates (rather than other graduates) because of their higher skill set, equivalent to a GVA of £1,589,000 (GVA to output ratio source: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft))	• £4,764,000 injected into Scottish economy from productivity savings made by Scottish companies recruiting ISLI graduates (rather than other graduates) because of their higher skill set equivalent to a GVA of £2,430,000 (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotla	• All enrolled students graduate • The proportion of Scottish graduates remains unchanged (27%) • The proportion of graduates remaining in Scotland and entering employment is unchanged (41%) • Each graduate saves recruiting company £40,000 in the first year after recruitment (and £0 thereafter) Source: ISLI Business Plan, Nov 2004, p.9 • GVA is calculated from savings made by companies using the electronic design sector ratio of GVA to output (51%) • Type II Multiplier used is the output multiplier associated

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
				http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	with the Electronic Components sector (1.529)
Postgraduate and professional education and training	• 398 individuals in Scotland receiving CPD training • Representatives from 56 Scottish companies receiving training		• £133,000 efficiency savings to Scottish companies from ISLI CPD • £1,200,000 productivity gains made from staff from Scottish-based companies undertaking CPD activity (Source: SE estimate based on ISLI business plan)	• £203,000 injected into Scottish economy from efficiency savings to Scottish companies from ISLI CPD (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls) equivalent to	• Based on previous annual average continuing • Type II Multiplier used in both cases is the output multiplier associated with the Electronic Components sector (1.529) • GVA is calculated from savings made by companies using the electronic design sector ratio of GVA to output (51%) • SE estimates assume that one man day of training will result in £1,000 productivity gain over 5 years

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
				GVA of £156,000 (GVA to output ratio source: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft)) • £1,835,000 injected into Scottish economy from productivity gains made from staff from Scottish-based companies undertaking CPD activity (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland	

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
				http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls) equivalent to GVA of £936,000 (GVA to output ratio source: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft))	
Industry-based R&D and support services	• 11 non-Scottish students enrolled on the EngD		• £193,000 off-campus expenditure by non-Scottish students (Off-campus spend per student source: Ursula Kelly, Richard Marsh, Iain McNicol "The Impact of Higher	• £300,000 injected into Scottish economy from off-campus expenditure by non-Scottish students equivalent to a GVA of £135,000 (Type II	• 7 new students enrol each year • The proportion of non-Scottish students remains unchanged (41%) • Non-Scottish students remain students in Scotland for 3 years • GVA is calculated from expenditure using the Scottish average

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			Education Institutions on the UK Economy – A Report for Universities UK." 2002, p 27) equivalent to a GVA of £87,000 (GVA to output ratio source: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls)	Multipliers Source: *2001 Input-Output Tables and Multipliers for Scotland* http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	ratio of GVA to output (45%) • The multiplier used is average of the Type II Output Multipliers for the following sectors - Bread, Biscuits, etc; Miscellaneous Foods; Spirits and Wines, etc; Tobacco; Wearing Apparel; Footwear; Soap and Toilet Preparations; Electrical Equipment nes; Hotels, Catering, Pubs, etc; Railways; Other Land Transport; Air Transport; Telecommunications; Banking; and Recreational Services (1.554)
Industry-based R&D and support services	• 28 EngD graduates	• 14 EngD graduates stay in Scotland			• 7 students graduate each year • The proportion of graduates remaining in Scotland is unchanged (50%)

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
Industry-based R&D and support services		• £640,000 of Design Team commercial contracts and R&D support (Source: ISLI Business Plan, Nov 2004, pp 94 – 97) • At least £750,000 of Design Team projects relating to IP Agreements (Source: DTZ Pieda Consulting "Evaluation of SE Funding to ISLI – Final Report" Nov 2004, p 21)	• Enhancement of the Scottish electronics research base • 20 new products or processes worth £13,250,000 in sales revenue generated by technology assistance/ innovation support between 2004/05 and 2008/09 (Source: SE estimates based on ISLI business plan) supporting an average of 27 direct FTE jobs per annum or creating £4,052,000 in GVA (gross) • 12 new products or processes worth £8,000,000 in sales	• £4,647,000 GVA (net of additionality) associated with new products or processes generated by technology assistance/ innovation support between 2004/05 and 2008/09, or supporting an average of 40 additional direct, indirect and induced FTE jobs per annum • £2,806,000 GVA (net of additionality) associated with new products or	• GVA as a proportion of output calculated for the electronic components sector from *2001 Input-Output Tables and Multipliers for Scotland* http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls • Technology assistance/ innovation support is assumed to have a 50% success rate from project to successful product launch and that products are launched in the year following the project. It is also assumed that the product generates no revenue in its 1st year, £100k in year 2, £250 K in year 3, and £500 K thereafter for next 3 years. • Projects supported by

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			revenue generated by projects supported by design consultancy between 2004/05 and 2008/09 (Source: SE estimates based on ISLI business plan) supporting an average of 16 direct FTE jobs per annum or creating £2,447,000 in GVA (gross)	processes generated by projects supported by design consultancy between 2004/05 and 2008/09 or supporting an average of 24 additional direct, indirect and induced FTE jobs per annum	design consultancy are assumed to have a 60% success rate from project to successful product launch and that products are launched in the year following the project. It is also assumed that the product generates no revenue in its 1st year, £100k in year 2, £250 K in year 3, and £500 K thereafter for next 3 years. • Additionality is 75% for both technology assistance and design consultancy
Industry-based R&D and support services		• At least 4 spin out companies assisted (Source: ISLI Business Plan, Nov 2004, p 14)	• £4,500,000 of sales revenues generated by spin-outs between 2004/5 and 2008/09 (Source: SE estimates based on ISLI business plan) supporting an average of 9 direct	• £1,578,000 GVA (net of additionality) associated with spin-outs between 2004/05 and 2008/09 or supporting an average of 14	• GVA as a proportion of output calculated for the electronic components sector from *2001 Input-Output Tables and Multipliers for Scotland* http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			FTE jobs per annum or creating £1,376,000 in GVA (gross)	additional direct, indirect and induced FTE jobs per annum	A/00014713/2001_IO_IxI.xls • One company assisted each year • Companies generate no revenue in year 1, £100K in year 2, £400K in year 2 and £1,000K in each year thereafter • Additionality is 75%
Industry-based R&D and support services	• 28 Research Engineers placed in industry	• Productivity or cost gains made from EngD REs	• 8 new products or processes worth £9,000,000 in sales between 2004/05 and 2008/09 (Source: SE estimates based on ISLI business plan) supporting an average of 18 direct FTE jobs per annum or creating £2,753,000 GVA (gross)	• £3,157,000 GVA (net of additionality) associated with new products or processes or supporting an average of 27 additional direct, indirect and induced FTE jobs per annum	• GVA as a proportion of output calculated for the electronic components sector from *2001 Input-Output Tables and Multipliers for Scotland* http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls • 30% of completed projects result in new products or processes • Products generate no revenue in their 1st

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
					year, £100k in year 2, £250 K in year 3, and £500 thereafter for next 3 years. • Additionality is 75%
Industry-based R&D and support services		• 230 jobs maintained in Design Operations	• £79,954,000 GVA associated with jobs maintained (Source: GVA per employee based on Scottish electronics industry average taken from *Scottish Executive Scottish Annual Business Statistics 2002*, p. 2. Available at: http://www.scotland.gov.uk/about/ELLD/EI/00016170/2002SectionF.pdf	• £122,250,000 injected into Scottish economy from GVA associated with jobs maintained equivalent to 465 FTE jobs (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	• Continuation of existing situation • Type II Multipliers used are the output and employment multipliers associated with the Electronic Components sector (1.529 and 2.022 respectively) • Additionality is 100%
Pre-competitive		• Leverage of £5	• Equivalent to	• A total injection	• GVA as a proportion

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
Research		million research funding	£4,000,000 in GVA (GVA to output ratio source: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls) or 100 FTE jobs.	(net of additionality) of £6,480,000 in GVA or 33 FTE jobs per annum (Type II Multipliers Source: 2001 Input-Output Tables and Multipliers for Scotland http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_multipliers.xls)	of output calculated for the Education sector • Type II Multipliers used are the output and employment multipliers associated with the Education sector (1.620 and 1.331 respectively) • Additionality is 100%
Other			• ISLI Turnover of £11,507,000 (Source: ISLI Business Plan, Nov 2004) resulting in and an equivalent GVA of £7,537,000 (GVA to output ratio	• Additional direct, indirect and induced GVA of £12,210,000 • This creates additional direct, indirect and induced	• Continuation of existing employment situation • GVA as a proportion of output is the average of that for the education sector and the design sector • Type II Multipliers

Objective	Outputs	Outcome	Direct Impact	Direct, indirect and induced impacts net of additionality and displacement*	Assumptions
			(GVA to output ratio sources, Education Sector: http://www.scotland.gov.uk/about/FCSD/OCEA/00014713/2001_IO_IxI.xls. Design Sector: DTZ Pieda Consulting, "Micro and Opto Electronics Baseline Study" 2005 (Draft)) • This creates direct employment in ISLI of 23 FTEs per annum	induced employment in ISLI of 31 FTEs per annum	used are the output and employment multipliers associated with the Education sector (1.620 and 1.331 respectively) – no output or employment multipliers are available for the design sector • Additionality is 100%

* displacement assumed to be 0% throughout

SUMMARY OF TOTAL QUANTIFIABLE NET IMPACTS

£722k GVA associated with off-campus expenditure of non-Scottish MSc and EngD students
£2,430,000 GVA associated with savings to companies employing ISLI graduates
£1,092,000 GVA associated with savings to companies from ISLI CPD
£12,188,000 GVA or 105 direct, indirect and induced jobs (net) associated with R&D, spin-outs and design team activity
£122,250,000 GVA or 465 direct, indirect and induced jobs (net) associated with 230 direct jobs maintained in Design Operations
£6,480,000 GVA or 33 direct, indirect and induced jobs (net) per annum associated with leveraged research funding
£12,210,000 GVA or 31 direct, indirect and induced jobs (net) per annum associated with turnover of ISLI

EQUIVALENT TO A TOTAL OF £157,372,000 GVA or 634 direct, indirect and induced FTE jobs