University Collaboration on Technology Transfer:
An All-Island Feasibility Study

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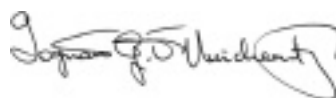
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FOREWORD

There is a growing recognition of the importance of the role that universities play in economic development, and governments in Europe, North America and Asia are now providing support to translate the results of research in higher education institutions into outcomes that benefit the economy and society.

This timely report makes a number of recommendations as to how the universities on the island, North and South, might work together to strengthen and extend the capability of technology transfer services in the third level sector. Clearly the universities on the island have different structures for the delivery of intellectual property management and technology transfer. However there are common challenges which face all of us: notably the need to exploit our research output successfully and to promote, market and sell our research-led technologies and intellectual property.

As the report points out, the environment in which universities operate is undergoing rapid and significant change, with governments providing less in traditional block grant funding and urging the higher education sector to be more competitive in attracting private sector finance and selling its services to business. In this climate of greater competition, the universities are increasingly asking themselves the question: How can we do better at exploiting the bright ideas that are being generated in our libraries, lecture rooms and laboratories and, where appropriate, bring them to the marketplace to the benefit of our economies as a whole?

At a time when both research investment and research outputs in the two jurisdictions have grown exponentially, the universities on the island, which are small by international standards, continue to have very different ways of delivering IP management and technology transfer. This report endorses the developments already taking place within the universities. The time has come to look seriously at how we might achieve significant added value by undertaking at least some of these activities collaboratively. In the US this has been happening for many years. In the UK groups of universities like the White Rose consortia and IP2IPO have come together on a regional basis to work with business and build knowledge transfer activities.

This report provides some clear signposts for mutually beneficial collaborative action between universities on the island of Ireland in this vital area, and outlines an implementation plan for how this necessary process might begin. Universities Ireland welcomes its publication and looks forward to working with other agencies such as Inter*Trade*Ireland and the Irish Universities Association in taking forward its proposals.

Iognáid Ó Muircheartaigh

Chairman, Universities Ireland
President, National University of Ireland Galway

EXECUTIVE SUMMARY

This feasibility study, commissioned by Inter*Trade*Ireland on behalf of Universities Ireland and the Irish Universities Association, examines the potential for collaborative activity in the area of Intellectual Property (IP) management and technology transfer by the universities on the island of Ireland. This report provides some initial recommendations on how the universities on the island, North and South, might work together to maximise the benefits of exploiting the output of their research activity and proposes mechanisms to achieve collaboration and co-operation.

The universities are an important element in economic development on the island, North and South. There has been significant investment in research in both jurisdictions and there is now a need to optimise the exploitation of the results of that investment in a consistent way. The environment in which the universities operate is undergoing considerable change and significant steps have been taken recently at both national and institutional levels in both jurisdictions to support and develop IP management and exploitation in the universities. As a result of this, and of their history, each university is at a different stage of evolution in its ability to undertake the exploitation. However, all face the need to exploit the research output successfully and all face particular, and similar, issues in marketing and selling technology and IP.

The data was collected by a series of surveys of institutions, Technology Transfer professionals and external stakeholders, plus consultative meetings with Technology Transfer professionals. A project Steering Group oversaw the project. More detail on the methodology is given in Appendix 1.

There are 2 core recommendations for the universities which are outlined overleaf. The detailed recommendations are provided in section 7 and are grouped around:

- Joint marketing
- Expert professional input into policy and strategy
- Training & entrepreneurship
- Campus company support
- Interaction with the Venture Capital community
- Accessing external professional services
- Shared expertise
- Technology bundling
- Single funding stream in Ireland[1]

Core Recommendations for Universities Ireland

1   Joint Marketing

- establish a strategy and policy task force on joint technology marketing, drawn from Technology Transfer professionals and appropriate communications professionals. The task force should have the remit to develop and cost a comprehensive marketing strategy, working with external stakeholders where appropriate.

This was recognised as the primary initial area for collaboration. Promotion of the university research base on the island, North and South, building on the expertiseireland.com website, can only be beneficial to the universities and to the economic growth of the island. This combined with support for market research would:

- Raise the profile and establish the position of the universities and the island as an R&D powerhouse
- Provide a vehicle for the marketing of technology, services and facilities
- Provide a common platform for addressing the multi-national company sector
- Improve the perceptions of stakeholders and the business community both on the island, North and South, and worldwide
- Inform policy by elucidating common strengths and positions
- Provide a common platform for lobbying policy development, particularly at European level on R&D and Innovation policy
- Facilitate technology take up from the research base by companies
- Enable technology bundling for marketing purposes

This group's remit would incorporate the more detailed recommendations in Section 7 of the report.

2   Expert Professional Input to Policy & Strategy

- establish a sub group of Universities Ireland comprising Directors to advise Universities Ireland and the VPs for Research & Innovation on IP management and technology transfer policy issues, with an agreed remit which would include matters at European level.

- agree the level of support to be provided to AURIL-Ireland, and the reporting mechanisms.

The expertise of the group would provide the practical professional advice required to inform policy and strategy developed by the VPs. Where an approach was required or a policy development occurred which applied to only one jurisdiction, this would be addressed by forming a sub-group on an ad-hoc basis.

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1   *Ireland refers to the Republic of Ireland.*

This sub-group would:-

- Advise the VP groups and thus the Presidents/ Vice Chancellors

- Act as the consultative point for all the external stakeholders on policy and process at all-island level

- Provide a formal consultative route through sub-groups for issues specific to Northern Ireland or Ireland

- Prohibit grounds for an oft repeated claim that universities were "picked off individually"

- Increase collaboration as the group activity evolved

THE WAY FORWARD: Implementation

This section provides the mechanism for the way forward, not necessarily the exact route to be followed to achieve the desired ends.

An implementation flow chart is provided.

1 The Vice-Presidents/Pro-Vice-Chancellors/Deans of Research (VPs) and the Directors meet in early 2006 to discuss and then agree the implementation and scheduling of the 2 core recommendations in this report that can be actioned by the universities and the phasing of the subsidiary recommendations. This should be part of what will become a regular series of meetings, ideally twice each year.
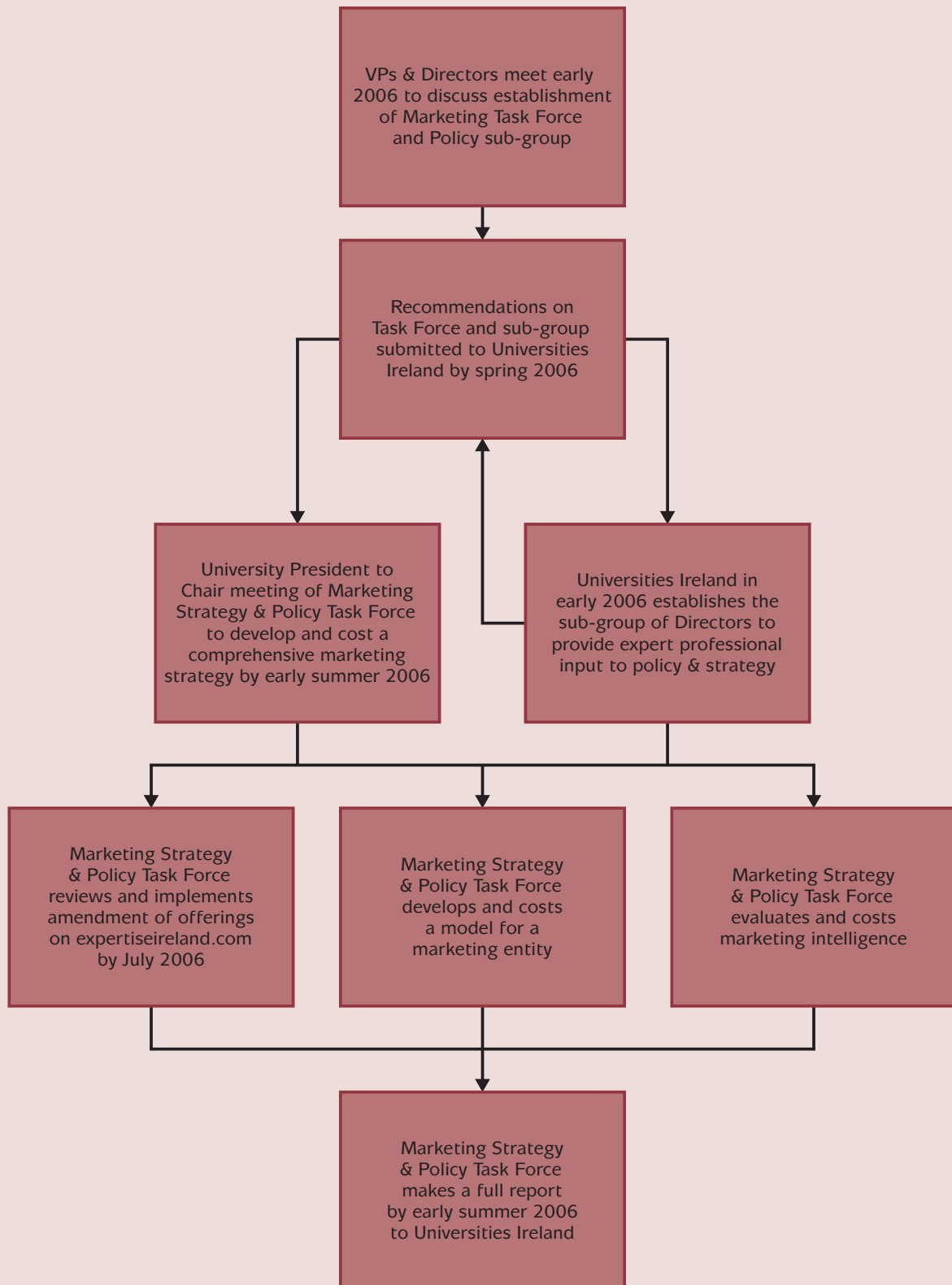
   Their decisions will be put to Universities Ireland as a recommendation, with details of the planned implementation and clear lines of accountability. The recommendation would identify those who would form the core marketing strategy and policy task force, advising the larger group of VPs and Directors on what steps and resources were required. The marketing strategy and policy task force should include:-

   - people with professional marketing experience (external relations, corporate communications and recruitment areas are obvious examples from within the universities, but there are others in external organisations who may have more directly relevant experience) who would be co-opted to provide professional advice and guidance.

   - those among the Technology Transfer professionals with responsibility for marketing technology – those 'on the ground'. Not every university would need to be involved at this level because arrangements for consultation would be put in place (see 2).

   - Ideally an external expert who might be seconded from an agency or from a commercial organisation. The universities may have marketing companies with which they work and whom they could recommend for this.

2 A university President/Vice-Chancellor should chair meetings of the marketing strategy and policy task force. The chair would provide regular reports on progress and bring forward to the VPs/Directors group any requirements for decisions on issues of principle.

3 The marketing strategy and policy task force should have the remit to develop and cost a comprehensive marketing strategy, working with external stakeholders where appropriate. Travel costs should be met by individual universities.

4 As a first step, before May/June 2006 the marketing task force should:

   a) review the current licensing offerings posted on the expertiseireland.com website and develop a common template for such postings, with a process for refreshing offerings. A deadline of late June should be set for populating the website in the template format.

   b) review available options for providing market intelligence and make recommendations by early summer 2006

   c) develop within the same time frame a costed proposal for a marketing entity to actively promote technology

5 The marketing task force should be required to provide a full report and a detailed strategy to the VPs and Directors group by early summer 2006.

6 Implementation and support for the marketing strategy should be agreed by Universities Ireland in time for work to start in autumn 2006. This will require early engagement, through parallel discussions led by the VPs and Directors, with external agencies which may support the establishment of the new entity. Ideally the new entity should be recruiting staff before Christmas 2006.

7 The same group of VPs and Directors should return to examination of the other recommendations in March/April 2006 with a view to establishing how these might be delivered and resourced. Again, a recommendation should go to Universities Ireland from this group.

8 Separately, in support of the recommendation to develop expert input to policy development, Universities Ireland should

   - establish a sub-group of all the Directors to provide advice and support, and to take forward the recommendations of this report

   - agree the level of support to be provided to this group and to AURIL-Ireland, and the reporting mechanisms.

The support could be put in place from the start of the 2006/7 academic year, or earlier if funding was obtained from external sources. A part-time secondment, that would act as a pivot for implementation of the recommendations in this report as well as supporting policy development and expert input would be appointed. This post could based in a host university, following the AURIL-UK model.

VPs & Directors meet early 2006 to discuss establishment of Marketing Task Force and Policy sub-group

Recommendations on Task Force and sub-group submitted to Universities Ireland by spring 2006

University President to Chair meeting of Marketing Strategy & Policy Task Force to develop and cost a comprehensive marketing strategy by early summer 2006

Universities Ireland in early 2006 establishes the sub-group of Directors to provide expert professional input to policy & strategy

Marketing Strategy & Policy Task Force reviews and implements amendment of offerings on expertiseireland.com by July 2006

Marketing Strategy & Policy Task Force develops and costs a model for a marketing entity

Marketing Strategy & Policy Task Force evaluates and costs marketing intelligence

Marketing Strategy & Policy Task Force makes a full report by early summer 2006 to Universities Ireland

Funding

The direct cost of implementing the recommendations is dependent upon the strategy agreed by the proposed task force. This would be facilitated by the employment of a fixed term post to support development of the strategy. It is proposed that this post should initially be for up to 12 months and should be undertaken as part of the work of AURIL-Ireland, as the specialists in the field, and funded through Universities Ireland and Inter*Trade*Ireland.

All the Technology Transfer professionals in Ireland consulted for this study emphasised that currently they did not have the staffing infrastructure nor the budgetary flexibility to undertake even minimal additional activity in the marketing area. This is despite the obvious benefits and potential cost savings in the longer term.

There is clearly a North/South misalignment in the funding of technology transfer/commercialisation on the island. The 2 Northern Ireland universities have a central government funding stream for their knowledge transfer and technology transfer activities through the Higher Education Innovation Fund (HEIF). Such a mechanism does not currently exist in Ireland. Technology transfer/commercialisation funding through the current phase of HEIF (2004 – 2007) amounts to approximately 3 per cent of the total research funding. This report recommends that a similar proportion of total R&D funding in Ireland is ring- fenced for this vital activity. If the HEIF funding levels for the universities in Northern Ireland were transferred, pro-rata, to the sector in Ireland, the funding for Technology Transfer (under the 2007-2013 National Research Plan) would be in the region of €7 million per annum, across the 7 universities. The funding required to support the collaborative marketing, and other activity recommended in this report, would come from this fund. There would need to be consideration of an additional collaborative fund for the Northern Ireland universities. This is because HEIF funds were allocated against specific projects and targets and this is already committed. A total of £50,000 per annum for the universities in Northern Ireland is an indicative sum.

SECTION 1

CONTEXT

Recognition of the importance of the role of university research in the development of the economy and the improvement of the quality of life is growing worldwide. As governments recognise this key role, particularly in countries where the industrial base is changing, or requires development, they have responded by enhancing support for the creation of knowledge in the universities.

That in itself however has proven to be insufficient to stimulate the necessary levels of economic growth. Research results are not translating as easily as expected into economic growth.

Therefore many governments have started to provide support through a variety of mechanisms to translate the results of that creative process into outcomes that benefit the economy and society. This process is known as technology transfer when it relates to the development of intellectual property which can be licensed to new or existing companies, or assigned to a new company as the cornerstone of its development, and as knowledge transfer when it relates to the provision of expertise and other services, including collaborative research.

On the island, North and South, the rate of change has created an environment that is in flux, to quote one stakeholder. Universities are struggling to keep up with the rate of change and the implications this change has for their role in the context of economic development. External expectations have changed rapidly, although most stakeholders are aware that the universities need time to change simply because they are large and complex organisations.

The engagement of the third level institutions, as a sector, with the industry base is not as effective as it needs to be to stimulate sustained economic growth, and is under-resourced to meet current and potential demand. This is particularly critical as other European countries, led by the UK, start to invest significantly at government and institutional level in knowledge transfer to create economic growth.

Research Funding Investment

On the island, North and South, the different jurisdictions have invested heavily in the research base in recent years.

The universities of Northern Ireland have been funded through recurrent grant for research activity, the quality of which is assessed periodically and the level of grant adjusted accordingly. This totalled £37 million in 2004-2005, a rise from £23.5 million in 2002-2003. In addition the Support Programme for University Research provided £90 million in the period 2001-2007, the Research Capability fund provided £3.2 million in 2004-2005 and the Science Research Infrastructure Fund will provide £26.3 million in 2006-2007. Over £40 million has been allocated through the 2 previous rounds of the SRIF. All figures are taken from the Department for Employment and Learning (DEL) Annual Report 2004-2005 (www.delni.gov.uk). This is enhanced by the award of grants gained from the UK Research Councils and other sources on a competitive basis. IP ownership of the outputs is clear in all cases, with the universities responsible for exploitation in return for retaining the benefits of such exploitation.

The universities in Ireland are funded through a recurrent grant for both teaching and research, with no direction on the level available to support research specifically. Funding comes from the Higher Education Authority (HEA) which also provides research support for recurrent and capital costs through the

Programme for Research in Third-Level Institutions (PRTLI) which was launched in 1998. That programme requires institutional strategies as a condition of award and also encourages inter-institutional collaboration in research. It has grown from the first phase of €206 million in 1999 to €320 million in the third phase which will end in 2006. In total the HEA funding for research (albeit across all the Higher Education sector in Ireland) grew from €53,297,130 in 2003 to €85,135,644 in 2004 (see the HEA Annual Report for 2004-2005 at www.hea.ie). In addition research funding is available from a number of funding agencies, including Science Foundation Ireland (SFI), Enterprise Ireland, the Research Councils, the Health Research Board and others. SFI funds work in the areas of ICT and Biotechnology and is currently investing over €100 million per annum in the universities, with the CSET programme (Centres for Science, Engineering and Technology) supporting collaborative research between academia and industry.

IP Management & Exploitation Support

In the last 5 years the research investment in Northern Ireland has been complemented by sustained, relatively stable, and increasing investment through the Higher Education Innovation Fund (HEIF) and investment from Invest Northern Ireland (Invest NI). In particular Invest NI has funded 18 Centres of Excellence, located either within universities or in businesses with strong linkages to universities, that focus on issues faced by industry, and that are generating IP for exploitation. In total £9.2 million has been provided through HEIF to the two universities in the period 2004-2007. The success of this funding will be measured by the success of the universities in developing and implementing strategies for knowledge transfer which support and reflect their individual missions.

Support for IP management and exploitation of the outputs of the increased investment in research in the higher education sector in Ireland has come primarily, for the universities, from their own resources. Ad-hoc support has been provided by development agencies, primarily Enterprise Ireland, but there has been no stable and sustained funding stream. As the research investment starts to produce results, the absence of appropriate funding to support the increased flow of outputs is causing problems which in turn could have a negative impact on economic development. As a result the situation in Ireland in particular is in flux as universities and development agencies start to respond to the challenges they face. Planning is now underway for implementation of a €300 million fund announced in the Budget of December 2005. Although details have still to be announced, it is intended to support change and improve the overall performance in the Higher Education sector and to encourage more co-operative working across the sector.

Moving Forward: Expectations and Possibilities

Research investment on the island, North and South, has led to findings that may have commercial potential and the availability of skills and expertise that can be used for economic benefit. Resources will be required to ensure that those outputs in whatever form become available to industry and to policy makers.

Much of the spend on the island, North and South, on IP management and technology transfer is by government agencies. However, universities in Ireland are starting to increase their own investment while those in Northern Ireland are funded now through a specific type of Higher Education Innovation Fund (HEIF) which allows the support of infrastructure. There is no single stream government funding in Ireland of the infrastructure required to undertake technology transfer as yet. In Northern Ireland the situation

is easier but still involves two funding sources, HEIF and Invest Northern Ireland. It is fair to say that overall across the sector there is limited resource available for these tasks in the universities and that in Ireland especially the available resource will not have the capacity to support the additional activity that is starting to flow from the research funding.

Nevertheless, the most effective systems of IP management and technology transfer worldwide depend critically on the initial identification and evaluation of the commercial potential within the universities, and require internal resourcing.

As the system in Ireland matures it will be crucial for the balance of resource to move from the central government agencies to the universities and for infrastructure resource within the universities to be increased to manage and effectively exploit the forthcoming IP. Across the island, North and South, the universities will have to take responsibility for their funding and their activity in line with their stated institutional strategies.

At present in Ireland the myriad funding arrangements for technology transfer, the lack of coherence across agencies and the shortage of dedicated resource under the direction of the universities are actively inhibiting both strategic exploitation of IP and exploration of collaboration. One unit reported 14 different funding streams for their activity; 14 different regimes for bidding, reporting and monitoring. The resultant paperwork must take more resource than delivery of the programmes on occasion.

Significant changes within the universities in Ireland are also leading to parallel structures within some universities as new management structures are put in place. This will lead to different terms and conditions being agreed on different deals because no single person is charged with ensuring consistency. The Technology Transfer manager has no oversight and no authority to define the parameters of deals. The end result will be confusion for the client and some may opt to work with other providers elsewhere in Europe who have clear terms and conditions applicable across the board. In addition, use of consistent terms and conditions would be expected to facilitate reaching beneficial deals and help avoid the other party negotiating unfavourable terms.

This issue will not be resolved by increasing resources from the agencies or by agencies working together in isolation from the universities. It was frequently commented that bidding for funding for core activity took more resource than delivering, and that often commercialisation decisions had to be referred to the funding agency for approval. This process took time, but more importantly it inhibits the development of commercial expertise and judgement within the universities who can rely, if they wish, on the external body to make decisions for them on the exploitation of their IP. This does not assist the system as a whole to mature.

Agencies understandably prefer to fund delivery of their own priorities and in some cases this is on a project by project basis. In Ireland there is no long term external funding stream for the infrastructure within the universities to support IP management and technology transfer. That in turn lowers its priority in the overall picture of university funding as senior managers within the universities focus on activities that do generate funding streams rather than project based funding. A lesser but similar situation pertains in Northern Ireland and indeed across much of England and Scotland because large amounts of funding are made available as a result of economic development strategies.

The universities must take some responsibility for the shortage of external funding. The agencies would welcome articulation of a series of measures that they would and could fund but, amid the major changes taking place in many of the universities, this degree of coherence has not been forthcoming from the universities at any level. This is not to say that individual universities are not developing coherent strategies, they are, almost uniformly, but what is needed is a sectoral approach. As with all activities, strategic planning in this area should be an integral part of university planning and reporting to the funding agencies. This is under consideration in Ireland and in place in Northern Ireland, but development of both systems would benefit from closer dialogue between the funders and the sector.

What appears to be needed is a more coherent longer-term funding route to the universities on the island, North and South, more resource within most of them at the operational end of the process and more accountability from them within a unified (within each jurisdiction) funding and reporting system.

This report suggests that a common position from the funders and agencies in Ireland on IP policy, process and mechanics is an essential prerequisite to increased collaboration.

SECTION 2

CURRENT ENVIRONMENT

2.1   Overall Findings From The Institutional Survey

The data collected provides clear support for the recommendations and conclusions and is presented in summary form here. It should not and cannot be used for comparative purposes.

Each university was able to produce activity data, albeit some were not able to produce complete details for the 2004-05 academic year at the time of survey (mid September 2005). All the institutions reported major changes in their approach to Intellectual Property and technology transfer; some prompted by internal drivers, others by external drivers which leveraged funding. Some are developing or have completed development strategies which support and enhance their stated missions and roles as universities. Others are at the early stages of that process. In every case however change is underway.

Each university has a different structure for delivery of IP management and technology transfer. Common models exist, usually around variations of the central unit versus wholly owned subsidiary companies. There is scope for discussion in the universities on the merits of the different models although ultimately each must work with the model that best addresses its own needs.

The different models need to be borne in mind in the context of the institutional survey when some answers were provided by wholly owned subsidiaries which have discrete roles and remits and some were provided by central units which have much broader roles and remits, and possibly closer links (by virtue of their remit) with other university sections.

Collaboration was not rejected in any responses as an option other than where the universities were in direct competition with each other. All the universities, however, and many of the stakeholders felt it was important to state that collaboration would arise naturally. Many of the universities pointed out that they would seek collaboration with excellent institutions wherever those were; that quality would be a factor in any collaboration they undertook. Most were referring to research activity in this context but the same principles apply to the delivery of IP management and exploitation.

Issues were arising as a result of the changing environment and the uncertainty that created. Communication and consultation between funders/stakeholders and universities and within the universities did not appear to be as clear as it could be. This has created a degree of insecurity and defensiveness, particularly as Technology Transfer professionals attempted to reconcile their historic resource levels with changing university expectations, and their understanding of changes in funder expectations. This is particularly evident in Ireland, but there was Technology Transfer professional evidence from Northern Ireland that more clarity on the knowledge transfer strategy would be welcomed.

A further complicating factor in Ireland is the funding mechanisms. Although funders are in discussion (as at October 2005) to synchronise their contractual arrangements, the administration of bids for support and the fragmented approach to providing this support creates enormous pressure on the limited resources that exist in the universities. Alignment of the processes, expectations and reporting requirements of the funders in Ireland will be a major step forward in cutting the administrative burden on the universities, but the process needs to involve the universities. All the partners in the system are required to be engaged in order to drive the optimum outputs from it. (See recommendation 7.9)

The reported outcomes in Table 3 (page 13) from research funding are on an upward trajectory, but in Ireland the raw data showed that the resources to support exploitation are not being provided on a cost effective basis or on the basis of the actual outcomes. While it is understandable and helpful that agencies have provided support as and where they saw a requirement, it may be that the situation has matured to a point where a complete review of all the support mechanisms is required and more control given to the universities. This would be on the basis of both the evidence and the development of a strategy and acceptable outputs. It should be understood by all that investment will take time to produce results, but if the strategy is effective evidence will be available of those outputs coming through.

On funding, some universities declined to provide an indication of costs in the survey. Others, however, were unclear about costs and about available budget. In part this is attributable to the multiple funding sources, especially in Ireland, but budgeting and costing systems within the university may also contribute to this uncertainty.

The trends in the outcomes were encouraging, although the interaction with companies through collaborative research was much lower in Ireland than in Northern Ireland, where one university reported two thirds of the reported total for both collaborative research and consultancy contracts.

The robustness of the figures in these categories does need to be tested for universities in Ireland. If they are approximately accurate, the government agencies charged with economic development may wish to engage with the universities to examine ways to enhance interaction with indigenous companies. The obvious question is where, if at all, companies in Ireland are obtaining the relationships and developments that will support their growth.

On other activities it is clear that the investment in Ireland is producing IP. This is producing more disclosures, patent filings, license deals and license income. In addition the level of conversion from patent applications to patents licenses was on the global norm of approximately 10 per cent, even allowing for the inevitable time lag in completing license arrangements. Marketing of this technology must be a priority. (See recommendation 7.1)

Spin-out numbers are also increasing. The big issues reported by institutions were all around the need to align policies, funding mechanisms and communication across and within agencies, funders and universities.

In answer to a query about the potential for collaboration universities reported possibilities in:

Technical Areas

- technology assessment / evaluation
- marketing technology
- seed funding for campus companies
- patent costs

People

- policy influence & development and lobbying in concert
- sharing expertise on an informal basis

It was felt that the greatest benefits from collaboration would be in marketing and in the presentation of a 'joint front' in relationships with organisations of all kinds outside the island. (See recommendation 7.1)

2.2 Detailed Analysis of Knowledge Transfer Activities

2.2.1 Knowledge Transfer Activities Undertaken by the Universities

Several respondents, who were identified by their comments as active in the management of IP and technology transfer, were also heavily involved in supporting academic development activity which was not directly related to their core activity. This included activities such as visits from overseas universities or from external bodies.

The reported breakdown of core activities is detailed in table 1.

TABLE 1:
KNOWLEDGE TRANSFER ACTIVITIES UNDERTAKEN

ACTIVITY	NUMBER OF UNIVERSITIES DELIVERING
Research & development support	4*
Contract management	6
Training & awareness of staff/students	3 of which 1 also trained companies
Industrial Liaison / Marketing resources & expertise / Business development	6
Patenting	5
Commercialisation & IP Management a) Licensing	8
b) Company formation & development	6
Policy responses to & liaison with external agencies	3

Source: Institutional survey
*the other 5 had classified this as Contract Management and 1 university reported under both categories

2.2.2 External Environment Issues that Impact on Knowledge Transfer Activity

Many responses here were extensive and detailed, demonstrating strong awareness of the factors which were having an impact and of the type of impact generated. Most referred to the increasing demands from government not being matched by resources. Several reported the benefits of the Enterprise Ireland staff placed in universities. Many, including a respondent from Northern Ireland, commented on the lack of clarity and long-term planning at government and institutional level which resulted in funding being provided on a short-term or project specific manner.

However, the external issues reported and the impact of these was not always, nor even predominantly, seen as being negative. It appeared to be the variety and proliferation of support initiatives, along with some of the management issues around funding, that was causing problems, not the objectives of the initiatives.

The comments are best summarised as follows:

"Numerous increased activities are placing extra workload within the office yet there are few, if any, mechanisms to increase internal resources"

The main external issues identified were:

- Nascent government strategy on knowledge transfer and commercialisation.
- Government commitment to meeting the targets set out in the Lisbon Agenda.
- Significant increase in funding for university research is resulting in a strengthening of the research infrastructure (mainly PRTLI and SRIF) and expertise (mainly SFI in Ireland).
- Government commitment to attracting overseas investment in R&D is generating increased opportunities for universities in collaborative research with multinational companies. The negotiation of these contracts raises issues for university Technology Transfer offices regarding the strategic use of university intellectual property.
- Despite many reports highlighting the need for increased resources to be made available to university Technology Transfer offices, no significant public funding has been provided.
- Unreasonable expectations regarding the timescale involved in commercialising university research, particularly in the life sciences.
- Shortage of seed funding for new ventures.
- Development by the Irish Council for Science, Technology and Innovation of the National Code of Practice for Management of Intellectual Property arising from Publicly Funded Research (similar code for university intellectual property arising from jointly funded research is now available).
- Public policy objective of attracting multinational companies to perform R&D in Ireland appears to favour these companies obtaining institutional IP on very favourable terms. This is not explicit policy, but it renders negotiation on an equitable basis difficult for the Technology Transfer manager, who has a duty of care to his Institution and inventors.
- Many external decision makers have no direct experience in the profession and tend not to appreciate some of the crucial issues which impinge on their objectives or their view of the technology transfer world.
- Agencies are seeking to have international best practise applied by the Technology Transfer professionals, but are not providing concomitant resources whilst having high and unrealistic expectations for rapid outcomes.

One respondent reported market demand for technology as an issue:

"Massively successful government agencies are marketing the country with relatively low level of follow-on execution plans that encompass the proper use of local expertise, infrastructure, or linkages."

"Low level of acceptance of offers to collaborate on technology transfer in Ireland"

2.2.3 Organisation and Support for Knowledge Transfer

In the responses to this question the difficulties faced by universities in Ireland became apparent as they collected all the data on funding. For those in Northern Ireland the funding, and its allocation, was much clearer and they could state "HEIF and block grant" against every category.

It would be useful for every university to establish and publish a clear organogram of responsibility and accountability for knowledge transfer. This would assist academic staff, but might also highlight anomalies which needed to be addressed in management structures. Most importantly it would enable external organisations to approach the correct contacts.

The responses varied in their complexity, but this did not necessarily reflect the size of the university. It should be remembered that universities with fewer than 3 staff engaged in knowledge transfer are often delivering the same – or an even greater - range of activity as those with 15-20 staff.

Allocation of staff resource to an activity reflects university priorities. This can be seen most clearly in the level of resource reported by some universities for support of research funding and contracts. Some responses indicated that a core group undertook several activities, prioritising their own workloads to ensure coverage. Others were able to directly attribute individuals, or elements of individuals, to specific activities. Thus some would report '3' under several activities which were undertaken by a core group of 3 people while others allocated elements of each person to the task, giving a '0.X' response as a consequence.

Limited data was returned on the level of budgets. This can be viewed as a competitive area and as such a reluctance to provide detail is understandable.

In the table below the range of responses is given for each aspect of the knowledge transfer role. 'Main Office' includes those wholly-owned subsidiaries established to undertake a wide range of knowledge transfer tasks on behalf of the university. Several respondents differentiated between tasks carried out in the PVC or VP for Research office and the 'Main Office'.

TABLE 2:
ORGANISATION AND SUPPORT FOR KNOWLEDGE TRANSFER

KNOWLEDGE TRANSFER ROLE	PART OF ORGANISATION	RANGE OF NO. OF STAFF (FTES)‡	FUNDING SOURCE
IP Management	Main Office	1.8 – 5	University/ HEIF/EI
Funding		0.1 – 8	University/ HEIF
Research Administration/ Contract Management	Main Office/ Finance Office	0.7* – 30	University/ HEIF/EI
Reach Out/Business or Community Connections	Main Office/ VPs Office	0.4 – 20	University/ HEIF/ Industry
Programmes with External Organisations	Main Office/ VPs Office	0.2 – 3	University/ HEIF
Commercialisation Management & Support	Main Office	0.8 – 8	University/ HEIF/EI
Consultancy Process	Finance Office/ Main Office	0.3 – 2	University/ HEIF
Incubation/Spin-Outs/ Science Parks	Wholly owned subsidiary/ Main Office	0.2 – 3	University/ HEIF
Innovation/New Ideas/ New Knowledge Management	Main Office	0.2 – 3	University/ HEIF
Post-incubation Support	Main Office/ Wholly owned subsidiary	0.4 – 3	University/ HEIF
Project Management	Main Office	0.2 – 3	University/ HEIF
Marketing/Promotion	VP Office/ Main Office	0.2 – 8	University/ HEIF
Technical Support/IT	n/a	0.2	University
Training of Researchers	Main Office/ VP Office/ Graduate Office	n/k – 4	University
Other (please specify)	No responses		

Source: Institutional survey
‡Full Time Equivalent: see section 2.2.3 for discussion of how staff were recorded
*Some included post-award administration, others did not.

2.2.4 Knowledge/Technology Transfer Activity Levels

Data collection is not undertaken routinely in the same way as it is in the UK, although the universities in Northern Ireland do provide data for the UK's Higher Education – Business Interaction Annual survey. Due to the timing of the survey no university was able to provide a full return for 2004-2005.

The table below gives a consolidated picture of activity as it was reported in August/September 2005. Most activity was evenly spread pro-rata across the universities. The exception was the reported industrial funding of consultancy and research, where the universities in Northern Ireland are clearly more active. The different economic environments were not explored and it may be that there is a deeper tradition of the universities in Northern Ireland working with industry, and with specific types of industry, but it cannot be attributed solely to the development of the HEIF funding in Northern Ireland. That funding may have enhanced what already existed in those two universities, but a robust base of activity must already have existed to be showing such results now. The type of activity must have built up over many years. If the universities were willing to share good practice, and the universities in Ireland had the resources to staff the activity and to maintain accurate records, this could be a fruitful topic for sharing knowledge.

However, there is no doubt that simpler funding arrangements for Northern Ireland do make it easier for those universities to develop and maintain activity. This should be looked at as a model for Ireland. (See recommendation 7.9)

TABLE 3:
KNOWLEDGE/TECHNOLOGY TRANSFER ACTIVITY LEVELS

ACTIVITY REPORTED	2002-2003	2003-2004	2004-2005 (INCOMPLETE)
No of new license deals established	12	13	18
License Income (€ '000)	420	605	840
No of spin-out companies formed using institutional IP	15	23	4
No of patents applied for	88	110	126
No of patents granted	12	24	16
No of patents used in commercialisation deal (licensing/spin-out)	9	13	16
No of new collaborative research contracts with industry	171	208	79
No of new consultancy/ knowledge transfer activities	307	344	14
Source: Institutional survey			

2.2.5 The Current Process for Commercialisation

All the respondents described well defined processes for invention identification, evaluation, protection, valuation and exploitation. Some used schematic presentations while others were text based, but all were clear. As mentioned elsewhere, the dominant models are either to have the activities in a central unit or to place IP management and exploitation in a wholly owned subsidiary. There are variations on these themes but the important point is for each institution to have clear management structures and reporting lines which are widely understood and followed.

Support for spin-out companies after formation was one major area where models varied. This would appear to be an area where collaboration would be beneficial but it would require clear policy decisions from the universities about providing support to companies after incorporation (see recommendation 7.4). Elsewhere in Europe there are mixed signals regarding spin-out company support, with many universities, especially in Scotland and England, being unwilling to provide company support services after incorporation.

One area of weakness was in valuing technology, where many universities rely on external assistance or allow the market to set the value without themselves undertaking market research into the potential norms for deals in the target sector. This is an area that all Technology Transfer professionals agreed could and should be strengthened.

2.2.6 Use of External Expertise

Of the 7 responses to this question, 1 institution interpreted the question to refer to geographic areas and responded with a list of global regions where they used external advice. The others interpreted it as areas of technical expertise and responded accordingly.

All used external patent advisors, and 2 indicated that they would use different patent companies for different technical areas. Two reported the Enterprise Ireland Patent Fund support under this question.

Three reported use of external legal advisors, with 2 using the same firm in Ireland. When asked about market research or technology valuation, 1 reported using external support for market research and commercialisation strategy while 3 reported using multiple advisers, including Enterprise Ireland's Biotechnology team, for technology valuation.

2.2.7 Collaborative Technology Transfer Activity across Universities on the Island of Ireland

The institutions were asked about the benefits of collaboration within different areas of technology transfer activity. The respondents indicated that the added value was in sharing the experience with colleagues in other universities – working together on projects. (See recommendations 7.6 and 7.7)

The Atlantic University Alliance is seen as adding practical real value, particularly as a marketing vehicle. It is clearly one of the strongest collaboration mechanisms reported in the arena of technology transfer while academic collaboration in research remains the strongest overall.

Several universities added other categories of collaborative activity such as:

- SME support (marketing resources through the Atlantic University Alliance)

- MSc in Technology Management (marketing joint programmes through the Atlantic University Alliance to an industrial audience)

- Membership of the Technology Transfer Initiative

- Exchanges of experience in innovation through the PANEL PAXIS programme

- Professional development through AURIL and the Institute for Knowledge Transfer

- National Institute for Bioprocessing Research and Training (NIBRT) for research and training in bio-processing

TABLE 4:
CURRENT COLLABORATIVE ACTIVITY ON THE ISLAND OF IRELAND

TYPE OF COLLABORATION	UNIVERSITY/IES	DRIVER	ADDED VALUE OF CO-OPERATION
Licensing of joint IP	Multiple-no evidence of exclusive strategic linkages outside the Atlantic University Alliance	Joint ownership of research projects, i.e. the drivers were the academic networks	Sharing experience
Company creation	Occasional	Joint ownership of IP from research projects	Sharing experience
Joint development project with commercial potential	Multiple-usually including industry partners	Joint ownership or participation in research projects	Sharing experience
Source: Institutional survey			

2.2.8 Collaborative Technology Transfer Activity with Universities Elsewhere

Reported activity was not extensive in this category, and was restricted to England, Scotland, Wales, Canada, Australia and Italy. Some expertise in training staff in offices was bought in from the US, but European sources were also used for this.

Under 'Others', one university reported networking and providing professional development expertise through membership of ProTon, the European knowledge transfer network. The same university was the only one to report membership of the Association of University Technology Managers (AUTM) and of AURIL.

TABLE 5:
CURRENT GLOBAL COLLABORATION ACTIVITY

TYPE OF COLLABORATION	UNIVERSITY/IES	DRIVER	ADDED VALUE OF CO-OPERATION
Licensing of joint IP	Responses were either very specific featuring 1 or 2 universities on specific projects but 1 from Ireland did report multiple collaborations with the UK	IP arising from EU R&D projects	None reported, other than financial benefits
Company creation	No collaboration reported		
Joint development project with commercial potential	EU R&D projects were the main activity in this category, but were reported by only 2 universities.	Academic networking	Research collaboration and funding
Source: Institutional survey			

2.2.9 Potential Areas for Future Collaboration

There are competitive areas where it would not be advisable to collaborate, but these do tend to be more on the research and funding aspects rather than on exploitation. The Technology Transfer professionals could readily identify areas where there would be real added value in collaboration.

Responses varied from 'would like to think so' to more thoughtful short contributions. None of the universities engaged in developing campus companies proposed sharing experience or collaborating as an option, but seed funding was suggested.

All of the responses were supportive of collaboration and the following areas were proposed:

- Marketing/bundling of technology and feedback from market
- Technology assessment evaluation
- Patent protection and infringement costs
- Campus company seed funding
- Increased use of the Enterprise Ireland managed Enterprise Platform Programme

- Stronger links with the Institutes of Technology
- Training in technology transfer and awareness raising
- Expertise sharing (currently informal) on knowledge transfer
- Joint lobbying
- Template/best practice sharing
- Joint marketing at a promotional level, e.g. the expertiseireland.com portal.
- Training seminars for academic community, (campus company, case studies, IP, patent, business planning, IP management in research, etc)

However, one respondent pointed out that:

"We collaborate with IDA and Enterprise Ireland in recent strong efforts they have initiated to involve universities in their programmes. They involve us in itineraries, focused meetings with industry sectors and overseas clients seeking technology transfer activities. We have no money to fund such collaborations. Independent collaborations are hard to execute given the frequent indifference of the state agencies and all-island agencies to initiatives that they do not front."

2.2.10 Case Studies

Respondents were asked if their institution produced case studies around knowledge transfer to illustrate their activity. Only 1 did produce such case studies, responding as follows:

'We do produce case studies for our entrepreneurship and IP workshops. These are based on our own local experiences blended with some other examples and disguised'

One other institution had used short examples in papers given at conferences and in internal reports but not for promotional or illustrative purposes with a wide audience.

2.2.11 Other Comments

Respondents were given the opportunity to make any other comments they felt appropriate. Two institutions responded to this question in the context of the survey, 1 to indicate that they would develop their systems organically:

"based on best practice models which are aligned to the university's operational structures. This would indicate that there is good internal communication and understanding of shared objectives between the university senior managers and others in the institution."

Other comments supplied and further discussions gave rise to one specific recommendation that perhaps is outside the scope of this study but which would assist development of collaborative activity – the development of a single funding stream in Ireland to support commercialisation activities.

A relevant comment is quoted below:

"Universities and their staff are thus now expected to take on much broader and additional functions, but this does not appear to be recognised at the policy making level of the State and it's various organs. In my view there is a need for a root and branch re-think on how this system is to be developed, implemented, structured and financed into the future. The current system seems to me to be extremely 'top heavy' in terms of planning, finance and expectations.

We suggest that it may be worth considering supplementing commercial research project funding and research commercialisation support funding and systems so that strategic planning and co-ordination can take place at the Institutional level. Universities rely essentially on 'Block Grant' funding from HEA – for their 'educational role' and, within that budget they can properly plan according to their own educational mission requirements – within those limits. Why can we not do something similar for the 'new' role being demanded of universities viz: – economic development through knowledge transfer?

One suggestion for consideration would be provision of a realistic 'Institutional Block Grant' for third leg activity, funded by the relevant Government department (possibly DETE) and set against a five year plan with appropriate and agreed objectives, milestones and targets and set in the context of the current National Research Budget and the National Plan for this activity, its aims and objectives as well as those of the relevant State Agencies."

SECTION 3

PROFILE OF THE SECTOR

3.1   Category of Technology Transfer Post

The findings here were encouraging, reporting a significantly higher proportion of permanent posts than is the norm in Scotland, England and Wales. This should encourage employers and employees to invest in long term career planning within the institution because of the ability to promote staff. It should also encourage the development of training programmes to facilitate new activities. A significant number of staff are secondees. A willingness to share resources is therefore apparent. The impact on staff motivation was not clear however and neither was the flexibility of the employment system within the universities in order to align job descriptions and targets with strategic needs.

FIGURE 1:
EMPLOYMENT STATUS OF TECHNOLOGY TRANSFER PROFESSIONALS

Category of Post (%)

Seconded 17%
Fixed Term 25%
Permanent 58%

Source: Technology Transfer Professionals Survey
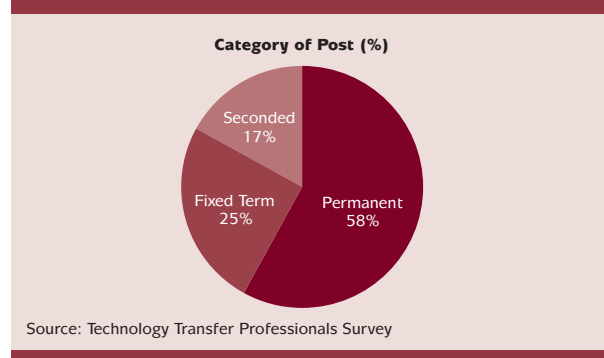
3.2   Formal Qualifications of Technology Transfer Professionals

The breakdown by qualification illustrates an emphasis on science qualifications, although a few had business related qualifications. This would suggest that many Technology Transfer professionals understand the technology but may not have the necessary skills on appointment to exploit it through striking deals.
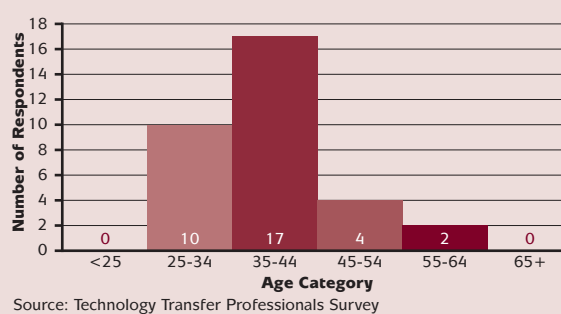
- 97 per cent hold primary degrees. Of these, 8 are business related and 24 are science and engineering related.

- 45 per cent hold Masters degrees. Of these, 8 are in business related areas (MBA, Innovation, Technology & Technology Management and Public Policy) and 7 are scientific.

- 44 per cent hold PhD level qualifications. All are science based, except 2 which are business related.

Additional courses and seminars related to knowledge transfer have been attended by many participants and delivered by a range of providers, including JIT, IMI, PRAXIS, SCITECH, ASTP, AURIL and Cranfield. From the responses, continuing professional development through attendance at courses and seminars does not seem systematic. (See recommendation 7.3.3)

3.3   Age Profile of Technology Transfer Professionals

The age distribution of staff indicates that there should not be a significant risk to continuity of operations as older staff retire. Although the age profile itself is reasonably balanced, this does not reflect involvement in technology transfer and IP management for these Technology Transfer professionals' working lives. The findings here, coupled with those on the experience of Technology Transfer professionals, suggest that measures should be taken to ensure those under 45 have the skills to move up and fill the places that will be vacated. Efforts will be required to fill this skills and experience gap in the very near future, with a particular emphasis on management and strategy skills.
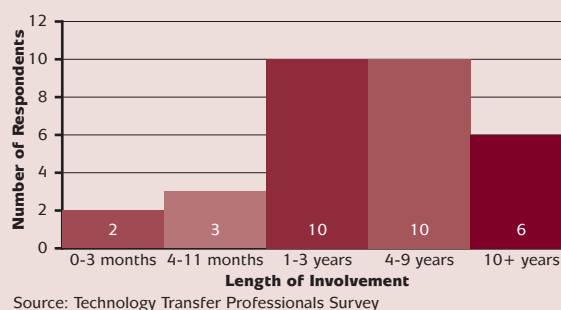

FIGURE 2:
AGE DISTRIBUTION WITHIN TECHNOLOGY TRANSFER ROLE

Number of Respondents (y-axis: 0 to 18)

Age Category	Number
<25	0
25-34	10
35-44	17
45-54	4
55-64	2
65+	0

Source: Technology Transfer Professionals Survey

3.4   Length of Involvement in Technology Transfer and IP Management

The profile of length of involvement in knowledge transfer activities is positive, with a good distribution of experience amongst staff. The number of staff with 4 or more years of experience indicates significant expertise that could benefit the less experienced staff through more formal mentoring and sharing of good practice. Greater levels of practical industrial experience would merit encouragement.

FIGURE 3:
LENGTH OF INVOLVEMENT IN KNOWLEDGE TRANSFER ACTIVITY

Number of Respondents (y-axis: 0 to 12)

Length of Involvement	Number
0-3 months	2
4-11 months	3
1-3 years	10
4-9 years	10
10+ years	6

Source: Technology Transfer Professionals Survey

3.5 Training Requirements

Respondents were asked to rank the importance of skills, with 1 ranking as not important and 5 as very important. Reports here indicated that more formalised training analysis would be welcomed. The survey findings indicated that training was delivered mainly through seminars/short courses and that it appeared to be ad-hoc rather than formalised (see recommendation 7.3). It was not clear how training requirements were reviewed or how training strategies might be linked to the availability of forthcoming courses.

3.5.1 Identification of Generic Skills & Training Needs

Of the 21 generic skills listed, the table below shows the skills ranked 4 or 5 on a scale of 1-5, with corresponding training requirements.

TABLE 6: RANKING OF GENERIC SKILLS	
GENERIC SKILLS RANKED AS IMPORTANT OR VERY IMPORTANT	**IMPORTANCE OF FURTHER TRAINING 1 = not important 5 = very important**
Research	3
Organisation & Co-ordination	3 / 5
Oral & Written	3
Meetings	3
Customer Relationship Management	4
Editing & Precis Writing	2
Team Leadership/Team Working	3 / 4
Negotiation	5
Listening	3 / 4
Obtaining Feedback	3
Conflict Resolution	4
Planning & Time Management	4
Business Planning	5
Business Development & Selling	5
Facilitation	3
Problem-solving & Decision Making	5
Quality Control	3
Networking	5
Project Management	3
Source: Technology Transfer Professionals Survey	

Key areas for further training as identified by participants are therefore:

- Organisation & Communication
- Negotiation
- Business Planning
- Business Development & Selling
- Problem Solving & Decision Making
- Networking

Secondary Priorities are:

- Customer Relationship Management
- Team Leadership/Team Working
- Listening
- Conflict Resolution
- Planning & Time Management

3.5.2 Identification of Knowledge Transfer Skills and Training Needs

Of the 21 specific knowledge transfer skills listed, the table below shows the skills ranked 4 or 5 on a scale of 1-5, with corresponding training requirements:

TABLE 7: RANKING OF SPECIFIC KNOWLEDGE TRANSFER SKILLS	
SPECIFIC KNOWLEDGE TRANSFER SKILLS RANKED AS IMPORTANT OR VERY IMPORTANT	**IMPORTANCE OF FURTHER TRAINING 1 = not important 5 = very important**
Business Networking	5
Brokerage	3
Commercialisation Techniques	5
Costing & Pricing	3
Deals & Decision-making	4
Finding/Engaging with Business	5
IP Protection and Management	5
Knowledge Transfer Management in Practice	5
Knowledge Transfer Management	4
Licensing	5
Joint Ventures	3
Research Contracts & Management	2 / 3 / 4 / 5
Spin-offs and Start-up Creation	5
Post-creation Support to Spin-outs	3
Technology/Knowledge Exploitation	5
Valuation of Technologies/Businesses/IP	5
Source: Technology Transfer Professionals Survey	

Key priorities for training are therefore:

- Business Networking
- Commercialisation Techniques
- Finding/Engaging with Business
- IP Protection and Management
- Knowledge Transfer Management in Practice
- Licensing
- Spin-offs and Start-ups Creation
- Technology/Knowledge Exploitation
- Valuation of Technologies/Businesses/IP

Secondary training priorities are:

- Deals and Decision Making
- Knowledge Transfer Management
- Research Contracts & Management

In addition, respondents also indicated that training was very important in Funding Management including Sources (ranked 3 out of 5 in importance) and Law Governing Knowledge Transfer (also ranked 3 out of 5 in importance).

3.6 Key Success Factors (Based on Recorded Institutional Strengths and Weaknesses)

Respondents were asked to identify the critical factors that in their view increased the likelihood of successful exploitation, and conversely, if lacking, inhibited success. They reported in order of priority:

- Top level support: strategy, priorities, direction, co-ordination, culture
- Process: clear, simple, flexible, consistent across Institution, budget issues
- Staff: resources, clear roles, training (academic & knowledge transfer), communication & networking
- Engaging with industry: marketing, promotion, identification/matching industry needs, networking, selling
- Research: strong base, Centres of Excellence, trained/informed academics, shared & contract research

Breaking these down:

Top level support

- Clear and consistent Institutional strategy
- Clear priorities
- Direction and co-ordination across Institution
- Co-ordinated response
- Open and supportive culture
- Dedicated human and financial resources
- Appropriate infrastructure
- External reputation
- Links to external organisations
- Marketing & branding

Process

- Clear, simple, and flexible
- Clear goals and targets

Academic staff

- Awareness raising and training in knowledge transfer principles and process
- Industry links & programmes
- Strong research base
- Shared and contract research
- Centres of Excellence
- Rewards and incentives

Knowledge transfer staff

- Dedicated staff
- Co-ordinated response
- Proactive attitude
- Strong internal team with clear roles, responsibilities and goals
- Engaging with industry, networking
- Selling
- Managing pipeline
- Marketing, promotion and branding
- Identification/matching industry needs

SECTION 4

OPPORTUNITIES FOR COLLABORATION

Preliminary findings from the surveys were discussed with Technology Transfer professionals. The potential for collaboration in the three areas which had been highlighted in each of the surveys was discussed. These were:

- Marketing

- Collaboration in training

- Collaboration across universities in IP management and technology transfer

4.1   Joint Marketing

"Marketing would be good."

The immediate benefits of a joint marketing strategy were apparent to all the Technology Transfer professionals, who recognised that no one institution could carry the overhead costs associated with a full marketing plan for its technology.

Alongside this practical consideration was an awareness of the strength of the brand if all the universities worked together, and an awareness of how any marketing would raise the profile of the universities with the general public as well as with industrial and commercial clients and other stakeholders.

The Technology Transfer professionals discussed various objectives that could be met though the mechanisms of a common marketing strategy, including market research as well as marketing and promotion. They felt that industry sought a single point of contact for access to the universities. Some institutions aspired to a form of relationship management with strategic partners from industry who were funding students and research or development and employing graduates.

The holistic approach, known as 'outreach', had always appeared too expensive for any one university but by working together overheads could be reduced and the benefits maximised.

It was not clear how many of the universities had defined marketing strategies to foster student and staff recruitment and generate additional income, but most did not appear, from the reports of the Technology Transfer professionals, to include relationships with industry in any such strategy, if it existed.

An obvious starting point was the expertiseireland.com website which was supported by all the universities but needed to be:

- populated with content that marketed the expertise in understandable terms

- populated according to a template for entries i.e. in a standard format

- maintained and refreshed

- marketed globally (successful marketing in the USA was commented upon)

- owned by the universities, in terms of allegiance rather than actual ownership and responsibility for costs.

The Technology Transfer professionals were aware of the technology marketing section but few had used it, with some citing the difficulties of finding resource to 'clean' disclosures as one reason for this. The comment was made that "Patented IP is often very rare on the site. It is used to attract more research funding rather than being exploited". (See recommendation 7.1)

It was not clear whether all understood that marketing technology would require rather more than sanitised disclosures to attract interest through the expertiseireland.com website. All supported the separation of technology marketing on the website from expertise marketing, as is the case with the current structure. (See recommendation 7.1)

Many commented that with the active marketing of such a portal the onus would be on the universities to differentiate their offerings in order to attract attention, but this was not happening at present. Such a portal would also strengthen the brand and the opportunity to market jointly developed technology in a non-competitive way.

A core recommendation from one group of Technology Transfer professionals was a joint marketing entity, university controlled and run, to actively promote technology. (See recommendation 7.1.3)

Other marketing vehicles were explored, including the similar development of www.biotechnologyireland.com and the application of technology showcases.

Other themes that ran though discussions with the Technology Transfer professionals included the need for a common format to communicate with industry to ensure accessibility to the required expertise or technology without confusion; joint marketing materials; and marketing materials that reinforced the 'island of Ireland' brand by being explicitly within the same design stable. However, there are inevitable reservations around such a brand and consideration would have to be given to adopting a brand for the island that was acceptable in both Ireland and in Northern Ireland.

It was reported that the University of Ulster, Queen's University, Belfast and the Further Education sector in Northern Ireland have a marketing group developing a brand.

Market research was raised as a requirement that was not being met within existing resources. Technology Transfer professionals commented that to work with local industry they needed local market knowledge, while for industrial players on the national and international scene they needed support in finding international industry who would be interested in their technology.

It appeared that none saw it as part of their role to find markets for their technology or to develop in-house skills to do so. This will be a major problem in finding deals as the results of the research investment in Ireland come on stream and features as a significant training need, alongside deal-making, for exploitation skills. (See recommendation 7.1)

4.2   Collaboration in Training

4.2.1 Technology Transfer Professional Training

The majority of Technology Transfer professionals believed that they were undertaking effective training needs analysis, albeit informally in many instances. Staff are set targets and are assessed against these on a day-to-day basis. This flexible approach facilitates change as knowledge transfer activities evolve. Formal appraisal systems were not in place in most universities and the norm was for on-the-job feedback. It was also reported that those that had a Board or a body to which they reported had more targets and reporting, but also more structure to their activity.

There was general agreement that provision of training for Technology Transfer professionals in specialist or technical aspects of the role in Scotland, England and Wales was easily accessed

and of a high standard and that resources should not be used to replicate that. Resourcing attendance at these courses did not appear to be an issue.

It was reported that attendance at free courses delivered locally was not good, possibly as Technology Transfer professionals and researchers felt that they need not attend a course for which they had not paid, or that they should not sign up because anything with no cost would not be of acceptable quality. There was nevertheless a belief that:

- there were gaps which could be met by pooling resources to buy-in expertise on specific topics at advanced levels

- a basic induction programme could be developed for staff joining offices, partly to enhance their expertise but also to ensure that they networked with colleagues in order to share, and to access, knowledge

- more could be done to share evaluation of the providers and their offerings in both the UK and Europe

4.2.2 Entrepreneurship Training

The need for specific entrepreneurship training for researchers and students was recognised and many Directors reported that they had established programmes in place, or viewed the development of such programmes as a priority, though primarily for research staff.

All recognised that the facilitation or delivery of training to research staff would raise the profile and credibility of the Technology Transfer office. However, in-house training of researchers and students was time consuming and the level of duplication of effort was recognised.

The Enterprise Ireland initiative in this area was praised and the concept of the Enterprise Ireland provision being rolled out for delivery across the island as a road show was well supported. This would allow consistent standards to be delivered locally with the support of the Technology Transfer office.

The idea of a closed membership intranet of training resources and debate was proposed by several Technology Transfer professionals. There would appear also to be scope for a sharing of thinking about the development of both ad hoc and formal award-bearing courses. Input into entrepreneurship training from academics who have Technology Transfer experience would be beneficial to provide the theoretical grounding that is required for such programmes. (See recommendation 7.3).

4.3 Collaboration across Universities

The advantages of all the universities working together were commented on favourably as allowing them to "join the dots" and to present a united front which has real critical mass. Lack of time and resources were identified as the major inhibiting factors and several Technology Transfer professionals commented that they had met more frequently in the past, but now there were many who did not know of others undertaking similar roles in other institutions. This inhibited the spread of knowledge and expertise and in some instances will have encouraged an introverted and protective culture. In part this has been the result of the increasing workload without any increase in resources, or perhaps in alignment of resources and workload.
(See recommendations 7.6 and 7.7)

Another factor, which echoed findings in the Technology Transfer professional survey was that universities were still struggling to develop clear and viable strategies in this area, and clear management structures to lead and develop such strategies. Many reported considerable duplication of effort with parallel units working independently of each other in the same institution, no co-ordination and little or no liaison.

Several noted that there were no incentives to collaborate, pointing to funding programmes which had previously required collaboration but now actively discouraged it. The reasons behind this change were not apparent, or were not articulated.

The view was expressed that university senior managers did not have the resources or the time to give priority to developing collaborative programmes in any activity. It was recognised that the sector's position had been weakened by this inability to work in collaboration or to present a common front. This was one area where the Technology Transfer professionals looked for a lead to their university managers and it could be an area for Universities Ireland to explore.

The Technology Transfer Initiative was identified as a successful collaborative programme because it provided collective funding and collective targets to which all contributed, with no singling out of individual institutions for acclaim or blame.

One area where collaboration was not deemed possible, at this stage, was in sharing a member of staff. Enterprise Ireland staff in particular felt that location defined loyalty and that to work and to deliver equally for more than one institution would not be possible. They also felt that issues of confidentiality and bias worked against such an arrangement.

Others believed that the current system in Ireland was inherently flawed because the universities did not have control and ownership of the seconded individuals on a day to day basis. The repeated example cited was of staff who were recalled to 'headquarters', disrupting their work within the university. Under these circumstances the universities appeared to accept such disruption and feel unable to challenge it.

It may be that the mechanisms which involved both distributed and centrally located staff could be found to do this successfully and Enterprise Ireland and Invest Northern Ireland should engage with the universities to develop and test pilot models in selected sectors. (See recommendation 7.7)

Overall the discussions were very positive and several areas of potential collaboration were identified, which are discussed below.

4.3.1 Engaging External Experts

Patent agents were one example where Technology Transfer professionals believed that collective buying power and a tendering system might bring a reduction in costs which, they believed, had escalated in Ireland since the introduction of the Enterprise Ireland Patent Fund. They were of the view that this exercise could be funded by Enterprise Ireland but selection and engagement should be solely at the discretion of the universities acting collectively. Throughout all the discussions ran a clear theme that the universities felt they were not trusted to exercise judgement and were not allowed to develop decision-making skills. There was a strong belief that the universities could and should fix scales of prices for patent agents.

The Technology Transfer professionals were also of the view that engaging patent agents with more specialist knowledge from outside the island could be undertaken collectively and would be beneficial. Some had informal arrangements with particular agents but claimed to gain no specific benefits from those. One university did operate a tendering exercise and had built into the contract the delivery of training and information sessions by the agents. It was clearly an area where discussion of the terms of individual arrangements would be of benefit to all the universities. (See recommendation 7.6.1)

Legal instruments and services were also identified as an area of potential collaboration in the engagement of services as outlined above, but also in the development of standard templates for Legal Agreements, Material Transfer Agreements, Non Disclosure Agreements and Research Agreements etc. This would enable universities to avoid duplication, but as some noted it would also indicate their commitment to sustainability and enable them to present a consistent front.

4.3.2   IP Management Systems, Access to Databases and the Development of IP Agreements for Inter-Institutional Use

On IP management systems it was not clear that there was the volume of activity to merit significant investment in proprietary systems and it would be worth the universities exploring precise requirements and what in-house systems are used in the UK and other universities. If a decision was made to purchase a proprietary system, collaboration would be required to specify the system and would give significant buying power.

Access to databases for market research could, it was felt, be tendered for on a collective basis, or could be provided through funding from government agencies.

Inter-institutional IP agreements on how to handle results from joint research projects could be put in place relatively easily as framework agreements, as could agreements on such matters when staff transfer between universities, either within the island, or to a university outside it. The effort required to develop many of these contractual frameworks would be far outweighed by the time saved once they were in place.

4.3.3   Funding of Joint Research and Development Programmes

The Technology Transfer professionals noted that in several instances collaborative bids were now prohibited by the funders and that this acted as a disincentive as well as requiring more resource from individual universities in preparing bids. This increased competition unnecessarily and enhanced the protectiveness and secrecy which was already endemic.

Furthermore, often bids would unwittingly duplicate each other. It was their view that collaborative bidding would bring more large scale bids which would deliver better quality, and stronger outcomes based on a wider research base.

4.3.4   Lobbying on Policy Development

The advantages of working in concert to address policy issues or to facilitate delivery of government or funder strategies were outlined using Scotland as an example.

There, the Directors are consulted routinely on new mechanisms or on the amendment of existing ones as well as themselves initiating change to make mechanisms more effective. Thus, they effectively become part of the leadership of the strategy. On some occasions they will be consulted as a group, an example being the development of metrics by which funding for knowledge transfer is provided under formula by the Scottish Higher Education Funding Council. On other occasions they will select a smaller group to speak for them, an example being the development of a framework of principles to govern interactions between the Intermediary Technology Institutes and the universities.

The important point is that their view is always collective; no one person's views are sought as an individual on matters that affect the sector, and there is always wide consultation within the group on issues.

This approach ensures that new initiatives and programmes are adopted and supported more easily; they are often improved by the input from the Technology Transfer professionals who can be more aware of the wider impact than the government agencies; and the Technology Transfer professionals are able to propose new mechanisms to enhance knowledge transfer in its widest sense. (See recommendation 7.2)

4.3.5   Benchmarking/Good Practice

This was a related area where greater interaction of the Technology Transfer professionals could be used to develop improved information for government and funders. An example would be the collection and analysis year on year of simple metrics, such as those collected in the survey of outcomes reported above.

These can be used by the universities to lobby for additional resources or to identify gaps where additional resource or new resource would be beneficial. The can also be used by funders and government to measure the success of the overall package of initiatives and funding mechanisms as well as having a significant role to play in marketing the island as an innovative place in which to do business.

Collecting an established and agreed set of metrics each year would become routine, providing evidence of trends to both individual institutional managers and to outside agencies for the entire sector. It would be reasonable to expect that some universities would be stronger on some metrics than others but that overall the universities would provide a coherent, strong package of returns that justified the investment being made.

Such a set of metrics would enable reporting on individual funding programmes. However, if standard metrics were used by all the funding bodies, the expected returns from a wider set of programmes could be encompassed. (See recommendation 7.2)

4.3.6 Working with the Venture Capital community

A united approach to venture capitalists would be more powerful in reaching agreed points of principle and achieving greater cross-sector understanding than individual approaches.

Such engagement would also help to spread more realistic expectations, both across the VC community about the nature of university technology and also among university management about the potential for income generation through sale of equity, and about the timescales required to realise value. In a sense it would control unrealistic expectations on both sides, and also in government agencies. (See recommendation 7.5).

4.3.7 Secondments

The Technology Transfer professionals consulted commented extensively on the issues that arose from the secondment scheme operated by Enterprise Ireland. All from Ireland were supportive of the scheme but believed that it was now at the point where greater management responsibilities could move to the universities. Many of the Technology Transfer professionals consulted were such secondees and supported this view.

Such a move would give the universities greater accountability and enable them to develop their processes and more stable management systems. (See recommendation 7.7)

SECTION 5

EXTERNAL PERSPECTIVES ON THE SECTOR

5.1   The External Context

A list of the stakeholders consulted is provided in Appendix 1. They included funders, clients of the universities and representatives of the professional services the universities access. All those interviewed were very supportive of the universities and recognised that they faced the issues of increasing activity and expectations not being matched by increases in resources. Possibly more so than in other European countries, they recognised that knowledge transfer is a long-term and complex activity, one where the impact is difficult to measure and where short term metrics can be misleading.

There is discussion among the funding bodies in Ireland about aligning their processes, especially on the exploitation of IP, in order to create a more coherent funding picture. However, there did not appear to be much recognition of the way in which the myriad of funding arrangements and the short term, administratively top heavy or restrictive nature of many of them, inhibited university activity.

It is clear that the single stream of funding into the universities in Northern Ireland has had tangible benefits to both the universities and the economy. Universities in Ireland would benefit from stability of funding, from the reduction in reporting and bidding administration and would then have additional resource to focus on the marketing and selling of technology and IP for the benefit of the country. (See recommendation 7.9)

On the question of ownership of the IP, the stakeholders overall were divided and the universities will need to be able to demonstrate, with something akin to the data reported above in Table 3, that they can achieve acceptable results if they have ownership. Nevertheless, most stakeholders did take the view that the universities and the inventors should benefit from the exploitation of IP and should be rewarded from the returns generated.

5.2   Stakeholder Perceptions

The knowledge transfer system was frequently described by stakeholders as being in flux as the universities started to respond to the need to exploit effectively the outcomes of the enhanced research funding in recent years.

5.2.1   Resources

Many expressed the view that the universities were not resourced to undertake IP exploitation and that this was a matter for concern, as was their perception that overall staff in the offices needed to be more professional in their approach – a development which was inhibited by the lack of resources. This uncertainty seems to underlie the stakeholder processes for administering funding applications, and the ad hoc short-term nature of much of the support, but the immaturity of the system is also a factor. This was recognised by all of the stakeholders who were of the view that resources were not an issue but perhaps did not fully appreciate that control and application of the resources might be.

The relatively undeveloped system that exists, and the diversity and varying levels of influence and power of the key stakeholders, reinforces the need for the funders and the universities to work together to allow the system, and the levels of independence in the universities, to develop as expertise grows.

5.2.2   Stakeholder Expectations of University Management

Most stakeholders appreciated the complexity of the issues faced by the universities and recognised where attempts were being made within finite resources to address external expectations. However, several commented on their perception that the universities as a whole did not fully understand the core role they play at the heart of the economic development agenda – one going so far as to point out that research funding put into the universities was expected to generate outputs that would benefit other areas of society and the economy. The universities perhaps need to be seen as a sector to appreciate the expectations of the external stakeholder group as a whole and to address these in a constructive fashion with proposals that would enable realisation of these expectations, or moderation of them if that is appropriate. Stakeholders were open to proposals from the universities and would welcome, it seemed, a dialogue.

Collectively the universities could work with stakeholders to develop a technology transfer system which would be much more effective, and thus more satisfying to the participants on all sides, than exists at present.

Industry had reported concerns about the consistency of the professional approach across the university sector, North and South, and some views had been voiced questioning the true value that the universities placed on technology transfer and collaboration with industry.

An industry representative noted that universities (in Ireland at least) were heavily focused on teaching until about five years ago. Now there is a large research budget and two challenges:

- at high level: to ensure value for money from research spend; to ensure appropriate structures are in place for future knowledge transfer as outputs come through from research

- at the practical level: to develop industry linkages (including applied research, graduate research, product/process improvement)

Some universities were known to have clear strategies, or to be developing clear strategies, for working with industry while others were suspected of paying lip-service to the concept. Increasingly the stakeholders are looking to the public statements of the universities on IP management and technology transfer, the general motivation evidenced by the universities, as well as their reputation and track record in order to judge their level of commitment to exploiting IP and to supporting economic growth.

Many felt that the universities at senior level did not fully recognise or accept that they had a major role to play in economic development, and that the recent research funding in Ireland was expected to produce dividends in terms of economic benefits to companies as well as to the country's R&D performance.

The point was made by one interviewee that if the university has a strategy the short–term nature of some of the available support would not be a problem because the funding bid and the application of the support would be factored in to the strategy at project level. However, that interviewee had not taken account of the administrative burden placed on the universities by applying for, and administering, short term support.

All the stakeholders believed the process was being formalised and becoming more consistent through the application of the Lambert Review findings and the influence of the Baye Dole Act passed in the USA in 1980.

5.2.3 All-Island Collaboration

One question was on the stakeholders' perception of North/ South collaboration. Most were of the view that collaboration should occur if it would be beneficial, but it should not be put in place or encouraged for artificial reasons.

For many universities their natural collaborators in academic areas were in the UK, the USA or Europe, not elsewhere on the island. In professional areas collaboration was inhibited by the undeveloped nature of IP management and technology transfer in most of the universities which led them to seek role models elsewhere in the world from whom they could gain an insight into good practice quickly. There are universities on the island which are good at aspects of technology management but for a holistic picture all go overseas.

An industry representative raised the question of collaboration with the Institutes of Technology, pointing out their strength in linking with local companies to support the local economic base.

5.2.4 Views on University Expertise in Technology Transfer

Stakeholders were asked for their perception of the expertise in the universities and many volunteered views on the confusion they experienced when trying to establish what the universities' internal management structures were and where responsibility for developing and implementing strategy actually lay.

On the question of staff expertise many identified a need to train staff to enable them to be able to work with developing systems as the overall context was changing so rapidly.

One noted that there is a perception that the staff involved in knowledge transfer, although very good on technical issues, are perhaps too junior to effect change. There is a need for training but also for top level support with sufficient power to marshal resources etc. (See recommendation 7.2)

All stakeholders identified a need to raise awareness amongst researchers and to educate and motivate researchers, but they did not appear to be aware of the level of activity in this area that is reported by the institutions.

For professional staff in the offices, apart from the need for more staff and greater technical expertise, one gap identified by stakeholders was the ability to mine information within the university and to bring it forward for exploitation.

5.2.5 Barriers to Successful Technology Transfer

The results of the stakeholder survey on the question of the barriers to successful technology transfer are summarised as follows (in no particular order):

Universities at institutional/structural level

- The need for the universities to focus more on knowledge transfer activities with strategies which had clear goals and targets
- The need for Technology Transfer office staff to become better involved with researchers at an early stage

The overall system

- The absence of a set of case studies which could be used to demonstrate to companies and to universities what was possible
- The lack of early funding for spin-offs
- The need for incentives for all participants
- The need for more co-funded/contract research
- The cost-effectiveness of knowledge transfer for small universities

Staff skills

- The need for Technology Transfer office staff to become more professional and gain expertise on technical aspects of technology transfer, and also in sales and marketing
- The need for enterprise training for researchers
- The absence of role models for academic staff

Company context

- The shortage of skilled people in industry and the ability of companies to take up IP generated by the universities
- The need to gain cultural acceptance of failure of start-ups
- Better marketing to industry/better way of finding out what expertise universities have of relevance to industry

5.2.6 Potential Areas for Collaboration

Stakeholders were asked for their views on where collaboration between the universities would strengthen the overall system. Their proposals were:

- Joint promotion of the benefits of university-industry interaction, including some case studies
- Domain specific shared resources
- Training in identified areas for knowledge transfer staff
- Awareness training programme for academics
- Inter-university awareness of what expertise existed
- Identification of industry needs (market research function & competitive analysis) across the island
- Developing patent applications – establishing an overarching agreement detailing the expectations of service from patent agents

SECTION 6

WHAT WORKS ELSEWHERE

The models described here were presented to Technology Transfer professionals. These models align with the 3 areas of collaboration and it was felt that these would be relatively easy for the universities to implement. Their potential application in the context of the island of Ireland is also described below.

6.1   Marketing

6.1.1   www.university-technology.com

This is a website established and funded by the Scottish universities' Technology Transfer offices to collectively market technology and IP which has been protected. It is overseen by the marketing assistants in each of the active universities – normally around 7 or 8 attend each meeting. It serves also, therefore as a practical focus for networking across the community engaged in similar roles within their universities. It has an agreed marketing strategy to ensure that potential industrial interest is drawn to it.

Each office can post new entries directly to the website and these are flagged on the site. A log is kept of the number of hits. Progress reports are made to the Scottish Directors meetings by the marketing group every 6 months. Those reports include detail on which entries should be reviewed or refreshed by the posting university as well as progress on enquiries generated by the site.

The universities are collectively responsible for the site, for the brand and for the image it portrays of Scottish technology. As a result it is taken seriously and peer pressure ensures that each university participates and maintains the high quality of technology and technology descriptors on the website.

It is a model that could be applied to expertiseireland.com and which would foster interaction among staff in the offices around the management of the project. (See recommendation 7.1)

6.1.2   SME Gateway

Now known as "INTERFACE" The Scottish Higher Education Portal, this gateway was initiated by the Scottish Higher Education Funding Council to improve take up of a website the Council had funded – scottishresearch.com – and in recognition that small and medium sized enterprises (SMEs) prefer to deal with people, even those in an intermediary capacity.

The model was developed by three directors on behalf of the Scottish Directors group, with extensive consultation. However to ensure stakeholder and client engagement the portal is overseen by a Board with university (2), enterprise agency (1), Council (1) and industrial (2) representation. The Director reports on a day to day basis to the Chair of the Board who is not from the university that hosts the portal staff. At present the Board and the Director are consulting widely about appropriate performance measures. The Gateway will be actively marketing the Scottish research base directly to Scottish companies through established SME networks.

The aim is to ease, facilitate and support industrial (particularly Scottish SME) engagement with higher education in an effort to promote interaction and stimulate innovation to benefit the Scottish economy. The Gateway will complement the existing activities of all of the university commercialisation offices in Scotland and will supplement the expertise databases for Scottish Higher Education Institutions such as Scottishresearch.com and the recently launched university-technology.com website.

It will:

- Provide information on expertise and commercial opportunities

- Filter and direct enquiries

- Facilitate initial interactions with SMEs

- Screen enquiries to avoid negative outcomes

The proposed facility will consist of a Director plus 2 assistants with highly integrated and networked connections to the research grant offices of all of the Scottish HEIs and the other research organisations.

The interface between the central facility and the individual institutions will require pro-active commitment from each stakeholder research institution to provide up-to-date and comprehensive information on its research and other relevant activities. It will also require key staff to be the designated link within the commercialisation offices. This will allow robust, dynamic, 2 way interactive networks between both the central facility and the HEIs and the central facility and external clients.

Strengths

- Supported by all the universities – a Universities Scotland/SHEFC initiative

- Consolidation of existing initiatives and university efforts

- Will enable collaborative responses

- Can be used for fast turn-around on inward investment queries or to present a picture to companies thinking of doing business in Scotland

- Builds on established branding of Scottish research base

Weaknesses

- Engagement of companies remains to be seen although it addresses issues raised about ease of access to university expertise and facilities

- There is some conflict with services already provided by economic development agencies, notably the Small Business Gateway. However, there is clear demand which suggests other mechanisms are not working.

Application to the island of Ireland

SME Gateway could be used as a model for part of the active marketing entity to support the expertiseireland.com website with the essential human contact that enables effective interaction with companies to be achieved. It would ensure that university resources were not being wasted by unformed enquiries and it would increase the number of enquiries that would be converted into sales.

6.1.3   Medicon Valley

The Scandinavian life science cluster, Medicon Valley, encompasses Copenhagen on the Danish side and Skåne on the Swedish side. The aim of this programme is to market the unique concentration of company and university strengths in bio-medicine and biotechnology.

Medicon Valley hosts an impressive number of biotechnology, pharmaceutical and medical device and service companies, and also holds a strong scientific position within this area in Europe.

It encompasses 12 universities including the major international players in biomedicine and biotechnology and the universities of Copenhagen and Lund, both of which have established patent filing systems but embryonic technology transfer structures. Co-operation between technology transfer offices is the subject of one recommendation from a Medicon Valley Academy review group which was critical of the disjointed approach. Possibly more significant are the university hospitals which operate separately from the universities in technology transfer and have a well established track record in licensing to companies.

In 1996 Position Skåne and Copenhagen Capacity, both economic development agencies, launched a joint programme to promote Medicon Valley internationally to attract foreign companies to the region. The programme was focused on marketing initially but has gathered force as the universities and the companies began to see the value of co-operation, not just in R&D, but also in lobbying to government and bidding for shared facilities. It claims to have attracted skilled workers and researchers to the area who would not otherwise have located there. In recent years the number of new biotech companies has increased significantly, with these new companies being either indigenous or subsidiaries of foreign biotechnological companies.

Investment in the area has been assisted by government. In Sweden a proposal to allow Swedish Industrifonden to invest a percentage of its available funds in the Oresund area is under discussion, while in Denmark the new Danish Entrepreneurial fund (Iværksætterfonden) was formed in November 2004 with permission to invest 25 per cent in Skåne.

Strengths

- Well funded with considerable political support
- High quality materials and profile
- Excellent concept which has potential to be very strong

Weaknesses

- Primarily a marketing exercise; limited buy-in from companies or universities
- Brand is strong but purpose is unclear

Application to the Island of Ireland

This marketing model could be examined by Inter*Trade*Ireland working with Enterprise Ireland, Invest Northern Ireland, the universities and the inward investment agencies. (See recommendation 7.1)

6.2   Training

6.2.1   Midlands Medici

The Medici programme is funded through the Higher Education Funding Council for England (HEFCE) under the Higher Education Innovation Fund. It is a joint award to 15 partner universities, with University of Birmingham taking the role as lead partner.

Medici Fellows undertake experiential learning to identify and develop a personal portfolio of commercial projects either from their own work, or through collaboration with colleagues. This involves interviewing research staff, undertaking technology audits and assessing the commercial potential of projects.

To support this, an accredited taught course in business, commercialisation and intellectual property issues is provided. This is further supplemented by training in entrepreneurship and

innovation, with particular emphasis on aspects relating to the biosciences and medical fields. It includes familiarisation with intellectual property and inventorship routes to commercialisation, spin-out company formation, together with information on how to write a business plan, practical accounting and legal matters.

Fellows put this knowledge to practical use during the course of their fellowship and are expected to conduct market research, write business plans, submit applications to funding bodies and prepare patent applications as appropriate. Fellows work in close liaison with mentors who provide extensive support at all stages of the process throughout the year. For success the programme requires:

- Commitment of partners
- Robust selection criteria for Fellows
- Accredited training
- Support of Head of School/Department to effect longer term strategic change rather than solely benefiting the individual Fellow

Strengths

- Strong track record among the core Higher Education Institutions
- Additional partners have significant expertise to bring to bear
- The model has real potential to deliver significant benefits for the region
- The focus is on developing academic staff and using the Fellows to spread culture change within their departments
- The programme is focused on key business clusters of the Regional Development Agency
- There are clear and quantifiable targets
- There is a clear management structure
- Completion of an accredited course
- Flexibility in delivery to allow tailoring to the size/capacity of each participating institution

Weaknesses

- Long-term demand is not proven. If the scheme is successful, culture change will have taken place and the scheme will no longer be required

Application to the Island of Ireland

This would be an excellent model for the universities to explore with the University of Birmingham in terms of how it might be applied to and operate on the island of Ireland.

6.2.2   Scottish Institute for Enterprise

In 2000, 5 Scottish Universities made a successful bid for the "Scottish Institute for Enterprise (SIE)", a single centre to support the development of enterprise activity among the student population. Core activities were a combination of enterprise teaching and commercialisation support.

Funding covered staff salaries and running costs for the Core Team. At university level it allowed the employment of SIE staff. In most universities this consisted of an Enterprise Co-ordinator (a senior

academic with experience of enterprise teaching) and a Student Commercialisation Adviser (mid-grade administrative post). Throughout the project, funding was also released for specific project staff, for example, case writers.

For the purposes of this case study the focus is on the commercialisation activity. The network was extended to encompass all Scottish Universities and HEIs in 2003. The outcome was to embed enterprise in the science and engineering curriculum and foster cultural change in the student body.

The Education group focused on developing shared teaching materials and programmes, and initiated a series of master classes and exchanges with the MIT Entrepreneurship programme. Strong links were formed through the Cambridge-MIT link funded separately by the UK government to promote entrepreneurship.

The Commercialisation group comprised the Directors from each of the universities and focused initially on putting in place all the necessary Memorandums of Understanding etc. It then, with the funds available in the award, set up and managed a Patent Fund for student ideas, a Business Plan competition and an Innovation Fund for innovative ideas from both the teaching and the commercialisation aspects of the project.

The Scottish Institute for Enterprise is the first large enterprise-related project in which all Scottish Universities and HEIs have collaborated. Previous collaboration had been limited to 2 or 3 universities working on short-term research projects.

Strengths

- A unique opportunity for universities and HEIs to develop a coherent strategy for enterprise development in Scotland

- A forum for discussion and information exchange

- The commercial advisers in the universities established a strong informal network, through which common activities were established

- Teaching activity was embedded (particularly in those universities where no enterprise teaching had previously been available)

- The initial input of funding encouraged buy-in from the universities.

- The National Business Plan and other centrally-funded events raised the profile of enterprise in the universities.

Weaknesses

- Little or no funding was available to the "second round" universities and HEIs. It was difficult therefore, for them to commit resources to the project.

- As funding came to an end, SIE entered a period of transition. Without funding, some universities were unable to maintain the same level of resourcing as before.

- Each participant had to consider the needs of his or her institution as well as the overall needs of SIE. In some cases this resulted in conflict.

- A nationwide project requires strong top-level management, with a clearly developed strategy, which was sometimes lacking at Board and Core Team level.

Application to the Island of Ireland

There is growing activity on the island of Ireland around supporting the development of entrepreneurial skills. Co-ordination through a model such as this would make the overall offering much stronger and more cohesive, as well as enabling some cost reduction in the development of teaching materials. Funding would be required and the universities would have to explore this with the appropriate funding agencies, but firstly Universities Ireland and I.U.A. members need to take a view on the principle of working together in this area.

6.2.3 Royal Society Enterprise Fellows

The aims of this programme are to increase the commercialisation of the Scottish academic research base, raise understanding of commercialisation throughout Scottish universities and research institutes, and to create sustainable companies with high-value jobs. The programme is funded by Scottish Enterprise and delivered by the Royal Society of Edinburgh.

Scottish Enterprise have provided funding for 80 researchers who wish to develop a spin-out business around their technological idea and within which they will be expected to play a leading role. On average 15 are funded each year. Enterprise Fellowships offer:

- A year's salary to develop their commercial proposition and product, hosted at their university or HEI

- Business training to give them the knowledge to prepare a viable business plan

- Access to networks of mentors, business experts and professional advisors

Fellowships are available in the following Scottish Enterprise cluster and industry categories:

- Life Sciences

- Energy (including oil & gas and renewables)

- Microelectronics

- Optoelectronics

- Forest industries

- Food and drink

- Tourism

- Electronics

The Fellowships are tenable for a period of one year, commencing on 1 April and 1 October each year. The Enterprise Fellowships are designed to encourage greater commercialisation of research in Scotland. The Fellowships enable the holder to concentrate on developing the commercial potential of their research, whilst also receiving formal training in relevant business skills.

Forty per cent of the Enterprise Fellowship programme will comprise business learning modules from the participating Business School (Glasgow Caledonian University) which will be directly relevant to the commercialisation process. The remaining 60 per cent will be spent on developing the research from a commercial perspective. Enterprise Fellows are expected to devote all their time to the Fellowship.

In terms of IP ownership, the IP is retained by the original owner; in essence, if the background IP belongs to the host institution, it undertakes to make it freely available to the Fellow for the period of the Fellowship and thereafter to be willing to negotiate on a fair basis with the Fellow regarding acquisition or ongoing access to support commercialisation.

Strengths

- The focus is on developing academic staff and using the Fellows to spread culture change within their departments
- The programme is focused on key business clusters of the Regional Development Agency
- The taught element is an accredited course so the Fellow gains an MSc
- The RSE is seen as impartial and thus the universities participate and support Fellowship applications
- The programme provides funding, training and focus for entrepreneurs in setting up a company
- The programme provides good networking opportunities

Weaknesses

- Mentoring has been variable
- Ownership of IP must be clear and not in dispute
- Conflicting advice on business processes has been provided from mentors and universities: the host university role is not clear, and is unrewarded
- Some issues arose when it became clear that the company was viable but the Fellow was not a suitable CEO. The wording now specifies but does not define a "leading role"
- The business case for the company is not always robust, but in each instance the individual Fellow has gone on to join other spin-outs and to make a significant contribution.
- The programme cannot run concurrently with other SE funding packages.
- The reporting path can be unclear. The host institution is not always kept informed of the progress of the Fellowship. This can limit the assistance which the institution can offer.

Application to the Island of Ireland

This model could be developed to stimulate the development of a cadre of entrepreneurs on the island of Ireland.

6.2.4   ProTon Europe

ProTon Europe is a network funded by the European commission, DG Enterprise, in which universities can participate at no cost. The goal is to identify and document good practice in technology transfer and to enhance the development of the profession in Europe. The long term goal is the enhancement of the European technology industries in competition with those of the USA and Japan.

University College Dublin are participating members and lead the work package looking at good practice in IP management.

Application to the Island of Ireland

ProTon Europe is not a model per se but an opportunity that the universities could take up to extend their engagement with good practice across Europe and to access the staff exchange scheme. Under that scheme member institutions within ProTon can apply to send a member of staff involved in technology transfer to another member university for up to 5 days training, with all costs paid. Conversely, the scheme may also be used to bring an expert in to either an individual university or to work with a group. With all costs paid this is an extremely good opportunity, with little attached bureaucracy, to have staff learn from some of the foremost Technology Transfer professionals in Europe. Details are available at www.protoneurope.com

6.3   Shared Resources

6.3.1   TLB (Technology Licensing Bureau)

Inventions from German universities can be commercialised through the Technology Licensing Bureau and also through the universities themselves. The TLB evaluates the invention and, if appropriate, patents and licenses the innovation. In return, the TLB receives 30 per cent of the total licensing income. The TLB has experts in the different technical fields and an established comprehensive network of contacts in those areas which facilitate licensing of the various technologies.

Application to the Island of Ireland

This is a model that may be appropriate if there is external expertise available on the island to develop such an organisation. An alternative would be for those universities with commercialisation teams to provide that service to smaller universities in return for a percentage of any outcomes, or for a flat fee.

6.3.2   SET squared

SET squared is a joint venture between the English universities of Bath, Bristol, Southampton and Surrey to help knowledge-based entrepreneurs in that region. For approximately £100/month for a period of up to 12 months, new ventures/companies get access to business facilities in one of 5 centres. These facilities include low cost, serviced office space, business support from experienced entrepreneurs, business reviews and access to funding sources.

Business incubation is an activity that all the universities and the Institutes of Technology are engaged with. There is potential for mutual learning through development of an incubation centre network. Sharing of knowledge and of different practices can only be good for both staff and companies, and as this area is non-competitive there is no rational argument not to develop such a network.

Application to the Island of Ireland

Such a network would spread good practice in this area. It could work with economic development agencies to look at a common approach to monitoring the early development of companies with a view to identifying success factors and developing metrics to predict the chances of company survival beyond the initial stages.

6.3.3 REDValor

REDValor was created by Spanish universities as a network of evaluators of innovation and the results of investigation. The objective was to establish a system, based on business experts, to assist the universities in the evaluation of the potential of innovations. This model is very new and the results, although encouraging, are not yet proven. However, it is one that, if successful, would foster collaboration across universities and enable technology bundling, as well as cultivating co-operative relationships with large industry.

Application to the Island of Ireland

This is one model of obtaining external expertise on a shared basis that should be examined once REDValor has been in operation for a year (mid 2006).

6.4   Formalised Networking

6.4.1   AURIL (www.auril.org.uk)

AURIL is the Association for University Research and Industry Links in the UK and Ireland. AURIL is a membership organisation and each university holds institutional membership. In addition, up to 20 members of staff may have individual membership under the institutional subscription.

AURIL provides online discussion fora, conferences and opportunities to discuss current hot topics at meetings which are arranged on an ad-hoc basis. It also provides a community to which Technology Transfer professionals belong and within which they can develop and grow with exposure to different practices and environments.

Application to the Island of Ireland

AURIL-Ireland has recently been established and should be encouraged and supported by Universities-Ireland and I.U.A.

6.4.2   Scottish Directors

The Scottish Directors are a formal subset of the Vice-Principals' committee within Universities Scotland. They meet formally every three months and report to the Vice-Principals' Committee, providing advice and practical guidance. They are used extensively to inform and develop government policy on a wide range of issues around knowledge transfer.

Application to the Island of Ireland

Scottish Directors are a model that would be very appropriate to inform the development of AURIL-Ireland.

6.4.3   Yorkshire & Humberside
(www.yhua.ac.uk)

This regional grouping at institution level allows Technology Transfer professionals to meet and network according to their specialist area, exchanging views but also coming together to lobby institutions and government agencies on specific issues.

Application to the island of Ireland

A review of the nature and content of this group's discussions would be a good starting point for the development of networks of staff in particular specialist areas within the knowledge transfer arena.

SECTION 7

CONCLUSIONS and RECOMMENDATIONS

7.1   Joint Marketing

Recommendation: Universities Ireland establish a strategy and policy task force on joint technology marketing, drawn from Technology Transfer professionals and appropriate communications professionals. The task force should have the remit to develop and cost a comprehensive marketing strategy, working with external stakeholders where appropriate.

The proposed terms of reference for this task force should include development of the expertiseireland.com website, market intelligence and an entity to market technology.

This was supported as the initial top level priority for the universities. Models elsewhere such as Medicon Valley or INTERFACE in Scotland illustrate the importance of effective marketing, especially using people "out on the road" in creating market pull and in establishing the recognition factor. They also illustrate how such a model can operate across 2 jurisdictions.

Promotion of the university research base on the island, North and South, building on the expertiseireland.com website, can only be beneficial to the universities and to the economic growth of the island, North and South. This combined with support for market research would:-

- Raise the profile and establish the position of the universities and the island as an R&D powerhouse

- Provide a vehicle for the marketing of services and facilities

- Provide a common platform for addressing the multi-national company sector

- Improve the perceptions of stakeholders and the business community both on the island, North and South and worldwide

- Inform policy by elucidating common strengths and positions

- Provide a common platform for lobbying policy development, particularly at European level on R&D and Innovation policy

- Facilitate technology take up from the research base by companies

- Enable technology bundling for marketing purposes

7.1.1   Website development

Recommendations:

- the universities review their current offerings on the expertiseireland.com website and make every effort to populate the website in a standard manner with agreed quality of content

- AURIL-Ireland address the issue of responsibility for marketing, including maintenance of the university information on the website

A starting point would be to fully populate and to develop a marketing strategy for the expertiseireland.com website. This recommendation arose from the Technology Transfer professionals who recognise the value of the site, but commented on the resources required to translate technical disclosures of IP into a suitable form for publication on the website. (See section 4.1)

The expetiseireland.com website already has a strong profile and is well marketed in the USA according to Technology Transfer professionals. To get the full benefit of the recommended changes it would require the provision initially of some resources to write up in appropriate language the available technology, describing what it could do rather than what it was.

Technology Transfer professionals reported that "cleaning" disclosures in order to market the technology took resources they did not have, which may account in part for the difficulties companies have in accessing knowledge about available technologies. In time however, those engaged in exploitation i.e. marketing the technology, would be expected to be able to write short technology descriptions for use with companies, in marketing material and in case studies for funders or venture capitalists and for websites. The development of a standard template for these would facilitate their production and present a consistent style and level of content.

Responsibility for the maintenance of the university information on the website would rest with the universities and a strategy for uplifting content, checking the content and clearing badly written content or stale offerings should be put in place by the Directors and should be monitored by them. Such a website can only succeed if it is credible and its content is dynamic and up to date. A similar exercise could be undertaken by the universities for their offerings on www.biotechnologyireland.com.

7.1.2   Market Intelligence

Recommendations:

- the economic development agencies and the Directors explore the potential to purchase access to a selected database of protected IP, such as the Delphion database, on behalf of all the universities

- the economic development agencies and the Directors explore the potential to access information on companies to which particular technologies, or types of technology, would be of interest

To understand the potential appetite in the market for a technology the universities have to develop their knowledge of the market itself. Their difficulties with this were commented on by stakeholders and by Technology Transfer professionals alike (see section 4.1).

The universities need support to develop or to easily access expertise on

- the needs of local industry – local market knowledge;

- regional plans and market gaps;

- national / international markets – to find international industry.

Much of this information is available through databases of companies but the most effective route should be through collaboration with development agencies. In addition, those agencies supporting inward investment should make information available through regular contact with the universities – possibly identifying liaison managers to work with them – and supporting bulletins etc. They should also consider providing more tailored services to match companies and university technology. A starting point is to provide more detailed access than is available through Patent Offices to information on protected IP and thus to companies interested in/engaged in relevant areas.

7.1.3   Technology Marketing Entity

Recommendation:

- establishment of a group, with representation from the development agencies and the universities, to develop a model for an entity, owned collectively by the universities, that would employ staff to actively promote the technology produced by the universities; the pre-selling stage

- the universities, working across the Technology Transfer professionals and the External Communications units, develop a suite of materials – case studies – which could be showcased

- the development agencies develop strategies to produce these professionally and to use them in suitable venues and events

Technology Transfer professionals proposed the establishment of a "central" marketing entity, owned collectively by the universities, with staff who would go out and promote available technology, adding value to existing mechanisms. Responsibility for the actual selling and the terms of deals would remain with the university/ies. This would also facilitate the bundling of protected IP as recommended in section 7.8.

Funders, development agencies and the universities should consider and develop a marketing strategy for a single sector brand and a joint marketing, university controlled and run, entity to actively promote technology. This would interact with the expertiseireland.com website, adding value by acting as a single point of contact, marketing expertise, access to facilities and technology in a common format to all types of industry. It would require staff who have the ability to promote technology.

The model would have to be considered to take account of how it would interact with the universities on the actual sales of technology. Some technology might be marketed by this entity, but other products might best be marketed by the university if it had a ready market for it. Marketing expertise and access to facilities should be relatively straightforward and should be developed quickly in parallel with discussions of what guidelines were applied to technology. As a baseline however, all technology available for marketing should be at least sign-posted through the website and this entity.

Such a model could be based on profit sharing to ensure its sustainability. The value of such branding cannot be overestimated, particularly if the brand achieves recognition as a "blue chip" brand. Given the high visibility of the island of Ireland as a brand in other sectors it should be relatively easy to establish an island brand for university technology, while still taking into account that there are 2 jurisdictions involved. Any such brand would have the universities and the exploitation of their research output and technology as the focus. The challenge may be in ensuring the quality of the offerings to industry.

Showcases encompassing all the universities under a single brand would support the marketing strategy and were also identified as being important by Technology Transfer professionals. With appropriate marketing materials they could be used by the inward investment offices overseas; at international trade fairs and conferences both globally and on the island, North and South and at airports on the island, North and South (as research is promoted at the moment). They would need to be refreshed but core material could be built around the major research themes, including the emerging themes which would attract the attention of multi-national companies looking for long term partnerships.

Showcase events could be built around these themes with inward investment strategies for multinational companies.

7.2   Expert Professional Input to Policy & Strategy

Recommendation:

- Universities Ireland establish a sub group of Directors to advise Universities Ireland and the VPs for Research and Innovation on IP management and technology transfer policy issues, with an agreed remit which would include issues at European level.

- agree the level of support to be provided to AURIL-Ireland, and the reporting mechanisms

Currently there is limited, although increasing, consultation by stakeholders with the Directors in Ireland but this is not systematic and is generally reactive. Issues were raised about the possibility of such collaborative working across 2 jurisdictions but there are models, for instance ProTon Europe, where more than 2 jurisdictions are covered by a single entity addressing policy issues that are generic or apply at European or global level. There are sufficient professional issues in IP management and technology transfer facing all the universities on the island, North and South to merit an all-island grouping. Where an approach was required or a policy development occurred which applied to only 1 jurisdiction, this would be acknowledged by forming a sub-group on an ad-hoc basis.

This sub group would:-

- Advise the VP groups and thus the Presidents / Vice Chancellors

- Act as the consultative point for all the external stakeholders on policy and process at all-island level

- Provide a formal consultative route through sub-groups for issues specific to Northern Ireland or Ireland

- Prohibit grounds for an oft repeated claim that universities were "picked off individually"

- Increase collaboration as the group activity evolved

Such a group would be invaluable in developing the profile of the sector at both local and European level. It would also serve as a useful sounding board for the external stakeholders and the university senior strategic managers.

The sub-group would comprise all the Directors, that is, those who have operational responsibility for implementing institutional and sectoral strategy under the oversight of the VPs for Research & Innovation.

The group should also be charged with presenting to Universities Ireland, on an annual basis, a report on performance against agreed metrics. These would be invaluable in discussions with stakeholders and in promoting and marketing technology and expertise in a wide range of milieus.

This group could be, and should be, built around the recently established AURIL-Ireland. This ensures that the advice received will be fully rounded and informed by those who are engaged in discussions with the UK and Europe on new developments and trends in technology transfer and IP management and related government practices, good professional practice, career development and impact assessment.

A model could be the Scottish Directors who report formally to the Research and Commercialisation Committee of Universities Scotland but also use their quarterly meetings for informal discussion on emerging topics or matters of sector-wide concern, as well as strengthening collaboration around ad-hoc sector projects and cross-university development projects.

The group would require some administrative support for meetings and for drafting documents. This could be provided by a part-time secondment to Universities Ireland, probably of a mid-range administrator, for 4 days per month. This appointment would also provide some executive support to the Chair of the group and possibly provide representation at appropriate events.

7.3   Training

7.3.1   Entrepreneurship

Recommendation: the universities to look at the work of the Northern Ireland Centre for Entrepreneurship (NICENT) as a model of collaboration in this area and decide how that might be applied across the sector.

This recommendation arose from discussions with Technology Transfer professionals and from comments made by stakeholders, particularly those who engaged directly with academic staff. Entrepreneurship training is widely available and it would be useful to codify and benchmark it. One such appropriate model which was identified is NICENT, which is a collaborative model across 2 universities. Models elsewhere include the Scottish Institute for Enterprise, the Midlands Medici programme and the Royal Society of Edinburgh's Enterprise Fellowship programme funded by Scottish Enterprise.

Developing and encouraging entrepreneurial take-up of the IP created by the universities is essential for economic development and the 2 activities of entrepreneurship development and exploitation facilitation should be closely linked to gain most benefit. The universities should consider development of a collaborative teaching programme to include entrepreneurship in the curriculum for science and engineering students. This would have to be led by teaching experts in entrepreneurship, although Technology Transfer professionals could contribute to modules

7.3.2   Centralised System for Training in IP Awareness

Recommendation: the Enterprise Ireland Enterprise Platform programme be delivered as a permanently available road-show and arrangements put in place to allow participation from the universities in Northern Ireland.

Several of the universities provide in-house training programmes for academic and research staff. These are essential in fostering and supporting a culture change but can be very resource intensive.

Technology Transfer professionals reported that a successful programme had been developed in Ireland by Enterprise Ireland and suggested that there was a case for central provision delivered locally and facilitated by their offices. One very strong argument in favour of this, which applies in almost every

university in the world, is that academic staff will listen more readily, at least initially, to external expertise. Another would be that local provision of a single, all-island programme would ensure a common standard and be cost effective.

It is recommended that the course content and structure of all the in-house provision, and that provided under the Enterprise Ireland programme is reviewed with a view to developing an agreed, comprehensive, single suite of modules which could be delivered as a road show on an annual cycle in every university or institution. Ideally a small advisory board would be drawn from university managers, agencies and the academic community to review and, if necessary, refresh the programme each year.

7.3.3   All-Island Continuing Professional Development (CPD) Programme

Recommendation: AURIL-Ireland should roll out the pilot AURIL-NovaUCD CPD programme.

There is demand for a programme of training on the island, North and South which fosters career progression and goes beyond the technical skills, as evidenced by uptake of the pilot CPD programme supported by InterTradeIreland. This arose in the findings from the Technology Transfer professionals survey (see section 3.5) but was expressed mostly strongly in repeated comments from almost all the external stakeholders (see sections 5.2.2, 5.2.4 and 5.2.5).

One specific topic that has been partially addressed but needs to be more widely understood is that of working with multi-national companies to understand their objectives and how a university may protect its rights and position while working to assist those objectives.

7.4   Campus Company Support

There are different models of company support in different universities. Training and experience in this area was recognised as being of very high importance. There exists a clear, well defined specialist group which could work together, and would support development also of recommendation 7.6.2 below. Examples are numerous, particularly in England as a result of HEIF collaborations.

7.4.1   Seed Fund

Recommendation: the universities in Ireland[2] develop a proposal to the government for a single multi-university pilot scheme for seed-funding of new companies. If successful it could be opened up to the universities in Northern Ireland under suitable funding arrangements.

Seed-funding is an essential element of company support before the company is ready to launch on the market. It is in part funding of proof of principle and in part pump-priming of the first stage of company development, usually under the wing of the university. The absence of such a fund in Ireland was remarked on by stakeholders. Interaction with such a fund under experienced fund manager control would assist development of the skills base referred to by stakeholders and by Technology Transfer professionals (see sections 3.5.2 and also 5.2.5).

In the short-term an Ireland seed fund should be established with the model rolling out across the island, North and South if appropriate. The seed fund should be established under independent management to fill gaps in funding by the revenue

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2   *Ireland refers to the Republic of Ireland.*

capital community and to grow campus companies. A reputable third party could be found to manage the fund and the investments, as has been done in some parts of the UK with University Challenge Funds.

Funding should be provided from government sources but investment should be on a purely commercial basis with no account of geographic factors. Oversight should rest with a Board comprising the government agencies and the universities. That Board would be expected to develop a business plan to make the fund self-sustaining within a reasonable timeframe – recognising that returns will take time to start flowing.

7.4.2 Business Incubation Network

Recommendation: AURIL-Ireland arrange a meeting of all those engaged in business incubation and support around a topic or a series of topics in order to establish an informal network.

Business incubation is an activity that all the universities and the Institutes of Technology are engaged with but many lack confidence (see section 3.5.2).

There is potential for mutual learning through the development of an incubation centre network. Sharing of knowledge and of different practices can only be good for both staff and companies, and as this area is non-competitive, there is no rational argument not to develop such a network.

It would be beneficial if the network was able to establish – or share knowledge on – the availability of a pool of potential CEOs for new companies, preferably those with experience in growing new companies.

7.5 Interaction with the Venture Capital Community

Recommendation: AURIL-Ireland arrange a series of seminars with representatives from the Venture Capital (VC) community to allow an exchange of views

Working together the universities would have more power as a group in negotiations for funding of new companies. If they shared information and reached agreement on points of principle - which were realistic - they would further the development of the VC community and the quality of the deals being struck by the companies.

To do this would require consultation and interaction with the VC community, possibly bringing in external VC companies with experience of deals outside the island of Ireland.

A starting point should be a series of evening seminars where both communities meet constructively to attempt to understand each one's point of view and to address the question of what deal structures are realistic and provide win-win situations for both and for the island.

Such a face to face format would build understanding and create a network that would make deals and access to technology and to funding easier in the long run.

7.6 External Professional Services

7.6.1 Tendering for Services

Recommendation: the Directors appoint a small group from their number to negotiate an acceptable arrangement on access to external patent support and legal advice.

The universities have reported an increase in the costs of patenting following the establishment of the Enterprise Ireland Patent Fund. This wider development of rising patent costs was reflected in some of the comments of stakeholders about the relative inexperience of junior staff and in their suggestions that academic staff would benefit from more awareness when engaging with external service providers. (See sections 4.3.1 and 5.2.5)

Universities on the island, North and South, engage with a variety of patent agents. None appear to be developing in-house resources in initial patent writing, a development that is increasing in England, Scotland and Wales. Most appear not to have a retaining contract with any specific patent agent although some in Ireland do get services in-kind in return for recognition of the patent agency/lawyers as the "house" adviser. They do not believe they get discounted fee rates despite the increasing volume of business from the university sector. The exception is Queen's University, Belfast, which reported a retaining contract with one company which required delivery by the company of training and awareness events to the university community.

The patent agency interviewed reported a lack of control by universities in Ireland on the costs and the extent of interactions with the researchers. This may reflect the overstretched resource more than anything else but it is undoubtedly increasing costs to the university and to Enterprise Ireland.

Discussions with the Technology Transfer professionals generated widespread agreement that they could work together to:-

- Establish common terms and fee levels with both patent agents and providers of legal services

- Share information and evaluate the quality of service provided

- In the long term put out to tender one or more contracts to provide such services to the universities

7.6.2 Shared Central Resource on Patenting

Recommendations:

- the Directors develop a business case for using/ sharing in-house expertise to support the process of drafting initial filings with a view to making a costed recommendation based on the premise of a shared resource by early summer 2006

- a similar case is developed for legal and contractual advice

A further development which had not been considered as a possibility by the Technology Transfer professionals might be to collaborate on the funding of a central resource to support the drafting of initial filings with academics under the oversight and direction of the Technology Transfer office. Initially this might be based in one university but provide a service to several. Managing the patent portfolio of items included in this process could form part of the role, with the intention being to ensure that patents are only maintained if they are to bring tangible results. This would be of particular benefit to the smaller universities where activity levels do not as yet merit the investment that is required from external patent agents but there would be no reason for larger universities not to participate.

This would cut patent costs significantly; it would be predicated on what was needed to close a deal, rather than drafting a totally watertight protective patent; it would provide and build internal expertise and understanding and would assist in the development of a more informed and more pro-active approach to IP management.

This model exists in some UK universities where the post can be held by someone who enables the researchers to draft the technical aspects of the initial patent. Sensitive or more complex filings would always be finalised with external expertise.

Advice on the development of such a service, and the training and costs could be obtained from UK universities who have adopted it.

The system has been shown to work because:

- Experience indicates that a patent need only be complete or watertight to a certain degree in order to be used. Total protection against every eventuality is not necessary and indeed is rarely possible since a valuable patent will tend to be attacked anyway by a competitor's legal team if the commercial drivers are important enough.

- There is time to adjust filings in the first year and subsequent filings in the Patent Co-operation Treaty and national phases will use external patent agents

Similar views pertain to the provision of legal services. One quoted example related to legal fees rapidly mounting over the sub lease of property for a new company. The only stumbling block was the original lease. The lawyers spent considerable time trying to ensure that the length of the original lease would not inhibit company growth. It took a third party to ask what relevance to anyone present was a lease that ended in 3004!

7.7   Shared expertise

Recommendation: Enterprise Ireland to consider initiating discussions with the Directors on the transfer of accountability and day to day responsibility for seconded staff.

There was extensive discussion by the Technology Transfer professionals about the current arrangements for secondments from Enterprise Ireland to the universities.

The current arrangements were put in place when the overall system for IP exploitation was immature and many universities lacked experience in managing such processes. The level of maturity now, and the need to develop faster the expertise and accountability of the universities suggest that Enterprise Ireland should consider developing their programme of placing expertise in universities to allow the university or a group of universities to manage the work of those staff within the context of the university. Enterprise Ireland would continue as the employer of such seconded staff.

This could be supported by developing the Enterprise Ireland network of sectoral expertise but it would require the universities to be accountable for the output from the posts, and would give them more ownership, and more management responsibility for recruitment strategy and outcomes.

Although some universities in Ireland would have the critical mass to sustain one or more full-time posts in some sectoral areas, the programme should encourage collaborative bids in areas where that critical mass does not exist at the level of the single institution and provide new mechanisms to support inter-institutional collaboration which in turn would provide new opportunities.

7.8   Technology Bundling

Recommendation: investigation of the potential of a system for technology bundling.

Although technology bundling forms part of the recommendations on joint marketing it also underpins some aspects of sharing resource and for that reason it is listed separately.

The recommendation above would facilitate development of a system for bundling technology into packages that would give true robustness and comprehensive technical/product breadth. This would facilitate sustainable growth of new companies exploiting this technology or larger scale licensing deals.

The Technology Transfer professionals consulted saw the potential for establishing framework agreements on joint projects and there would be little difficulty in extending that to exploitation. The actual identification of suitable technology for bundling might be delivered by a mix of the universities consulting each other about technology they have under development and intend to protect, the use of shared expertise which would enhance awareness of possible synergy and by joint marketing.

The universities, at all levels, would have to recognise the benefits of being part of a larger offering, but probably holding a smaller share. As always, 10 per cent of something with commercial potential is better than 20 per cent of something that has no commercial potential on its own.

7.9   Single Funding Stream in Ireland

Recommendations: The funding agencies in Ireland[3] should:

- examine the impact of HEIF funding for infrastructure in Northern Ireland and the mechanisms for delivery of that funding, against strategic plans

- reach agreement on the ownership of IP arising from work or infrastructure they have funded, ideally allowing IP ownership to rest with the universities who would report through strategic plans on their success in exploitation

- develop a single funding stream to support the necessary infrastructure. A suitable funding level would be 3 per cent of the research budget to exploit the research. This is comparable to the level of HEIF expenditure on technology transfer in Northern Ireland.

The difficulties experienced by the universities in Ireland as they struggled on limited resources to deal with the administrative burdens of applying for and reporting on project based funding to manage and exploit IP were referred to by both Technology Transfer professionals and external stakeholders as seriously inhibiting exploitation. (See sections 2.2.11, 4.3 and 5.2.1). Although outside the scope of this study it should be noted that the issues raised are regarded as very serious in that they hinder successful IP exploitation for the benefit of Ireland.

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3   *Ireland refers to the Republic of Ireland.*

APPENDIX 1 - METHODOLOGY

Definitions

For this study technology transfer is defined as: Licensing; Joint Ventures; Company Creation; IP Protection & Management and Consultancy.

University Technology Transfer professionals in the following areas were consulted: Contract Management; Marketing/Market Research; New Company Formation/Support; Licensing; Business Development; Intellectual Property Management; Strategic Alliances/Joint Ventures; Science Park Management (involving University IP/Spin-outs/Employees).

Data Collection

Good Practice Models

Desk-based research was carried out from June to September 2005 to identify and document models of best practice where universities were sharing resources or collaborating in IP management and technology transfer. These are presented as models to examine with the Technology Transfer professionals and stakeholders on the island, North and South.

Surveys of Institutions, Technology Transfer Professionals and Stakeholders

A top level institutional survey was issued by email to the identified institutional contacts in August. Responses were received from 8 universities.

The Technology Transfer professionals survey was developed to be accessed and completed on-line. At the close of the survey 35 returns were received.

A list of external stakeholders was agreed with the Project Steering Group and Directors. These were individuals representing organisations that exerted influence on the university process. These were interviewed by telephone using an agreed series of questions. A list of the nominated contacts is provided opposite.

Consultation

Technology Transfer Professionals Workshop

A Technology Transfer professionals workshop was held in Dublin, hosted by the IUA, in September 2005. This was designed to review the project objectives, to present the desk research on models from elsewhere and discuss the results of the surveys. There were 26 attendees, a list of whom is provided in Appendix 1.

Project Steering Group

- Aidan Gough - Inter*Trade*Ireland
- Marion McAneney – Inter*Trade*Ireland
- Dr Bernadette McGahon – Inter*Trade*Ireland
- Professor Eugene Kennedy – Dublin City University
- Professor Bernadette Hannigan – University of Ulster
- Trevor Newsom – Queens University Belfast
- Dr Tony Glynn – Dublin City University
- Andy Pollak – Universities Ireland
- Dr Conor O'Carroll – Irish Universities Association

External Stakeholders

Former Chief Science Adviser to Irish Government

- Barry McSweeney

Department for Employment & Learning

- David McAuley, Assistant Secretary, Higher Education & Analytical Services Division
- Dr Linda Bradley, Higher Education Research Policy Branch

Department of Enterprise, Trade & Investment (DETI)

- Fiona Hepper, Strategic Policy Division

Department of Enterprise, Trade & Employment

- Páraig Hennessey, Science, Technology & Intellectual Property Division

Enterprise Ireland

- Feargal Ó Móráin, Executive Director, Applied Research & Commercialisation
- Martin Lyes, Manager, Applied Research & Commercialisation

Forfás

- Declan Hughes, Science & Technology Policy

Health Research Board (HRB)

- Dr Ruth Barrington, Chief Executive

Higher Education Authority (HEA)

- Dr Eucharia Meehan, Head of Research Programmes

IBEC-CBI Joint Business Council

- William Poole, Chief Executive
- Jackie Harrison, Projects Director

Invest Northern Ireland

- Tracy Meharg, Managing Director, Innovation & Capability Development Services
- John Thomson, Innovation, Research & Technology

Industrial Development Agency (IDA) Ireland

- Enda Connolly, Divisional Manager, Education, Skills & Research
- Raymond Bowe, IP Technical Specialist

Patent Agents

- Dr Maura O'Connell, F.R. Kelly & Co

Science Foundation Ireland

- Professor Mark Keane, Director, ICT Division
- Dr Maurice Tracey, Director, Biotechnology Division

Institutional & Technology Transfer Professional Contacts

Vice Presidents / Deans of Research

- Professor Ian Robertson, Dean of Research, Trinity College Dublin
- Professor Bernadette Hannigan, Pro-Vice-Chancellor (Research & Innovation), University of Ulster
- Professor Des Fitzgerald, Vice President for Research, University College Dublin
- Professor Peter Kennedy, Vice President for Research, University College Cork
- Dr Maura Hiney, Acting Dean of Research, National University of Ireland Galway
- Dr Frank Mulligan, Acting Dean of Research, National University of Ireland Maynooth
- Dr Vincent Cunnane, Vice President for Research, University of Limerick
- Professor Eugene Kennedy, Vice President for Research, Dublin City University
- Trevor Newsom, Director of Research & Regional Services, The Queen's University, Belfast

Directors

- Dr Eoin O'Neill, Director, Innovation Centre, Trinity College Dublin
- Dr Pat Frain, Director, Nova Centre, University College Dublin
- Tony Weaver, Industrial Liaison Officer, University College Cork
- Dr Sean Nelson, Director, UUTech Limited, University of Ulster
- John Scanlan, Industrial Liaison Officer, National University of Ireland Maynooth.
- Paul Dillon, Industrial Liaison Officer, University of Limerick
- Dr Tony Glynn, Director, Director, Innovation & Business Relations, Dublin City University
- Daniel O'Mahoney, Director, National University of Ireland Galway
- Trevor Newsom, Director of Research & Regional Services, Queen's University, Belfast

Technology Transfer Professional Questionnaire

Name
Job Title
Contact Details

1   How long have you been involved in knowledge transfer activities?

0-3 Months
4-11 Months
1-3 years
4-9 years
10 years+

2.   Is your post

Permanent
Fixed Term
Seconded

3.   Within which age category do you fall?

<25
25-34
35-44
45-54
55-64
65 +

4.   What academic qualifications do you hold?

	Subject
First degree	
Masters	
PhD	
Other	

5.   What formal courses/training have you attended directly related to knowledge transfer?

Course	Duration	Outcome/award	Year(s)

6. What practical experience do you have in knowledge transfer/commercialisation?

7. Key Skills

On a scale of 1-5 how important are these skills for your role and how important do you believe further training/development to be for you?
1 = not important, 5 = very important

Aim: To identify core, generic skills gaps

Skill	Importance to your role (1-5)	Importance of further training to you (1-5)
Research		
IT		
Organisation and Coordination		
Oral & Written		
Meeting Skills		
Customer Relationship Management		
Editing & Précis Writing		
Team Leadership/Team Working		
Negotiation		
Listening		
Obtaining Feedback		
Conflict Resolution		
Planning & Time Management		
Business Planning		
Business Development and Selling		
Facilitation		
Problem-solving & Decision Making		
Quality Control		
Risk Assessment & Management		
Networking		
Project Management		
Other (please specify)		

8. Key Competencies for Knowledge Transfer

Which of these competencies related specifically to knowledge transfer are important for your role and how important do you believe further training/development to be for you in current and future roles?

Aim: To identify core knowledge transfer competence gaps and exemplars

Competence	Importance to your role (1-5)	Importance of further training to you (1-5)
Business Networking		
Brokerage		
Commercialisation Techniques		
Consultancy		
Costing & Pricing		
Deals & Decision Making		
Finding/Engaging with Business		
Funding Management, including Sources		
IP Protection & Management		
Knowledge Transfer Management in Practice		
Knowledge Transfer Management		
Law Governing Knowledge Transfer		
Licensing		
Joint Ventures		
Incubation Parks Needs & Management		
Research Administration		
Research & Contracts Management		
Spin-offs and Start-ups – Creation		
Post-creation Support to Spin-outs		
Technology/Knowledge Exploitation		
Valuation of Technologies/Businesses/IP		
Other (please specify)		

9 Organisational strengths and weaknesses in commercialisation / Knowledge Transfer

What do you believe to be the key strengths & weaknesses of your university in commercialisation/knowledge transfer?

Institutional Questionnaire

Please complete the Questionnaire below and return it by 2nd September 2005 to Gillian McFadzean, email as below, or by post to:
Director, Technology & Research Services
Heriot-Watt University, Edinburgh, EH14 4AS

If you have any questions, or would like to discuss your response, please contact a member of the study team:
Gillian McFadzean (G.McFadzean@hw.ac.uk tel +44(0)131 451 3881)
Dr Mike Cox (M.K.Cox@hw.ac.uk, tel +44(0)131 451 3071) or
Antonia White (antonia.white@truenorthinnovation.co.uk, tel +44(0)131 552 0121)

Thank you for your assistance.

Institutional Questionnaire

1. **Name of University**
    Main Contact point and contact details

2   **What Knowledge Transfer activities are carried out by your University?**

3. **Please describe any external environmental issues that impact on your Knowledge Transfer activity and the result of these.**

4. **Responsibility for Knowledge Transfer Activities**
    Which part of the Organisation is responsible for the following areas of the Knowledge Transfer process? Please provide an organisational chart separately.

Knowledge Transfer Role	Part of Organisation	No of staff (FTEs)	Funding Source	Budget
IP Management				
Funding				
Research Administration/Contract Management				
Reach out/Business or Community Connections				
Programmes with External Organisations				
Commercialisation Management & Support				

Consultancy Process				
Incubation/Spin-outs/Science Parks				
Innovation/New Ideas/New Knowledge Management				
Post-incubation Support				
Project Management				
Marketing/Promotion				
Technical Support/IT				
Training of Researchers				
Other (please specify)				

Comment:

5   University Activity

	2002-2003	2003-2004	2004-2005	Current Totals
No of new license deals established				
License Income (€/£)				
No of spin-out companies formed using institutional IP				
No of patents applied for				
No of patents granted				
No of patents used in commercialisation deal (licensing/spin-out)				
No of new collaborative research contracts with industry				
No of new consultancy/knowledge transfer activities				

6   Please describe the current process for Commercialisation (i.e.: invention identification, evaluation, protection, valuation and exploitation)

7. **What Knowledge Technology/Technology Transfer collaborative activity exists between your university and other universities on the island, North and South?**

Type of Collaboration	University/ies	Driver	Added value of cooperation
Licensing of joint IP			
Company creation			
Joint development project with commercial potential			
Others (please specify)			

8. **What Knowledge/Technology Transfer collaborative activity exists between your university and other universities elsewhere?**

Type of Collaboration	University/ies	Driver	Added Value of cooperation
Licensing of joint IP			
Company creation			
Joint development project with commercial potential			
Others (please specify)			

9. **Are there areas where you see potential for future collaboration (e.g. joint marketing etc)?**

10. External support

Which, if any, aspects of support for commercialisation are dealt with externally?

Area/description	External Provider Name

11. Markets

Which geographical areas are most important in terms of current commercialisation/knowledge transfer activity?

AREA	Type of deal (e.g. licensing)	Technology Area	Examples of Clients
Island of Ireland			
UK & Europe			
USA			
ROW			

12. Best Practice Case Studies

Does your university produce commercialisation/knowledge transfer case studies? If Yes, what information do these contain?

13. Any other comments

Technology Transfer Professional Consultative Meeting

Workshop Topics

Area 1: Collaboration with other Universities

- What would be the benefits of working together?
- Why don't Universities work together at the moment?
- What are the barriers?
- What would have to happen to make Universities work together more?
- How could Technology Transfer professionals make working together sustainable?

Area 2: Joint Marketing to Industry

- Is there any joint marketing undertaken at the moment? If so, what?
- What potential areas could be covered?
- What formats might be used (eg web, case studies, posters etc?)
- How might this be undertaken and by whom?

Area 3: Collaboration for Training

- Is there a need for formal periodic review of training needs for knowledge transfer staff?
- Is this part of current appraisal process/should it be?
- Are the group aware of what knowledge transfer training is available and where the gaps are?
- Is local delivery an issue?
- What training might benefit the academic community?
- How would this be delivered cost-effectively?

Attendees

- Dr Philip Graham – QUB
- Sharon Devlin – QUB
- Rodney Hamill – QUB
- Panos Lioulias – QUBIS
- Dr Tony Glynn – DCU
- Dr Fred Logue – DCU
- Dr Declan Raftery – DCU
- Dr Noel Daly – DCU
- Ron Immick – DCU
- Bridgeen McCloskey – UCD
- Dr Ciaran O'Beirne – UCD
- Dr Pat Frain – UCD
- Dr Eoin O'Neill – TCD
- Dr Bernie McGahon – ITI
- Chris Ryan - ITI
- Dr Margaret Woods – TCD
- Dr John Scanlan – NUIM
- Daniel O'Mahony – NUIG
- Padraic DeBurca – NUIG
- Fiona Neary – NUIG
- Neil Ferguson - NUIG
- Paul Dillon – UL
- Mary Shire – UL
- Dr Timothy Roche – UCC
- Michael Grufferty – Tyndall National Institute
- Gillian McFadzean – TRS
- Antonia White – True North Innovation
- Dr Mike Cox – TRS
- Marion McAneney – ITI

APPENDIX 2 - CASE STUDIES

A number of relevant case studies were identified and these are described either in this Appendix or in Section 6 of the report.

- The North Texas Enterprise Centre for Medical Technology (NTEC), USA
- Proof of Concept Fund, Scotland
- SMART Fund, Scotland
- SCORE, Scotland
- SEEKIT, Scotland
- Innovative Actions, Scotland
- Intermediary Technology Institutes, Scotland
- Centres for Research-Based Innovation, Norway
- PROvendis, Germany
- Southern Growth Policies Board, USA
- Technology Innovation Group, Texas, USA
- Discovery Parks, Canada
- West Midlands Knowledge Exchange, England
- Research Triangle International, North Carolina, USA
- Edinburgh Science Triangle, Scotland
- RSE Enterprise Fellowships, Scotland & Medici Fellowships, England
- Know-How Wales
- Medicon Valley, Denmark/Sweden
- Scottish Higher Education Portal, Scotland
- Scottish Institute for Enterprise, Scotland
- SET squared, England
- Midlands Medici, England
- Spanish collaboration in market evaluation (REDValor), Spain
- Technology Licensing Bureau (TLB), Germany

THE NORTH TEXAS ENTERPRISE CENTER FOR MEDICAL TECHNOLOGY (NTEC)

www.ntec-inc.org/default.asp

Summary

NTEC is a not-for-profit corporation that assists entrepreneurs with starting and growing new medical technology ventures. The center provides a broad base of support to entrepreneurs, both internally and through its extensive resource network.

As the leading medical technology incubator in the American Southwest, NTEC provides its programme companies with a comprehensive suite of services and infrastructure enabling them to accelerate market entry and attract investment capital. NTEC programme companies can access a wide range of business, academic, legal, marketing and financial partners and advisors that provide the niche specific expertise to help mitigate risk and accelerate new venture development.

NTEC is focused on the rapidly growing medical technology sector which includes medical instruments and devices, diagnostic equipment, medical therapeutic devices, medical monitoring equipment, and other health related products. NTEC seeks out medical technologies which have the potential to become disruptive by leveraging the convergence of computer processing power, communications, software, and information technology. It is supported through a public-private partnership between the Frisco Economic Development Corporation (FEDC) and Hall Financial Group, and is further supported by a contributor network of Stakeholders, Patrons, Preferred Partners and individuals.

Services

NTEC's facility is designed to provide its programme companies with an entrepreneurial and collaborative environment, where founding teams interact with seasoned professionals, service providers and capital providers to address strategic and tactical issues. In addition to the facility and the services outlined earlier, NTEC serves the community and its partners through a variety of outreach and educational programmes.

NTEC hosts or co-hosts numerous internal programmes for its member companies and network, including CEO roundtables, brownbag lunch panel discussions, stakeholder meetings, investment forums, and other training programs. They also participate in outward-facing events, such as an annual Medical Technology Summit, the Medical Device Action Alliance, Business Plan Competitions, Angel Funding Forums, Technology Award Events and other general technology and entrepreneurial seminars and training.

NTEC's hands-on approach combines expertise and guidance in the areas of:

- Business Management
- Operations
- Regulatory Matters
- Manufacturing and Quality Control
- Funding
- Staffing
- Support Network
- Referrals

It draws on a network of:

- Capital Providers (individual investors, angel syndicates, traditional and corporate venture capitalists, institutional investors, banks, government funding sources, etc.)
- Service Providers (marketing, public relations, printers, consultants, contract manufacturers, components providers, business support services, etc.)
- Mentors and Medical Advisors (experienced business and medical advisors categorised by experience and area of specialisation)
- Research and Development Alliance (universities, medical centres, physician groups, medical device manufacturers, research laboratories, etc.)
- Strategic Partners (medical device manufacturers, software developers, consulting firms, information technology providers, etc.)
- Contributors (law firms, accounting firms, banks, corporations, health care institutions, manufacturers, service providers, etc.)
- Community leaders and organisations (local/regional/national politicians, Small Business Administration, chambers of commerce, trade associations, etc.)

Strengths

- Tailored support
- Wide support base of expertise and funding
- Independence

Weaknesses

- No direct connections to universities; therefore no pipeline of technology or expertise for companies

PROOF OF CONCEPT FUND, SCOTLAND

Summary

The Proof of Concept (POC) programme supports the pre-commercialisation of leading-edge technologies emerging from Scotland's universities, research institutes and NHS Boards. It helps researchers to export their ideas and inventions from the lab to the global marketplace.

Projects can be typically defined as occurring after advances made during curiosity-driven or strategic research. This is usually after a background patent has been filed, but before:

- a full lab-scale demonstration of the technology.
- any pre-production development/prototyping.
- commercial funds for development have been made available (because of the existing level of technical and market risk).

History

POC was launched initially as a three year £11 million programme in October 1999. After the second year the programme was extended to £33 million over a six year period. The Fund received a further £10 million from the European Regional Development Fund to fund an extended programme which aims to improve the commercial potential of existing POC projects.

The Programme currently supports 146 projects worth over £23.7m and has created 340 new jobs.

Strengths

- Fills a crucial funding gap
- Allows focused commercialisation of appropriate technologies
- IP retained by institutions
- Reinforces technology transfer activity in Scottish universities
- Provides funding for market research and patenting

Weaknesses

- Projects may require follow-on funding (being addressed by PoC+ scheme)
- Can be bureaucratic
- Does not count for Research Assessment Exercise
- Can underestimate the experience of Principal Investigators and Technology Transfer Offices
- Lack of detailed feedback for rejected projects
- Competition for finite resources

SMART SCOTLAND

Summary

SMART:SCOTLAND aims to stimulate the creation of new, innovative businesses and to help existing small businesses improve their competitiveness by developing new products and processes to the benefit of the national economy.

SMART:SCOTLAND is competitive and assists individuals and small firms to carry out a technical and commercial feasibility study lasting 6-18 months.

Support is made available at 75 per cent of the eligible project costs. The maximum award is £50,000. One third is paid up front to the winners and the remainder is normally paid quarterly against claims submitted.

Strengths

- IP is retained by the company
- Competition is against criteria rather than other companies
- Fills a funding gap – early stage spin out
- Multiple calls
- One third of the grant is paid in advance
- Feedback is very specific and useful
- Can reapply if unsuccessful

Weaknesses

- Low level of funding (£60K including contribution from the company)
- Only part funding
- Requirement for significant technical risk
- Company must be incorporated before end of contract

SCORE

Summary

The SCORE programme is designed to support R&D projects jointly undertaken between public sector research bodies (such as Higher Education Institutes, Research Institutes, NHS Trusts) and Scottish SMEs. Under this scheme, an SME or group of SMEs with a specific technical problem or requirement can assign a significant part of the required scientific and technological research to a public sector research body. The SCORE programme was introduced in 2004 and to date there have been 8 SCORE awards.

The key objectives of the programme are as follows:

- to increase the competitiveness of SMEs through support for product or process development;
- to encourage increased co-operation between enterprises and research organisations;
- to help effect wealth creation from the science base; and
- to provide a framework for collaborative research projects involving SMEs across a wide range of sectors.

Financial support is available at 50 per cent of the eligible project costs of partnerships undertaking an R&D project, up to a maximum grant of £35,000 per project. The research base partner(s) must incur and defray at least 40 per cent of the total eligible costs of the project and it is expected that they will receive 100 per cent of their costs.

For a partnership to be eligible for support, it must contain at least one Scottish-based SME and one public sector research body (e.g. Higher Education Institute, Research Institute or NHS Trust).

The lead partner on the SCORE project should be a Scottish-based SME and the offer of grant will be made to the lead partner. The SCORE Programme uses the EC definition of a small or medium-sized enterprise in order to determine eligibility for the scheme. The programme will provide funding for pre-competitive development activities in R&D. Fundamental research activities will not be supported under the scheme. Typically the IP ownership resides with the SME.

To be eligible for support projects must be a minimum duration of 6 months and maximum of 18 months.

Strengths

- Rapid decision making process
- No deadlines for applications
- Encourages SMEs to undertake research
- Develops links between SMEs and universities
- SME is the lead partner

Weaknesses

- Only 50 per cent of eligible costs covered
- No formal follow up after funding
- Claims paid in arrears

SEEKIT

Summary

The SEEKIT programme is designed to support projects that will promote co-operation in R&D and knowledge transfer between small to medium sized enterprises (SMEs) and the Scottish public sector science base. Applications are invited from public bodies, such as universities, Research Institutes, Technology Transfer Organisations, NHS Trusts etc .

The scheme is not prescriptive and will support a wide range of knowledge transfer/outreach activities. However, all project proposals must show that the project will improve the science base partner's ability to work effectively with SMEs and will ultimately result in positive competitive benefits to local businesses.

The key objectives of the new programme are:

- to help effect wealth creation from the science base;

- to increase the competitiveness of SMEs through their engagement with the science base; and

- to encourage productive knowledge transfer links between business and the science base.

The actions which can be supported under the scheme are broad and some typical examples are provided below:

- Actions which encourage the dissemination and application of new and existing knowledge, processes and technologies;

- Actions which encourage the effective commercialisation of R&D activities and the outputs of HEIs and Research Institutes;

- Actions which encourage collaborative research and innovation through increased commercialisation of R&D related activity.

The SEEKIT programme aims to complement actions which can be funded under the European Structural Funds ERDF programmes. The amount of grant payable on each project is determined by the amount of co-finance required to enable the project to proceed. In exceptional circumstances and/or if other forms of support are not available, the SEEKIT programme may fund up to 100 per cent of eligible project costs.

History

The SEEKIT Programme was introduced in 2004. SCORE & SEEKIT have a combined budget, over 3 years, of £9 million. To date there have been 5 completed SEEKIT Programmes and funding totalling £2.4 million.

Strengths

- Develops links between SMEs and Universities

- Encourages the commercialisation of technology through SME

- Potential for further EU funding

- Encourages innovation within SME

- Rapid decision making process

Weaknesses

- Only 70 per cent of eligible costs can be applied for

- No formal follow up

- Claims paid in arrears

INNOVATIVE ACTIONS

Summary

The Innovative Actions Programme forms an integral part of the EU's strategy on stimulating innovation in business. Scotland will benefit from accessing a network of similar expertise and related knowledge operating across 138 regions throughout Europe, each with the stated aim of stimulating and improving the delivery of innovation and entrepreneurship support systems.

The Programme offers an opportunity to pilot innovative and creative ideas. Operating Scotland-wide it aims to make a major contribution towards the improvement of the Scottish innovation support system.

Projects funded under this Programme will be delivered by partner organisations involved in the mechanisms of delivering innovation support services to SMEs across Scotland.

The programme concentrates on supporting innovative pilot projects in 4 key strategic areas:

- the Scottish innovation system – exploring new systems-based approaches towards innovation in Scotland and systems mapping

- SME demand for innovation – exploring business attitudes to innovation and research and development; and piloting new interventions to stimulate demand within SMEs

- knowledge access, flows and management – exploring SME access to knowledge and learning, knowledge flows and how Scottish SMEs manage and exploit knowledge to improve growth and competitiveness

- marketing and product launch – exploring the mechanisms of how Scottish SMEs create new markets and seek to turn innovation into value.

Another important feature is the emphasis on networking across other regions. This will provide the facility to disseminate the findings from pilot projects carried out in Scotland to the other regions in Europe operating Innovative Actions Programmes. This means that innovative ideas and new innovation support mechanisms that have been successful elsewhere in the Europe can be introduced to Scotland.

The Programme is a total investment of £4 million, 50 per cent of which is provided by the European Commission under the European Regional Development Fund.

Strengths

- Considers more unusual ideas where funding is not normally available

- Encourages risk

- Open, easy application procedure

Weakness

- No sense yet for what is required for success – even though the programme supports "innovation", examples and feedback could assist planning.

INTERMEDIARY TECHNOLOGY INSTITUTES

(Innovating Tomorrow's Industry)

Intermediary Technology Institutes (ITIs) have been created to stimulate greater entrepreneurial dynamism in Scotland. The ITIs have been established in three key areas: Life Sciences, Energy and Techmedia.

The ITIs are explicitly market-driven and demand-led – to address genuine business requirements. By providing access to cutting edge technology, ITIs will ensure that new and existing high growth companies build the foundation of economic growth.

History

Each ITI has a minimum of £150 million from the Scottish government to invest over a 10 year period.

The spend to date has been as follows:

- Life Sciences - £44.5 million on R&D Programmes
- Energy – up to £9.2 million on R&D Programmes
- Techmedia – in excess of £11.7 million on R&D programmes

The IP ownership is effectively negotiable, with the ITIs preferring to own all foreground IP while the background IP is retained by companies or institutions.

The funding allocation from Scottish Enterprise is £45 million per annum over 10 years on projects.

Strengths

- Help to pool activities and expertise
- Market focused
- Fully funded
- Significant engagement with companies and industry
- Staff have industry knowledge
- Strong links are being established with university commercialisation units
- Valuable foresighting work is made openly available to inform research programmes in universities

Weaknesses

- Slow to get projects up and running initially
- Contract Research model does not fit well with universities who are increasingly taking consultant positions rather than development delivery roles
- ITI demands ownership of foreground IP
- Contractual position can appear a little inflexible which acts as a disincentive to researchers; many are choosing to deliver consultancy advice in preference to undertaking funded development programmes
- Security and reporting requirements appear onerous, particularly to researchers who are accustomed to working with industrial partners.

NORWAY: CENTRES FOR RESEARCH-BASED INNOVATION

Summary

The Centres for Research-Based Innovation scheme is a new national programme under the auspices of the Research Council of Norway, which provides the basic source of funding for the scheme.

The goal of the scheme is to build up or strengthen Norwegian research groups that work in close collaboration with partners from innovative industry and innovative public enterprises. The objective is to support long-term research that promotes innovation and competitiveness in areas in which Norway currently has or has the potential to achieve a strong international position. Important objectives of the initiative include promoting the internationalisation of Norwegian industry and research, the training of industrial researchers and the transfer of research-based knowledge and technology. The criteria for the selection of the centres are scientific quality and commercial potential. The criteria listed below, which were formulated and agreed upon in 1994 when the Competence Centres Programme started, form a basis for the evaluations of the Centres' activities.

A successful Competence Centre:

- offers commerce an attractive and concentrated research environment for collaboration, problem-solving and long-term competence development. The centre has a clear home within the contracting university;
- has enduring participation from commerce in management, implementation and financing of a research programme of common interest and attracts resources from industrial partners;
- has a clear competence profile within which the centre is internationally competitive and capable of adapting and reinforcing this, having regard to the needs of interested parties and technological-scientific development;
- renews and extends its scope of interests within commerce in Norway (including small and medium-sized enterprises);

is characterised by mutual person mobility between the university and corporate research and development environments.

Strengths

- business enterprises and ventures participate in the centres' activities
- the centres' research results and competence will furnish a platform for innovation and value creation among user partners
- the commercial partners will participate in the centres' governance, funding and research, and must have significant innovation activities of their own as well as the ability to take advantage of advanced research when developing their activities. Each centre is required to have not just one, but several user partners that support and participate in the centre's activities.

Weaknesses

- relationship with the host institution would have to be carefully managed
- degree of participation of users would have to be uniform

PROVENDIS

Summary

This is a patent marketing company working with universities in North-Rhine/Westphalia. It is 100 per cent owned by ZENIT GmbH - an independent consulting company that is part-owned by the North-Rhine/Westphalia state government. It also works with units such as the Technology Licensing Bureau.

Its objectives are commercial; to identify and utilise inventions from the state universities and polytechnics which have market potential. Part of the goal is to generate income but another aspect is to increase co-operation between the business and the scientific communities.

Business benefits by obtaining access to a gateway to the universities and is guaranteed protected technology.

The benefits to the universities include:

- IP advice for inventors
- Invention evaluation
- Development of suitable patenting and exploitation strategies
- Registration of IP rights, using third party patent lawyers, not PROvendis staff
- Marketing & licensing of commercial property rights
- Monitoring of licenses and recovery of income

History

German universities register approximately 4 per cent of the patents arising from their research. PROvendis was formed to improve this and to provide a professional service in exploitation. All staff are technical experts who also have business experience in related fields.

Support is available free of charge to individual employees of the university for inventions not related to their work, on the proviso that they hand over ownership to the employing university (not to PROvendis).

Where work is undertaken for a university, the inventor gets up to 30 per cent of the gross income and the university and PROvendis share the 70 per cent .

PROvendis is funded by the national and state governments on a tapering model with funding reducing over 10 years as commercial income is generated.

Strengths

- Professional support in a commercial environment and thus dependent on successful exploitation for income
- Well resourced to undertake due diligence and to protect the IP
- Universities work loosely together and allow bundling of IP

Weaknesses

- At arms length from universities so licensees may find it difficult to agree follow-on support if they are dealing with both PROvendis and the university
- Universities do not retain all income once inventor has been rewarded
- Sustainability of the operation without public sector funding

SOUTHERN GROWTH POLICIES BOARD

www.southern.org

Summary

Southern Growth Policies Board is a non-partisan public policy think tank based in Research Triangle Park, North Carolina. Formed by the region's governors in 1971, Southern Growth Policies Board develops and advances visionary economic development policies by providing a forum for partnership and dialogue among a diverse cross-section of the region's governors, legislators, business and academic leaders and the economic and community-development sectors. This unique public-private partnership is devoted to strengthening the South's economy and creating the highest possible quality of life.

Supported by memberships from 13 Southern states (Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, West Virginia) and the Commonwealth of Puerto Rico, Southern Growth provides a gathering place for regional collaboration. Southern Growth Policies Board is a private non-profit organisation that is also supported through associate memberships from corporate, non profit and academic institutions, as well as grants, contracts and corporate sponsorships.

History

Research Focus

Southern Growth's research focus encompasses the major drivers for economic development in the South - innovation and technology, globalisation, the changing nature of the workforce and the vital role of the community. Southern Growth provides its members, and the region, with authoritative research, discussion forums and pilot projects that define the critical issues shaping the South. Southern Growth develops new regional strategies for economic development and identifies best practices to facilitate action.

Advisory Councils

Four advisory councils, each chaired by a Southern governor, guide Southern Growth's policy work and research. The four councils are aligned with Southern Growth's major research areas and include the Southern Technology Council, focusing on innovation and technology; the Southern Global Strategies Council focusing on globalisation, international trade and investment, immigration and international education; the Council for a New Economy Workforce focusing on workforce issues; and the Council on the Southern Community focusing on leadership, civic engagement and community development and growth.

Publications

Southern Growth produces reports, toolkits and policy papers to support the deliberation and projects of the four advisory councils. Each June, Southern Growth releases an annual Report on the Future of the South. The Report on the Future of the South is the centerpiece of the organisation's yearly conference and the catalyst for in depth discussions on issues facing the region. In 2002, Southern Growth released The Mercedes and the Magnolia: Preparing the Southern Workforce for the Next Economy.

Case studies of each of the universities include details about external partnerships, including industry research partnerships, technology transfer, industrial extension and technical assistance, entrepreneurial development, industry education/training partnerships, and career services and placement. The case studies also look at each institution's enablers, particularly the university's culture and rewards, and formal partnerships with economic development organisations and university/industry advisory boards and councils.

Strengths

- Independent policy advice and formulation
- Buy-in from all parties
- Fosters collaboration through working together on projects

Weaknesses

- All funding for large collaborative projects has to be committed by partners; there is no core funding
- Local priorities within a very large region can cause policy differences

TECHNOLOGY INNOVATION GROUP, AUSTIN, TEXAS

Summary

This is a third party funded by providing technology transfer services to universities.

Services

The Technology Innovation Group services are provided under the following three areas:

Advise: the group draws on their team's backgrounds in technology commercialisation and transfer, entrepreneurship and regional economic development to write studies and develop action plans.

They apply their expertise and knowledge networks to create the following value-adding solutions:

- Commercialisation Assessments
- Innovation and Intellectual Property Portfolio Management
- Business Planning
- Feasibility Studies
- Knowledge Transfer Assistance
- National and Regional Technology Policy Development
- Economic Development Strategies for Technology-Based Economies

Activate: the group undertakes fundraising assistance, licensing the technology, recruiting management and directors, establishing operational and financial budgets, plans and policies, and identifying or negotiating joint venture opportunities under the following headings:

- Recruitment for Selected Management Roles
- Fund-Raising Assistance
- Business Formation and Development
- Valuations and Licensing
- International Expansion of Companies with Intellectual Property
- Organisational development

Educate: The group's publications and training programs are designed to enhance the understanding of the innovation process and to help professionals build economic value from useful discoveries.

Strengths

- Can be hired in on an ad hoc basis or on retainer
- Provide access through networks to expertise not available in the university or in the company and manage that sub-contract

Weaknesses

- Can opt not to accept a client

DISCOVERY PARKS, CANADA

Summary

Discovery Parks is a private Canadian trust that designs and builds research facilities in British Columbia (BC). Their tenants comprise leading edge technology companies. To support BC's commercialisation and technology transfer activities, Discovery Parks Trust distributes its profits to BC's post-secondary institutions, promoting further research and development within the economy.

Discovery Parks is British Columbia's leading developer of office and research space designed for technology and biotechnology companies. With more than 500,000 square feet situated on four post-secondary campuses and in the cities of Vancouver and Burnaby, their buildings are designed to meet the specific and unique requirements of the technology industry. Catering especially to small start-up and post-secondary spin-off companies, Discovery Parks becomes the link between research and the marketplace.

Acting as a risk transfer mechanism, Discovery Parks:

- Assumes the business risk
- Leases the land from the public institutions
- Secures the private financing
- Builds the building
- Finds the tenants
- Operates the building

Acting as beneficiaries, BC's post-secondary institutions enjoy:

- On-campus space for spin-out companies
- Financial returns from the building
- A faster rate of technology transfer from academia to the workplace

History

Discovery Parks has invested more than $22 million of cash equity in its research parks, not including mortgages. At the same time, more than $8.7 million of operating profits have been distributed to BC's post-secondary institutions and the BC Innovation Council, helping to fuel BC's technology economy.

Strengths

- Provides and operates office and research space for spin-out companies at no capital cost to the universities
- Profits distributed to universities
- Facilitates community of spin-out companies

Weaknesses

- Requires university to have land available for development

THE WEST MIDLANDS KNOWLEDGE EXCHANGE - CONTACT

Summary

This is a specialist resource that supports west midlands businesses by precision matching a company's needs with the skills and expertise available from the region's universities. These universities are Birmingham, Aston, Keele, Warwick, Wolverhampton, UCE Birmingham, Coventry, and University College Worcester.

CONTACT aims to create an environment in which businesses and business support agencies working with HEIs openly share their needs, ambitions, capability and experiences in order to identify, access and exploit the full range of opportunities that exist for collaboration.

In establishing this environment, the CONTACT follows the principles of enhancing not duplicating, building on and joining up successful and established activity, being demand led and supply responsive whilst recognising that brokering must meet user and supplier needs, and reflecting partner strengths in allocating lead roles, funding and responsibilities.

History

Established through two consecutive competitive bids to the UK Higher Education Innovation Fund (HEIF) provided by the Office of Science and Technology (OST), the award was used to establish three central posts and a number of HEI based Knowledge Brokers and to provide a resource to market and manage the delivery of university skills and expertise to businesses.

The project set out six challenges:

Challenge 1: To continue and extend the initial role currently undertaken by the individual HEIs on behalf of the region's businesses and SME intermediaries.

Action: to develop the current Contact remit to broker relationships between the region's HEI knowledge transfer offices and businesses and the key regional and sub-regional business intermediaries and representative bodies. Opportunities which arise are signposted to and between the partners through an enhancement of the existing Contact e-Brokerage system. This service provides individual institutions with a wide range of opportunities which would not otherwise be available to them. The development includes industrial research, training and professional development and graduate placement. The e-Brokerage system achieved a 48hr response to business enquiries, handling 500 enquiries in its first 2 years of operation in addition to the enquiries taken directly by individual HEIs.

Challenge 2: To bring HEI Regional Knowledge Brokers (RKBs) and pro-active business champions together to promote collaborative actions and to support the HEI's representatives by engaging them in these business and HEI communities of practice.

Action: to support, enhance and develop business and HEI forums, supported on line by an extension to the communities of practice facilities of the regional 2WM business clusters portal. The business forums will provide business-to-business and business-to-supplier exchanges in support of identified business needs. The West Midland HEI knowledge transfer professionals' forum will obtain, adapt and share the best practice in third stream activity sourced from partners and beyond. The sub-regional New Technology Initatives (NTI) will be engaged in these forums giving access to their findings across the region. The forums will also support the information and communication needs of a range

of HEI representatives who sit on regional committees and working groups, such as Cluster Opportunity Groups. This will improve their links to the region's business groups and HEI knowledge transfer offices.

Challenge 3: To engage the HEIs fully in national CPD developments through regional champions.

Action: to support a programme of CPD for knowledge transfer professionals across the West Midlands HEIs. This will support the provision of accredited training for HEI business development staff and the development of expertise, materials and methodologies. The AURIL national CPD framework for knowledge transfer professionals will be the first model to be utilised, through pilot actions at Coventry University and University College Worcester.

Challenge 4: To demonstrate the potential and use of e-referrals between the business support agencies and HEIs through a pilot systems integration project.

Action: to build on the links established with the key business support agencies, in particular the business links, chambers and learning skills councils. An exemplar multi-agency e-referral development will be undertaken.

Challenge 5: To raise awareness and promote the activity of the Brokerage regionally.

Action: to manage the Lord Stafford Awards (LSA) on behalf of the region's HEIs and in collaboration with the Regional Development Agency (RDA), ensuring that quality applications to the Awards are put forward and that sponsorship opportunities are pursued. The RDA will continue to fund the costs associated with the LSA events.

CONTACT, drawing on best practice from Technology Venture Scotland and Knowledge Northwest, will develop a news-based enquiry service to promote examples of best practice. This will enable businesses and agencies to post new developments and develop a service that is seen as the first point of call to find out what is happening between the HE and business sector.

Challenge 6: To provide business with more routes to access the services of the region's HEI and Further Education networks.

Action: the staff funded through CONTACT will engage their local FE colleges and NTI networks to investigate the opportunities for FE and HE collaboration in support of local businesses.

Strengths

- Fosters collaboration across a large group of universities
- Is currently delivering contracts at the rate of 2 per month to the universities
- Involves the Further Education sector

Weaknesses

- Requires strong management links with the universities or it will become self-standing entity
- Long term viability is not proven

RESEARCH TRIANGLE INTERNATIONAL (RTI)

Summary

Three North Carolina universities (Duke University in Durham, the University of North Carolina at Chapel Hill, and North Carolina State University in Raleigh) incorporated RTI in 1958. It is a separately operated affiliate of these schools and maintains its own staff and offices. Its staff collaborate with their scientists on research programmes and projects and maintain such relationships as adjunct faculty appointments, co-operative research programmes and other professional contacts. RTI also participates with universities and businesses in the Microelectronics Centre of North Carolina and the North Carolina Biotechnology Centre.

An independent, non-profit organisation, RTI engages in research and development with the goal of improving the human condition. It works with clients in government, industry, academia, and public service throughout the United States and abroad

History

In 1958, the idea of Research Triangle Park (RTP) was born with the guidance and support of government, education, and business in North Carolina

As RTP expanded and prospered after its inception, so did RTI. Growing from a handful of scientists in central North Carolina in 1959 to over 2,500 individuals working in 30 countries today, RTI is now one of the premier research institutes in the world. RTI activities both mirror and support national policies and programmes as well as diverse commercial, industrial, and academic endeavours. For instance, as public and government interest in environmental protection grew in the 1960s, so did related programs at RTI, building on their expertise in statistical, physical and life sciences.

Strengths

- Clear brand and focus
- Single point of entry

Weaknesses

- Develops life of its own, employing its own staff and thus little work goes to the universities

EDINBURGH SCIENCE TRIANGLE – BRANDING & MARKETING

www.scottish-enterprise.com/edinburghsciencetriangle.htm

Summary

The 7 science and technology parks within the Edinburgh Science Triangle are Alba Campus, Biocampus, the Centre for Biomedical Research, Edinburgh Technopole, Heriot Watt Research Park, Pentlands Science Park and the Roslin Biocentre

Each is owned/managed by a research institute or university. They are spread over a geographic area of 20 square miles around Edinburgh. Each attracts different sectors and companies at different stages of development. Each provides different levels of support to the companies. There is however a degree of competition to attract long term tenants between some of the parks.

The key aim of the project is to develop and raise the profile of the parks as the Edinburgh Science Triangle and its capabilities in order to attract new investment and place the consortium of Science Parks in the top 10 R&D locations in Europe. There is a website and an active co-ordinated marketing and promotion campaign supported by the local enterprise agency.

Advertising at the Edinburgh Airport is a major aspect of the campaign but in addition there is co-ordinated attendance at events world-wide (Euronano Forum, Bio Japan for example) and a strategy to gain feature article space in leading international media titles of both general and scientific types.

Strengths

- Brings the universities and research institutes together in a common cause
- Acknowledges and celebrates diversity; no empire building
- To date has had top level support from owners/managers
- Creates a single brand image that is very powerful
- Inhibits competition and ensures opportunities are passed between Parks rather than out of the area

Weaknesses

- Costs have to be met by enterprise agency; the strategy is not self-sustaining
- Organisations have to support and align with their Park Manager if this is to succeed
- Success may cause problems of under capacity

KNOW-HOW WALES

Summary

Know-How Wales is a free, impartial service available to all Welsh businesses, creating links between businesses, universities and colleges. It has a wealth of world-class knowledge, expertise and facilities available to Welsh-based businesses via universities and colleges through the Know-How Wales service. The service aims to improve business performance through the establishment of industry and academia projects.

The benefits of using Know-How Wales services include:

- Access to a team of professionals dedicated to providing businesses with an efficient and confidential service
- Access to operational and financial improvements
- Access to state-of-the art R&D facilities at universities and colleges
- Access to high-calibre technicians and graduates
- Access to world class scientific, engineering and management experts
- Access to latest business information and concept on marketing and development of new technologies.

Strengths

- Single point of access
- Common brand

Weaknesses

- Universities do not have ownership
- University expectations of income generation are high and probably unfounded given client base

APPENDIX 3 - RELEVANT PUBLICATIONS

A   International Publications

- A M Pappas & Associates, *Advisory services for the life sciences*, (2001)

- European Commission, *Expert Group Report, Management of intellectual property in publicly funded research organisations: Towards European Guidelines*, (2004)

- European Commission, *Improving institutions for the transfer of technology from science to enterprises Expert Group report*, (July 2004)

- Innovation U, *New University Roles in a Knowledge Economy*, Southern Growth Policies Board, (2002)

- Journal of the Association of University Technology Mangers, Volume XIII, 2001 AUTM, USA, (2001)

- Journal of the Association of University Technology Mangers, Volume XVI, Number I, Summer 2004, AUTM, USA, (2004)

- The Boston Consulting Group, *MassBiotech 2010; Achieving Global Leadership in the Life Science Economy*, Massachusetts Biotechnology Council, (2004)

- NC State University; Continental Campus, North Carolina State University, (1999)

- Research Triangle Foundation, *Research Triangle Park Owners & Tenants Directory 2004-2005*

- Responsible Partnering – *Joining forces in a world of open innovation*, EIRMA, 46 rue Lauriston, F-75116 Paris (with ProTon, EUA and EARTO) (January 2005)

- Stenby Offset, *Swedish Foundation for Strategic Research Activity Report 2001*, (2002)

- Newsnight Scotland, BBC2 Scotland, *The Development of the Biotech Industry in Massachusetts and Scotland*, (21 April 2004)

- McGill Office of International Research, Canada, *The gateway to international research and co-operation (undated)*

- DTI / Institute of Technology Management, HWU, *Strategic Technology Management in Arizona*, (1998)

- DTI / Institute of Nanotechnology, *The International Technology Service Mission on Nanotechnology to Germany and the USA*, (March 2001)

- Kenneth D Walters University of Washington, *UW-Related Startup Companies 1969-1999*

B   UK Publications

- Young Company Finance, McMillan-Scott plc, *Blackbook – the definitive resource for early stage fast growth companies in Scotland*, (2004)

- Technology Ventures Scotland, *Bridging the Gap – A Discussion Paper on Knowledge transfer in Scotland: The Interaction between SMEs & academia*, (March 2003)

- Julie Horn, Michael Zeithyn, Oakland Innovation and Information Services Ltd, *Business Interface Training Provision (BITS) Review Final Report, produced for the DTI*, (March 2002)

- AURIL / HESDA, *Continuing Professional Development Framework for Staff Engaged in University Industry Links*, (2001)

- UK Business Incubation, *Growing Success*, (2000)

- HEACF: case studies of good practice (HEFCE 2005/18), which builds on and expands the 2004 report (HEFCE 2004/21). (www.hefce.ac.uk)

- Higher Education Innovation Fund 3, www.hefce.ac.uk/pubs/hefce/2005/05_36/

- Higher Education- Business Interaction Survey (www.hefce.ac.uk)

- Scottish Science Advisory Committee, Investing in Scientific Talent, (October 2004)

- Scottish Science Advisory Committee Position Paper, Scottish Science Advisory Committee, *Knowledge transfer: Science to Scottish Businesses*, (October 2004)

- Scottish Universities Research Policy Consortium, Carter Rae *Making the Best Decisions: A guide to strategic investment in research infrastructure, Toolkit Summary*, (December 2002)

- Report of a Conference held at The Royal Society of Edinburgh *Managing Intellectual Property in Scottish Higher Education: Issues from the UUK / AURIL Study*, (June 2002)
  Scottish Enterprise, SHEFC, The Royal Society of Edinburgh, Universities Scotland

- Universities UK, AURIL, *Optimising consultancy; A good practice guide to the management of consultancy in universities and colleges*, (June 2001)

- CBI Publications, *Partnership for Research and Innovation between industry and universities: A guide to better practice*, (April 2001)

- The Royal Society of Edinburgh, Technology Venture Scotland, SHEFC, *Report of the Summary Event of The Royal Society of Edinburgh Science Based Research & Commercialisation Workshops*, (August 2001)

- Centre for Urban & Regional Development Studies, *Review of Research – Business Interface Training Provision*, (August 2001)

- Scottish Science Advisory Committee, *Science Matters: making the right connections for Scotland, First Report of the SSAC / Executive Summary*, (January 2004)

- Scottish Institute for Enterprise, *Scottish Institute for Enterprise – Annual Review 2003-04*, (2004)

- SQW report for OST – provided by Inter*Trade*Ireland www.ost.gov.uk/enterprise/knowledge/index.htm

- The Crichton Business Park, Dumfries, The Crichton Development Company Ltd

- Summary of all 46 HEIF2 collaborative projects OST November 2005, www.ost.gov.uk/enterprise/knowledge/index.htm

APPENDIX 4 - GLOSSARY

AURIL-Ireland	Association for University Research & Industry Links (AURIL) is the professional association representing all practitioners on the island of Ireland involved in knowledge creation, development and exchange who work to ensure that new ideas, technologies and innovations flow from their institution into the market place.
DEL	Department for Employment and Learning
DETE	Department of Enterprise, Trade & Employment
EI	Enterprise Ireland
HEA	Higher Education Authority
HEI	Higher Education Institution
HEIF	Higher Education Innovation Fund
IDA	Industrial Development Agency
IP	Intellectual Property
IUA	Irish Universities Association
PRTLI	Programme for Research in Third-Level Institutions
SFI	Science Foundation Ireland
SPUR	Support Programme for University Research
SRIF	Science Research Infrastructure Fund
VC	Venture Capital

The term VP refers to Vice President for Research or equivalent within each institution.

The term Director refers to Director of Technology Transfer or equivalent within each institution.

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