



Universities Scotland: Response to the Lambert Review of Business–University Collaboration

Universities Scotland welcomes the opportunity to contribute to the Lambert review. In developing this response we are mindful that the review is predominantly focussing on the demand-side of academia-business interaction. However, the higher education institutions in Scotland have much to offer business in terms of stimulating business development and success.

Our members also participated in the development of the Universities UK response through individual submissions and participation in a national seminar organised to gather a Scottish perspective on academia-business collaborations. This response, therefore, does not attempt to replicate that of Universities UK, but highlight some of the many different interactions that our members have with business and identify some of the current barriers to nurturing these relationships further.

1 Best practice

Diversity is a key characteristic of the higher education sector in Scotland and therein lies one of its greatest strengths. The core business of each institution is teaching and research, and it is important not to lose sight of this. However, higher education also delivers enormous economic benefits for Scotland, through a wide-ranging portfolio of knowledge transfer activities. In preparing this response, we have deliberately used the term 'knowledge transfer', which does not necessarily involve the exchange of technology. This is because too often focus has been placed on technology transfer as the main route to academia–business collaborations. In doing so this has resulted, perhaps inadvertently, in the perception that collaborations from the creative industries and social science sectors do not readily occur or are of lesser importance. Indeed in 2001, Scotland earned £5 billion from the creative industries, representing four per cent of GDP and employing 100,000 people.

In practice, how an institution will interact with business will be heavily influenced by fulfilment of its mission and by playing to its strengths. Therefore, there is no single model of best practice for academia-business collaboration that can be applied to all. Similarly, not all businesses are alike and are not expected to be. Initiation of collaboration can be in either direction, but there are distinct differences in approach between industry sectors and indeed company size. In general, larger companies are more proactive in identifying academic research groups of interest through conferences and seminars etc. SMEs often rely on the Local Enterprise Companies, or other support agencies, as an intermediary in identifying research groups.

Most institutions will have a portfolio of engagements with industry. These can range from informal networking, collaborative research, consultancy, licensing agreements, provision of Continuous professional Development (CPD) training, provision of on-campus incubation support and forming spin-out and start-up companies, to consortium agreements with large, multinational companies and many more. Depending on their institutional mission and strengths, each institution will seek to engage in one or more of these activities at local, national or international levels. It would be to the detriment of the higher education sector and the wider Scottish economy to expect all institutions to engage in all of these activities. And it is the responsibility of the Scottish Executive and Scottish Enterprise, our national development agency, to create the conditions to nurture all of

these engagements: to allow them, and new collaborations, to grow and to be able to exploit fully serendipitous collaborations when they occur.

Universities Scotland in partnership with the Royal Society of Edinburgh, Scottish Development International and the British Council are working together to proactively market research expertise in Scotland. Directors of R & D from global companies will be invited to participate in one of four five-day long tours specifically designed to reflect each organisation's research interests. Two visits each will be held in the areas of energy and the life sciences. Each tour will showcase the most exciting and innovative research currently happening in Scotland. Should the pilot year be successful the partners will seek to continue and extend the scheme.

The Scottish Institute for Enterprise (SIE) was established in 1999 to encourage a spirit of enterprise among university students and staff. All 13 of our university members are partners in SIE. In addition, three of our other non-university members have associate membership. The SIE has two fundamental roles:

- To improve the quality and quantity of entrepreneurial education in Scottish universities; and
- To provide assistance to support the commercialisation of student ideas.

SIE has built a network infrastructure that facilitates the interchange of ideas and opportunities between academia and business. To date it has helped more than two dozen start-ups emerge from Scottish universities.

The formation of three Intermediary Technology Institutes in Scotland is an important new development in forming business-academia links. It is still early days in their development, but it is anticipated that they will identify technology gaps and through the universities develop the technologies which Scottish companies need to exploit market opportunities in three market areas: life sciences; energy; and communications and digital media.

These examples highlight recent developments in Scotland to foster greater links between academia and business and instil and entrepreneurial culture. And there already exists considerable commercialisation and knowledge transfer from Scottish universities as evidenced in the results of the Higher Education-Business Interaction survey¹. The Scottish Executive and SHEFC have recognised the importance of knowledge transfer reflected through the introduction of more proactive policies geared towards enhancing universities' contribution to economic development and knowledge transfer, for example, the recently introduced SHEFC Knowledge Transfer Grant (KTG).

Examples of the wide range of collaborations between academia and industry that currently exist in Scotland are appended at the end of this submission.

2 Perceived barriers to collaboration

Flexibility, creativity, trust and patience from each **partner** are the key factors in developing successful relationships. Too often criticism is levelled at the higher education sector from business for being difficult to work with which is not supported by any robust evidence – it is anecdotal at best. Expectations need to be managed; there will always be room for improvement in building relationships and it is to be expected that not all relationships will work well. Neither academia nor business knows what exactly is expected by Government from third leg activities. Consequently, expectations cannot be shaped, managed or met. And, there is a culture of misperception between the two sectors particularly, but not exclusively, on the demand side. This

¹ Higher Education Business Interaction Survey - academic session 2000/2001: Results for Scotland. (2002) Based on data from a survey undertaken by the Higher Education Council for England on behalf of a group of stakeholders including the Scottish Higher Education Funding Council and the Scottish Executive.

can be attributed largely to a misunderstanding of the roles and responsibilities of both parties and even at the most basic level due to a misunderstanding in language when discussing the same topics. The most common cited barriers are:

- Business has problems in accessing and understanding academic knowledge and expertise, particularly when seeking solutions to highly-focussed research or commercialisation project definition. The Scottish Research Information System (SRIS) was developed by SHEFC to address this barrier. It is unclear at the moment how much use of SRIS is made by business and whether business has found it useful.
- There is no easily accessible source defining industrial, and particularly SME, needs equivalent to SRIS. Commercially available databases do not contain accurate data or a full complement of the smaller high-growth and high-tech companies. Universities Scotland has had discussions with the Scottish Executive, SHEFC and Scottish Enterprise about these limitations and is currently exploring the feasibility of constructing an up-to-date database to make available to the higher education sector.
- There is not always a clear understanding of the relative roles and priorities of each partner at an early stage, particularly with regard to Intellectual property (IP). Differing priorities can result in the business community feeling that universities take too long to react to market demand and academics feel that the demands of business are unrealistic. A compromise needs to be reached.
- Awareness of IP in universities is patchy and needs to be improved. Universities have sought ways of doing this through internal awareness-raising events or documents, but more can still be done. It is recognised that currently different institutions have reached different stages in this process.
- There is insufficient recognition of higher education institutions as IP generating, owning and exploiting bodies. Universities have very limited funds to spend on protecting IP. They are not entirely funded from the public purse and due to successive cuts in core funding over the last 20 years they have sought, quite rightly, to diversify their sources of income from other non-public sources. Business needs to understand better the financial constraints acting on universities. And business should be encouraged not to expect to obtain IP for less than its true market value.
- Instability of funding can deter potential partnerships and needs to be addressed. It is easier for Government to deliver this to the higher education sector through introducing longer-term funding programmes. The introduction of new initiatives for both sectors to facilitate collaboration would be welcomed, but only if they can clearly add-value to what can already be achieved through existing mechanisms.
- There is a significant shortfall in the numbers of professional knowledge transfer staff in universities. And once in post, professional training should be delivered and supported.
- Universities are not funded to market effectively to the type of company base in the UK. This is particularly true in Scotland where the ability of companies to work with universities is very restricted due to the nature and size of the company base. Consequently, there is a mismatch between demand and the research base supply. This can often lead to universities seeking to exploit their IP outside of Scotland
- Most research is several years from being market-ready commodity and this gap represents too great an investment risk for most companies. The Scottish Enterprise Proof of Concept Fund, established in 1999 to assist academics in exporting their ideas and inventions to the marketplace, is making a difference and is closing this gap. However, this funding gap can still be too large for the SME base in Scotland. SMEs often don't have the expertise or capacity to take forward technology emerging from universities. Targeted resources are needed to bridge this gap and allow SMEs to upgrade their skills in technology transfer and increase capacity.
- Statistics show that the level of R & D expenditure in UK companies is well below that of global competitors and this is even more pronounced in Scotland which invests half as

much as the UK average. While universities can work to establish links and seek opportunities for research collaboration, businesses must see the need for and be prepared to fund this type of investment.

- Commercialisation is not recognised as a route to academic promotion or advanced recognition and so is not ranked as a priority amongst academics.

It is evident that the problems involved in developing relationships between academia and business are varied and complex and so there is no easy quick-fix solution. Both sectors operate in different environments. Meeting the needs of different priorities or significantly changing their respective roles would seriously compromise their contributions to the economy and wider society. Therefore, a compromise needs to be reached and creative ways to fill the gaps in between the sectors need to be identified.

3 Provision of high quality graduates

In order for businesses to attract the graduates with the necessary skills that they require it should be recognised that there is a role for schools to play in ensuring that students enrol on the relevant courses at university. In particular, a shortage in the supply of physical scientists, mathematicians and engineers has been identified in the UK². While there is undoubtedly a role for universities to market these courses more effectively, and indeed universities are putting more effort into doing so, there is a need for earlier intervention at secondary education level to raise awareness of these subjects. Perhaps there also needs to be a greater involvement of professional bodies to supplement the efforts of schools and find additional ways to promote the value of these types of courses and the industrial careers that follow.

Universities receive conflicting messages from business about what they require from a graduate. As a result, it is difficult for universities to know how to respond. SMEs and large companies often want different qualities from graduates: SME's may want graduates with a range of transferable skills whereas large companies may prefer to have graduates that they can mould to suit their corporate culture.

There is also the issue of timescale. A significant problem for universities is the time difference between industry identifying a skills gap, and communicating its needs, and the time taken for the university to fill that gap. This is particularly the case for undergraduate programmes which take four years to complete. For businesses, speed is the key and in a rapidly advancing business environment it is extremely difficult for businesses to predict their needs well in advance for universities to respond.

However, progress is being made. Many institutions now have business advisors on their subject advisory panels or their equivalents. Most institutions now incorporate, where possible, student placements within industry as part of their degree programmes, which helps to prepare the students for work. Often these placements can lead to a lasting relationship with the company with the company employing the student after graduation. In addition, industry now sponsors a number of annual scholarships for students in many institutions. Joint collaborative projects at postgraduate level have been established for many years now in a majority of institutions. These courses have ensured that industry receives students with key skills aligned to business needs. Increased industry commitment to supporting scholarships would be welcomed and should be encouraged.

4 Financial considerations

Universities are under pressure to recover the full economic costs of collaborations with industry. While larger companies are more likely to be able to meet the costs of overheads, SMEs are not

² [The supply of people with science, technology, engineering and mathematics skills: The report of Sir Gareth Roberts' Review \(2002\).](#)

always able to do so. Targeted Government incentives for SMEs could perhaps be introduced to support greater development of strategic partnerships with universities. Mechanisms for monitoring the impact of such support should be developed in concert.

The TCS scheme is well recognised as an effective mechanism for knowledge transfer between academia and industry. However, there still remain financial barriers for some smaller companies preventing them from participating in the scheme. Consideration should be given to the possibility of providing greater support to these companies to encourage greater take-up.

It is too early to say the extent to which R & D Tax Credits have stimulated the growth of industry sponsored research. Early feedback suggests that R & D Tax credits are not as widely known about or understood as they could be. Perhaps greater promotion and understanding of their benefits is needed before an assessment of their effectiveness can be made.

5 Recommendations

- The local and national Enterprise agencies need to take the lead in bringing businesses to the universities to assist in building sustainable relationships between Scottish businesses and universities. The front door for introductions should be through the universities' Research and Enterprise offices or their equivalent.
- The Scottish Executive and Scottish Enterprise should work together to create the conditions in Scotland to allow existing collaborations to grow and flourish, new collaborations to develop and serendipitous collaborations to be exploited fully when they occur.
- The higher education sector should review its marketing strategies, including the use of sector-wide initiatives such as SRIS, to ensure that they meet the needs of both sectors.
- Universities should seek to ensure that they obtain market value of their IP and raise awareness of issues surrounding IPR amongst academics, such as protecting future commercial commodities and achieving market value.
- Financial support should be provided for both sectors to facilitate collaboration where it will clearly add-value to what can already be achieved through existing mechanisms.
- There is a significant shortfall in the numbers of professional knowledge transfer staff in universities which needs to be addressed. And once in post, professional training should be delivered and supported.
- Targeted resources are needed to bridge the funding gap faced by SMEs, which can prevent them exploiting the outputs of university research. The support should be provided to upgrade their skills in technology transfer and increase capacity.
- Targeted Government incentives for SMEs could perhaps be introduced to support greater development of strategic partnerships with universities. Mechanisms for monitoring the impact of such support should be developed in concert.
- While universities can, and do, work to establish links and seek opportunities for research collaboration they should seek to make the business case for establishing collaborations with business more explicit and businesses must react to this and be prepared to fund this type of investment at market rates.
- In order to move commercialisation up the agenda for academics, commercialisation needs to be recognised as one of the routes to academic promotion or advanced recognition in universities.
- Schools, and not just universities, have an obligation to ensure that students enrol on the relevant courses at university.
- Consideration should be given to professional bodies playing a greater role in supplementing the efforts of schools and find additional ways to promote the value of these types of courses and the industrial careers that follow.

- Increased industry commitment to supporting scholarships is welcomed and should be encouraged.
- Universities should continue to seek to offer courses that combine a placement in industry as part of their core curricula, where appropriate.
- Consideration should be given to the possibility of providing greater support to smaller companies to encourage them to participate in the TCS scheme. Financial constraints are still a barrier to participation for such companies.
- Greater promotion and understanding of the benefits of R & D Tax Credits is needed, followed by a review of their effectiveness in stimulating the growth of industry sponsored research.

Dr Gayle Wilson
Policy Officer
Universities Scotland
53 Hanover Street
Edinburgh EH2 2PJ
Tel: 0131 226 1111
Fax: 0131 226 1100
Email: g.wilson@universities-scotland.ac.uk

Appendix

Examples of innovative approaches to knowledge transfer from Scotland's higher education institutions

The next few pages highlight only some of the collaborations that have been established between Scottish higher education institutions and business. These collaborations vary widely from licensing, curriculum design, forming spin-outs, providing CPD and distance learning and many more creative partnerships.

Working together to achieve results at the Institute for System Level Integration

The global electronic design industry is coping with a world-wide shortage of people with system level integration and System on Chip [SoC] design skills. Historically, it has been rare to find business and academic communities co-operating to address problems such as these. Yet this is precisely what has been achieved through the creation of the Institute for System Level Integration (ISLI) on the Alba Campus at Livingston.

Founded in 1998, ISLI is a collaborative venture involving four of the UK's leading universities of Edinburgh, Glasgow, Heriot-Watt and Strathclyde, and Scottish Enterprise. Its mission is to provide world-class research, education and training in System Level Integration [SLI] at undergraduate, graduate and professional levels.

However for technology like electronics, today's advanced education and training is based on teaching which reflects today's best practises, common standards and knowledge, which often unavoidably reflect yesterdays learning, meaning that the material is out of date almost as soon as it is presented. ISLI and its partners have recognised this dilemma and are working to address it by supporting the development and delivery of a consolidated stream of leading edge industrially relevant advanced courses, at Doctorate, Masters and CPD levels.

The ISLI model sits in an intermediary position between academia and industry, outside, yet empirically linked to, the traditional University structure. It is industry facing, run like a business, yet populated not only by experts from academia but also from industry.

Support from industry has gone from strength to strength since the launch of the ISLI, creating valuable links between individual companies and leading University departments. Evidence suggests that ISLI's graduates "hit the ground running", achieve better job offers, starting salaries and career progression than those taking traditional post graduate courses.

One of the major routes to engagement has been ISLI's practise of involving its industry partners in its curriculum development, seeking early industries inputs into course development and refinement. This is achieved via an iterative process through which industry overview and directly influences the contents of ISLI's courses, thereby ensuring that their training needs can be continuously met. This allows ISLI to proactively provide superior industry relevant education and training with unsurpassed content made possible by ISLI's unique intermediary structure.

The unique success is ISLI's intermediary structure and its ability to successfully engage with two disparate stakeholders in a manner that both communities can best relate to and benefit from. A true win-win has been achieved.

Dundee research attracts £15m

The University of Dundee, working with the Medical Research council (MRC), recently secured its biggest ever research grant. The deal, worth £15million over five years, is with six major

pharmaceutical companies. The agreement renews an existing arrangement with the industrial giants, but doubles the funding coming to the University's School of Life Sciences and the MRC over the previous five years. The funding will be used in the search for new drugs to fight cancer, diabetes, rheumatoid arthritis and other serious diseases.

The companies involved in the renewed funding are AstraZeneca, Boehringer Ingelheim International, GmbH, GlaxoSmithKline, Merck Co.Inc in the US, Merck KGaA in Germany and Pfizer.

Licenses that just keep on running

Three licences from the University of Strathclyde to (originally) SME companies have for years been producing income of:

Artificial elbow joints	£45k p.a.
Goniometers	£15k p.a.
Monoclonal antibodies/toxin detection	£15k p.a.

These modest business deals have been of importance both to the companies and to the academics concerned over a sustained timescale.

Patents portfolio brings University and Local Enterprise Company together

A collaboration between senior staff within the University of Dundee's departments of Physics and Chemistry resulted in the filing of a series of patent applications covering novel materials for use in the semi-conductor and catalysis industries. The work attracted funding from the SHEFC RDG initiative and attracted the attention of large industrial players from overseas. It became clear that by adding further value to the technology in-house, it would have a much greater impact on the market and this would result in greater economic benefit to the University and Scotland.

Scottish Enterprise (Tayside and National) were approached with the proposition of forming a joint-venture company to develop novel applications for the technology and this resulted in the formation of the AMCET company in which Scottish Enterprise invested £2.4m.

AMCET is based at the University, has employed 9 members of staff, has developed the technology to working prototype stage and has already facilitated the formation of a further company, Aktina. After 3 years of operation AMCET is now re-focusing and is concentrating its efforts on the catalysis elements of the original portfolio. Other elements of the patent portfolio which have benefited from the added value of AMCET input will revert to the University which will use its best efforts to attract industrial licensees. Scottish Enterprise and the University will continue to hold stock in the company but it is envisaged that the future development of the company will be funded through the attraction of VC funding.

Ampsys Electronics – spinning out success

Ampsys Electronics, a Paisley University technology spin-out, specialising in fm radio demodulation has just signed a Memorandum of Understanding (MoU) with Visteon (Ford Motor Co), the second largest car radio manufacturer in the world. The MoU will allow Ampsys and Visteon to enter into commercial negotiations to use the Ampsys high performance fm demodulators in the Visteon premium range of car radios. Approximately five million of these radios are manufactured each year.

The Ampsys demodulator is unique in that it can provide reception performance advantages that were not previously realisable, especially in conditions of severe interference. Visteon is currently running mobile field testing of the Ampsys demodulator in various parts of the world.

The University has a significant equity holding and continues to provide active support.

Atracurium – An ongoing licensing success

Chance and coincidence played a part in the development of Atracurium, the muscle relaxant used by anaesthetists in more than half of all operations world-wide. This ongoing licensing success story ranks as one of the University of Strathclyde's most notable commercial achievements.

The starting point for Atracurium was curare, the naturally occurring resinous substance that South American Indians used to tip their poison arrows. When introduced into the blood stream the poison literally paralyses the victim. Surgical muscle relaxants work in exactly the same way, but in a highly controlled manner.

Professor John Stenlake was drawn into muscle relaxant research shortly after joining the University of Strathclyde in the early 1950's. A chance discussion with a colleague whose avenue of interest was neuro-muscular agents led him to realise that the intermediates he was using would also serve as intermediates in synthesising a new class of muscle relaxants.

Further developed by a team of pharmacists in the Department of Pharmaceutical Chemistry, from 1969 to the mid 1970s Atracurium is one of the few drugs to have been designed and synthesised in a University environment. Through licensing to what is now GlaxoSmithKline it was subsequently developed and launched commercially in 1982.

Atracurium won the Queen's Award for Technological Achievement in 1986 and to date has brought in more than £28.5 million in royalties to the University of Strathclyde.

Cyclacel

The collaboration between the University of Edinburgh and Cyclacel Ltd. is an excellent example of collaborative research and development. Under the agreement announced in March 2002, the University of Edinburgh and Cyclacel will be jointly applying state-of-the-art rational drug design techniques, including computational biology, X-ray crystallography, NMR structure, computational and combinatorial chemistry techniques, to the discovery of novel molecules. As part of the collaboration, two University of Edinburgh Professors, from two different University Schools, have been seconded to Cyclacel for three years, although this flexible agreement is designed to enable both of them to carry out further academic research within their respective Schools. Another part of the agreement is the exclusive licensing to Cyclacel of the University of Edinburgh's LIDAEUS™ *in silico* screening software programme.

Global recognition for CPD and distance learning

Heriot-watt University has achieved world-wide recognition for its delivery of short professional courses and distance learning qualifications:

- Working in partnership with Schlumberger and Texas A&M university the Institute of Petroleum Engineering at Heriot-Watt University delivers the leading programme of short professional courses for oil and gas professionals around the world, delivering anywhere in the world to suit the client.

- The Edinburgh Business School at Heriot-Watt University, in partnership with Pearson Education, has delivered its distance learning MBA to over 9,000 business people worldwide, gaining it the Queen's Award for Export Achievement twice in the last 10 years (1994, 1999).

Virtual Campus

The Robert Gordon University's e-learning programme, the Virtual Campus, has developed the services it offers in response to business needs, expanding from its original goal of supplying standard University courses to individuals. In response to demand it now offers a portfolio of CPD modules actively used by corporate clients for staff development as well as individual students. As a result of the relationships built with businesses we are now offering them a customised mix of components of our academic courses to meet their needs. Academic skills are being used to help such organisations develop their own courses. The success of this e-learning project has developed to the extent that organisations are now using the University's web-based facilities as a learning platform for their own in-house training.

This is a good example of the University building strong links with client organisations, listening to feedback and in response developing services to meet businesses needs. Organisations currently involved in their e-learning services include Chevron-Texaco, the IMES Group and NHS Grampian.

Rolls Royce

A significant research contract with industry is exemplified at the University of Strathclyde through the long term funding by Rolls Royce plc of a University Technology Centre (UTC). Both partners maintain close contact and a high degree of collaboration.

The purpose of the UTC is to allow the Centre for Electrical Power Engineering at the University of Strathclyde to undertake long-term research programmes under the direction of Rolls Royce personnel in order to meet Rolls-Royce's future market requirements. The UTC was established in 1996 and is ongoing and has a highly influential steering committee drawn from several of Rolls Royce's research and engineering divisions and from the senior academic staff of CEPE.

Pharmalinks – two universities working together to market bioscience research capabilities

PharmaLinks is the trading name given to a joint Strathclyde University/Glasgow University initiative to market their combined biomedical and bioscience research capabilities to industry. The Universities have invested in the provision of a joint marketing team which travels internationally to meet companies and to negotiate contracts. This is a young initiative already producing major contracts.

Thin Film Centre

The University of Paisley's Thin Film Centre, set-up with funding from a SHEFC RDG Grant, has just signed a LINK-supported development contract with Dupont-Teijin Films for polymer-based flat panel displays. The contract will be to develop flexible displays based on OLED (organic light emitting diodes) printed into the polymer sheet produced by Dupont-Teijin. For a flexible display to be viable, they need to have a working life of at least 10,000 hours. Water vapour, to which polymers are much more susceptible than glass, limits the working life for displays based on this technology.

The very high performance barrier coatings to be developed by the Thin Film Centre will prevent oxygen and water vapour from reaching the OLED, thus allowing Dupont-Teijin to produce high

quality polymer-based flat panel displays. A huge world market is available to the first company to mass produce these displays.

On campus Incubators

The Strathclyde University Incubator Ltd. was formed as a company limited by shares and financed by a Venture Capital Company, a Bank, Scottish Enterprise, and the University. It houses around 25 to 30 companies at any one time and has now been operating successfully for 15 years and regularly delivers profit. 70 per cent of the companies in the Incubator are sourced from outside of the University.

Embreonix / Dare to be Digital

Embreonix at the University of Abertay provides incubator facilities for students to develop a start-up business whilst undertaking a postgraduate diploma in entrepreneurship. This provides them with enhanced business skills for either self employment or business. In addition, Dare to be Digital, the University's summer creative industries competition provides 10 weeks of employment for software and computer arts students to work together in a team to develop a product prototype.

Teams pitch their product to a high profile industry team at the end of the ten week period. Successful teams are also supported in business start-up after the end of the competition with incubation facilities and industry mentors. Other teams are rapidly employed by industry because their CVs have been enhanced through real world product delivery. The competition is national throughout Scotland and this year has a feeder competition in Malaysia. The national event has secured sponsorship from the BBC.

All of these projects have received support from the Local Enterprise Company, primarily contributing to capital and revenue costs associated with the facilities.

IP advice for free

Heriot-Watt University offers a free advice service for small companies on all aspects of IP – demystifying the black art without charging professional fees and enabling small companies to realise the real value of their intellectual assets.

University manages CPD for business

The Robert Gordon University's distance learning portfolio includes postgraduate certificates and diplomas in management. The content of this has proved valuable in the commercial environment. These courses are currently being delivered, under contract, to three companies, Abbey National, British Airways and the NATS with a fourth company, the Tussauds Group recently having joined them. Their staff progress through the course in cohorts, timed to suit individual company needs. With advice from University staff the companies select modules from the course portfolio which again best meet their own needs. For each module a workshop is held on company premises with University staff travelling to each. This highlights the opportunity for packaging accredited courses in ways which meet business needs, while retaining the academic control.

Hi-tech textiles

Heriot-Watt University's School of Textiles leads the unique Faraday Partnership in Technical Textiles bringing together the UK textiles industry and academic research in Heriot-Watt, Leeds and UMIST to take this "sunset industry" forward in a new shape into the new century.

Local collaboration to counter flooding

Britain's flood defences are seeing some of the greatest investment they have seen for years. The University of Paisley, working with local company Meiklewall and Scottish Water, is developing innovative flood defence mechanisms such as the floating wall and sewage surcharge prevention measures. The floating wall is a flood barrier located below ground until activated by the action of flooding. The floating wall then literally floats / rises, to create a barrier between the flood waters and the area to be protected. The fact that when not in action, the floating wall is below ground and therefore not visible, makes it most suitable for areas where structures such as walls or large earth mounds would be unacceptable.

On completion of the development and testing later this year, a new range of flood prevention measures will be marketed by Scottish Water throughout the UK, and ultimately Europe and the USA. This very exciting collaboration will be very high profile in the near future.

IC CAVE

The International Centre for Computer Games and Virtual Entertainment (IC CAVE) is a research centre at the University of Abertay Dundee established to focus on the development of research to support the computer games and digital entertainment industry. IC CAVE is a key component in the local cluster of creative digital industries based in and around Dundee.

A key issue for interactive entertainment software developers is the area of usability. A usability test facility has been established in conjunction with industry partners who are also members of IC CAVE's advisory panel. The test facility allows companies to bring beta versions of games products into a usability laboratory and test them with target market cohorts. The facilities include multi-point video, eye tracking and physiological feedback. The resulting outputs have enabled interactive entertainment companies and other users to refine products prior to market.

EPICentre

- The Electronics, Photonics and Information Control Centre (EPICentre) at the University of Abertay Dundee is an institute established to promote interdisciplinary research, training and commercial activities related to all aspects of the human-machine interface (HMI). It places particular emphasis on the human factors of the visual interface, *i.e.* displays of all kinds.

A particular challenge for industry involved in the manufacture of any equipment with visual displays is the readability of the display in natural light, particularly in sunlight. The EPICentre established a "sunlight readability group" where design challenges and common related display deployment issues are resolved in a non competitive environment. Members of the group include NCR (Dundee), BAE (Edinburgh, Warton and Farnborough), Raymarine, Global Display Solutions, Visteon and the University of Paisley. The University of Abertay Dundee's EPICentre is the co-ordinator and lead investigator for the group. This has proved to be a highly cost-effective approach for the industrial partners and avoids duplication of in-house R&D by companies.

Business Inspirations Scotland

Queen Margaret University College's Business Inspirations Scotland (BIS) was set up in the performing arts and is based on the premise that the skills which are required in acting apply to business presentation skills, negotiating skills, leadership, team building, and time and project management.

The BIS unit has begun to offer courses and services internally and externally to enterprise companies, local business and Edinburgh City Council. Recent collaborations include using scriptwriters and actors to prepare the tour guide for the Mary Kings Close- a major new venue for tourism in Edinburgh working together with a local retailing park.

BIS is now working with Connect–Scotland technology business network, which organises events to introduce young technology companies to potential investors. The companies are given business advice on their proposals and are now also given voice and presentation skills training by BIS before they present their case to investors at these events. This has since been extended to the business plan for students' events which Connect organise on behalf of the Scottish Institute for Enterprise.