Making the links that sustain the recovery

Innovation can drive Scotland towards permanent growth, and establishing global networks will lie at the heart of success.

By Rob Stokes

Tough times are driving more companies in Scotland to drink at the well of innovation, according to matchmakers between firms needing research and development (R&D) and those that can provide it. Set up in 2005, government-financed Interface has caught on as news spreads that native and international businesses can use it as a free and impartial link to Scotland’s 26 universities and research institutes. It is a short cut to finding the expertise best suited to developing new and improved products and services.

Unique to Scotland, too, is the Interface’s aim to increase innovation by promoting and raising awareness. "Companies are telling us that in the good times before the recession, it was almost a case of being too busy making money to think about innovation. "Now the chips are down, they want to respond to what customers have been asking for, sometimes for years." This is music to the ears of policymakers. The Scottish government published an innovation strategy in 2005 and has made the response to R&D "a priority" in the pursuit of an improved economic climate and rising living standards - the Scottish Office is to fund a new economic and social research centre in the city called the Interface.

Research for the Global National Endowment for Science, Technology & the Arts established that only 6 per cent of businesses with the highest growth rates generated half of the new jobs created by existing businesses last year. Sector head offices, regardless, were much more likely to be innovative, and this innovation was the source of growth.

Scotland stands out from most of the herd in the depth and quality of its science, the range of support, science parks and initiatives focused on fostering and commercialising innovation, and the networks that have been created or have sprung up organically. An in-depth 2009 analysis of the research base by the Office of the Chief Scientific Adviser confirmed "the strong relative international performance of Scotland in terms of achievement, productivity and efficiency".

Scotland, a country of five million people, produced 1.9 per cent of the world’s most highly-cited scientific papers and had a high share of published papers in environment (1.6 per cent), humanities (3.3 per cent) and biological sciences (1.4 per cent), according to the benchmark Science Citation Index compiled by Thomson Reuters. With only 8.4 per cent of the UK population, Scotland accounted for fully 18 per cent of UK output in biological sciences publications.
Around half of Scotland's world-influencing research is generated by the universities and globally-renowned research institutes located in or just outside the capital.

The Times/QS University rankings place the University of Edinburgh in Europe's top five, together with Cambridge, Oxford and three in London. Its principal, Sir Timothy O'Shea, told the Edinburgh Science Triangle conference last year that he believes the city region is successful because it has a critical mass of world-class researchers, a culture of multi-disciplinary working, embedded commercialisation, appropriate infrastructure and strong support from government.

Edinburgh Science Triangle is a partnership between five universities and research institutes, four local authorities, two development agencies and seven science and technology parks, with co-funding from the European Regional Development Fund. The idea is to encourage collaboration between seven different science parks and their tenant companies and to promote the exchange of ideas and expertise between academia and business to further scientific development and industry commercialisation.

The potential presented by such an approach is untapped -- especially in exploiting the opportunities provided by converging sciences. The Edinburgh region is recognised as one of the top ten research and development locations in Europe with world-class clusters in life sciences, informatics, micro- and opto-electronics, and energy and clean tech. It also enjoys growing reputations in enabling technologies and specialist manufacturing.

Edinburgh Science Triangle promotes more than the science parks and the capital city. Crucially, it also encourages and promotes collaboration with new and existing science and hi-tech business communities.

Economists have identified networks as key drivers in achieving clusters with a critical mass of activity to attract talent and sustain research, commercialisation and inward investment for the long term. "Even though it's easier now to communicate instantly with anyone anywhere via phone or internet, most valuable relationships only happen when the right people meet face-to-face," says Barry Shafe, project director for EST. "It's about giving serendipity a chance."

"Universities need to work hard to engage with business and listen carefully to what it needs and what it is seeking to achieve. Business needs to integrate with the local academic universities to take an enquiring approach to discover how academic expertise can help them innovate and compete on the global stage."

As a key asset for Scotland's IT community, impacting most disciplines from life sciences to financial services, the world-class School of Informatics at Edinburgh University shows the value of networks driving innovation. The largest, longest established and

Case study: Touch Bionics

Touch Bionics, a 2003 spin-out from Scotland's National Health Service, is a fast globalising medical and bio-inspired artificial hands, fingers and skin.

Health budgets are under pressure, but Touch Bionics is recruiting to add to its 80 employees split between Livingston in West Lothian, and Hilliard in Ohio, USA. Keeping up investment in innovation really can help to power economies through hard times and secure recovery.

The company recently started selling i-LIMB Pulse, version two of the prosthesis hand launched in 2007 as the world's first commercially available, multi-articulating bionic hand. The latest model lets users grip more strongly and perform more intricate functions than before. The market potential of ProDigits, the company’s individually powered and self-contained artificial fingers, is believed to be even greater. LIVINGSKIN is silicone-based artificial skin that can be coloured to match a patient's own epidermis and may also be fitted with hair. The icing on the cake is BioSkin, a development concept that can improve lives by giving limb flippers and patients more control over what their prosthetics can do.

In any event, we would always advise that anyone considering giving suitably a personal guarantee should seek independent legal advice to ensure they fully understand the significance of the commitment they are making.
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highest quality informatics research group in the UK has attracted 31 spin-outs and start-ups in four years and cooperates with IT majors and local SMEs. "We're way ahead of plan," says Dr. Colin Adams, an IT industry executive recruited as commercial director in 2006 to lead a five-year transfer, entrepreneurship and network building.

The university, Scottish Enterprise and the Scottish Government co-funded the Informatics Forum, a £42 million research facility next to a new refurbished building for teaching, commercialisation and lifelong learning.

The site hosts 30 fledging companies, a community effectively teaching itself. Each autumn, it hosts DEMOfest, run by the Scottish Informatics & Computer Science Alliance (SICSA) of universities for researchers to promote innovations and collaboration to SMEs.

"I call it a geek dating agency," jokes Dr Adams. "With so many scientific advances, it's hard for firms to keep track." Engage Invest Exploit, an event each spring, saw Scottish university spin-outs pitch to 48 international investors in 2010. It is run by Informatics Ventures, based at the School of Informatics and funded by it, Scottish Enterprise, and the European Regional Development Fund.

"In three years, Engage Invest Exploit has generated £11 million of investment, most of it hard-to-get seed capital," says Dr. Adams.

Informatics Ventures invites international speakers to respond to SMEs' needs and academic wannabes as well as to a Silicon Valley speaker series. "Entrepreneurial education should be by entrepreneurship," insists Dr. Adams.

Informatics Ventures will send 10 ambitious companies, most likely university spin-outs, to Massachusetts Institute of Technology's prestigious Entrepreneurship Development Program in 2011. The School of Informatics also liaises with trade bodies like Scottish Venture to deepen technology and entrepreneurial links.

Tech Meet Up, a well-attended monthly forum, Edinburgh, Glasgow and Aberdeen allows student, academic, and public and private sector IT players to discuss topics of their choosing informally. Informatics Ventures Edinburgh and University also sponsor Girl Geek Scotland, a networking community for women girls interested in technology, creativity and computing.

There is a clear link between cluster strength and patent output. That, in turn, has an impact on regional economic performance, according to a 2007 report from the European Cluster Observatory, a consortium of five continental clusters coordinated by the Stockholm School of Economics.

Take life sciences for instance. Edinburgh Science Triangle is a key focal point for an emerging success story that is attracting attention and admiration from outside Scotland.

One leading, independent authority believes Scotland has the quality of research to lead the UK life science industry. A report by Dr. Glenn Crocker, chief executive of a rival region, BioCity, Nottingham, but previously author of Ernst & Young's authoritative European & US Life Science Reports, remarks on Scotland having the UK's highest rate of biotech start-ups and also more new biotech businesses than any other UK economic region except East of England, which encompasses the hothouse of Cambridge.

The UK is in the global top five emerging life science clusters, according to independent sectoral monitors. Since 2007, when Scotland was the second largest cluster within the UK, it punches above its population size to account for some 15 per cent of UK Life Sciences companies and has 625 organisations employing around 31,000 people. Scottish Enterprise estimated in 2009. In 2006, turnover from life sciences in Scotland was £3 billion and Gross Value Added £3.39 billion, the UK's Office for National Statistics calculated.

Another telling study on the subject of business connectivity was published by property investment specialists CBRE which looked in depth at the investment and relocation decisions of the large multinational pharmaceutical groups, arguably the most obvious example of the mobility of modern capital.

The research team found that the number one criterion used in making decisions on where to base operations globally is the strength of local networks. A few years ago it was a negligible factor.

"A connected community is now vital to bringing in technology and investment," says Barry Shafe. "If you want to be a major research and development hub you'll have to have good networks. That's why Edinburgh Science Triangle has worked with the University of Glasgow and Scottish Enterprise, for example, to extend the Nexus bioscience network to better connect life sciences companies with the four key medical schools — Edinburgh, Glasgow, Aberdeen and Dundee — to offer what amounts to a countrywide clinical research organisation for testing drugs that makes it easier, faster and cheaper to do clinical trials in Scotland.

In England, the average time to get a clinical trial proposal through hospital bureaucracy is 90 to 100 days; in Scotland, the average has been slashed to 19 days.

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In one example, Scotland's National Health Service, which is run independently, collaborates with the four key medical schools — Edinburgh, Glasgow, Aberdeen and Dundee — to offer what amounts to a countrywide clinical research organisation for testing drugs that makes it easier, faster and cheaper to do clinical trials in Scotland.

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The MRI scanner is an example of world-beating medical technology invented in Scotland.
Case study: Funky Moves

Scottish based entrepreneur Ralf Klimnert's feet haven't touched the ground since his pitch to TV's Dragon Den saw him trade 50 per cent of Funky Moves for £200,000 from Theo Paphitis and Peter Jones, two of the show's panel of investors.

Funky Moves sells bright-coloured sportswear with user-programmable flashing lights and sounds that can be used to build up interactive training games and exercises. It has been a long haul since 2000, when German born Klimnert graduated from Edinburgh's Napier University with his first degree in electronic engineering. He already hoped to start his own company one day.

Since the TV show, his website has handled a huge and international response from private consumers and professional buyers such as schools, colleges, sports and health clubs, and distribution companies. "I'm already in final stage discussions with global distributors of specialist sports and gym equipment," Klimnert revealed. "We're taking numbers and contracts."

While his fortune looks set to be made by television, he credits support and the business environment at the Alba Innovation Centre in Livingston with getting him there. Alba is recognised and accredited by UK Business Incubation, the professional body, as a leading incubator for innovative, high growth technology companies.

"Scotland is a very good place to develop a technology if you make the system work for you. I met the right people at the right time and if I hadn't, I would not have got as far as Dragon's Den. There is genuine interest here in helping companies get off the ground. Business contacts in Germany say it is easier to do that here."

As he prepares to go global, one of his motivations is just what economic developers love to hear. "To a certain extent, I feel obliged to give something back to Scotland."

across the central belt, not just in our own city region."

It is a point reinforced by Dr Michael Capaldi, director of commercialisation for Edinburgh BioQuarter, a stakeholder in EST, says the globally important, large scale development on the outskirts of Scotland's capital city is all about generating spin-offs from biomedical researchers, finance, businesses and hospitals being close enough to work effectively.

Edinburgh BioQuarter, a £750 million public/private investment, is a 100-acre site seemingly destined to position Scotland in the world's top ten places for biomedical commercialisation. One sure sign that the world has noticed is that Dr Capaldi is already fielding enquiries from venture capitalists with investment funds in the £50m to £200m range who are potentially interested in being based in the BioQuarter.

"What we are hearing is that Scotland is being taken very seriously," he says. "I don't think there'll be anywhere else in Europe with this concentration of teaching hospitals, institutes and incubators."

Edinburgh Science Triangle's faith in the power of networks and the important part played in fostering those links by science parks is demonstrated by some revealing research findings based on a small part of its constituency.

As part of a wider project to establish the economic impact of science parks EST undertook a pilot study at the Roslin Biocentre. The tenants are largely young companies, the sort of fledging operations that might normally be expected to be swept away in a major economic recession, such as the one that was raging as the researchers were doing their rounds. However, their findings could not have been more startling.

Overall, these smaller companies generated gross value by £11 million in the past 12 months and enjoyed year-on-year profit growth of 15 per cent. Removing the longest-serving tenant from the equation — which has also done well — the 16 companies questioned grew overall by 35 per cent.

The majority of Roslin companies launched new products in the past year — there were 29 products in total — and five tenants had filed patents. Some £9 million was spent on research and development and most companies are already working internationally.

"It is clear already from this pilot study results that the business activity on science parks is way ahead of the norm," says Barry Shafe, of EST. "We should not think of science parks merely as bricks and mortar but as outstanding support networks where innovative, ambitious companies can find assistance and grow to the next level."

Business needs to innovate to secure its own recovery. In securing economic recovery in Scotland, the Government can expect above average returns from future investments that take full advantage of the existing infrastructure and networks.

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The Heriot-Watt Research Park is ideally located on a mature meadow and woodland site of Heriot-Watt University's Edinburgh campus.

The first of its kind in the UK, the research park is easily accessible by public transport and provides free parking for all of its visitors. The University offers leases to meet the needs of interested companies, which may include using available laboratory/office buildings or building their own research facilities on the park.

A Heriot-Watt spinout company, Hydracter, has recently relocated to the research park to accommodate its expanded team and to build on its international reputation as a leading provider of low flow assurance and reservoir fluid solutions to the oil and gas industry.

Hydracter maintains daily interaction with the University by providing a live industry environment for Heriot-Watt students/start-up to carry out practical based projects using specialised equipment while also providing a route to market for research and commercialisation activities that emerge from university research projects.

The co-location of the University and Research Park is a two way street that allows us to tap into readily available academic expertise while allowing the University to continue to produce industry focused graduates through its understanding of business requirements.

James Ceyne, Research Park Manager
jceyne@hw.ac.uk
hydract.png
www.hydact.org

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Andrew Tarn

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The potential presented by such an approach is unrivalled — especially in exploiting the opportunities provided by converging sciences. The Edinburgh region is recognised as one of the top ten research and development locations in Europe with world-class clusters in life sciences, informatics, micro- and optoelectronics, and energy and cleantech. It also enjoys growing reputations in enabling technologies and specialist manufacturing.

Edinburgh Science Triangle promotes more than the science parks and the capital city. Crucially, it also encourages and promotes collaboration among and with the scientific and hi-tech business community it serves.

Economists have identified networks as key drivers in achieving clusters with a critical mass of activity to attract talent and sustain research, commercialisation and inward investment for the long-term. “Even though it’s easy now to communicate instantly with anyone anywhere via phone or internet, most valuable relationships only happen when the right people meet face-to-face,” says Barry Shafie, project director for EST. “It’s about giving serendipity a chance.”

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**Professional Viewpoint:**

**Commercialisation and Intellectual Property Rights**

During an economic downturn, university spin-outs and similar commercial ventures capable of exploiting intellectual property may struggle to compete for investment. However, as the market gradually recovers, universities will have to consider the human resource issues that can arise in such enterprises. One of the more immediate concerns will be around the appropriate protection of intellectual property rights and the prohibition of subsequent unfair competition. There will often need to be forthright discussions around the necessary protection, and how the key academics should be rewarded for their endeavours. But a combination of the existing employment contract provisions, the legal fall-back position on intellectual property ownership, whereby in simple terms, the key rights over intellectual property created in the course of employment are owned by the employer) and the fact that the vast institutions will have very clear published policies on revenue sharing, means that these discussions are likely to follow a reasonably well-trodden path. What is perhaps less obvious to those relatively inexperienced in commercialisation is how the working life of key staff might change, the very different skills that will be required of them and the performance management challenges these factors might throw up. These might include:

- Setting up, and maintaining involvement in, the spin-out may distract academics from their research and other academic work.
- The skills that gave life to the commercialisation were very different to those needed to exploit it. Some academics will have those skills and may already be utilising them in their current role, others will not.

Consideration would need to be given to any skills gaps, and whether training is the best solution or whether hiring someone with the right skills might be best.

- Thought should also be given to whether the failure of the venture (or the chimneys causing it to go off the ground) might impact the relationships involved and whether those are acceptable consequences? The human resources issues are varied, and go way beyond the ‘black letter’ legal and commercial issues. What is clear is that for the venture to be successful they need to be well understood from the outset.

**Professional Viewpoint:**

**Personal Guarantees**

Q: I have been asked to give a personal guarantee to secure a company loan from the bank. What are the risks?

A: A personal guarantee is a contractual agreement that an individual will assume personal responsibility for repayment of the company loan, should the company fail to pay. The main risk is that, if the company defaults on a loan, the lender would be entitled to recover the loan from the individual, meaning their personal assets would be at risk.

In any event, we would always advise that anyone considering giving such a personal guarantee should seek independent legal advice to ensure that they fully understand the significance of the commitment they are making.

Lisa Kelly, Solicitor,
Buchan LLP
0131 228 3777
laskelly@buchan.co.uk

Buchan LLP, the largest commercial law firm based in Edinburgh, has a specialist practice in employment law, including personal injury, public law, contracts, property, family, employment, business and construction. www.buchan.co.uk
Flight path to take us beyond recession

A comprehensive network at home and abroad helps firms find and train leaders of tomorrow

Scotland's training services and incentives have been recast to better match the supply and demand of skills to boost economic performance. Government-led initiatives aim to shift the skills balance toward high growth industries of the future while protecting jobs. Skills Development Scotland is the Government's leading, countrywide, skills body. Services include free workbooks for staff training; online search for courses; access to work experience, training, for individuals and businesses; and liaison with learning providers and institutions.

Schemes include Get Ready for Work, Training for Work, Modern Apprenticeships, Skillseekers, Flexible Training Opportunities, and ILA Scotland. For individuals, some are free or subsidised. Non-remunerative grants may be available to employers. Government initiatives drawing on some of these options include Step Forward Scotland, for teenagers. ScotAction, government-led skills support to assist sustainable growth, can include wage subsidies for training. Redundancy support is through Partnership Action for Continuing Employment. The Big Plus boosts literacy and numeracy.

TalentScotland helps recruit international talent. Free services include job advertising, company promotion, access to graduates, and a visa, immigration and relocation advice. Recruitment agencies may place client-led advertising free for posts in key sectors: life sciences, energy, financial services, electronics, and the games industry. Scottish recruiters who help international candidates find work in any industry in Scotland may profile their activities through TalentScotland.

Workers establish online accounts to apply for jobs and receive news and job alerts.

TalentScotland is a partnership between the Scottish government, the development agencies Scottish Enterprise and Highlands & Islands Enterprise, and Scottish Development International, the business internationalisation body.

The Association of Graduate Careers Advisory Services assists with TalentScotland Graduate Placement, offering recent Scottish and international graduates and postgraduates work with dynamic private firms and social enterprises for three to 12 months.

Scottish Enterprise provides management improvement initiatives and incentives. These include Leadership for Growth workshops, mentoring and coaching for existing and future leaders of growing businesses; a free Leadership Development Guide; a Business Mentoring service in partnership with Scottish Chambers of Commerce; and a Rural Leadership Development Programme.

Its Scottish Manufacturing Advisory Service offers free support and training for lean manufacturing. Innovation Support Services (ISS) helps managers develop new ideas and approaches. Investors in People Scotland is a proven model for leaders to support, manage and develop employees.

Scottish Development International assists firms to internationalise. It has a contact network, incubators, meeting rooms and support services in key global locations. SMEs can get 15 per cent discounts on flights to 130 British Airways destinations, subject to terms.

Scottish Enterprise provides Global-Scott to draw on the experience of Scots abroad. Scottish companies tap freely into this for advice, contacts, assistance and support.

The Saltire Foundation has an Internship Programme offering talented students experience with the world's top companies. Its Fellowship Programme, a 12-month, full-time schedule of academic study and company experience fast-tracks go-ahead leaders.

The foundation aspires to develop people with the skills and drive to transform Scottish companies into global businesses of scale.

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APPLIED KNOWLEDGE EXCHANGE
Unlock the potential of your business

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Our vision is to maximise the impact of our knowledge, skills, facilities and resources on Scotland's economic and cultural development.

The Applied Knowledge Exchange – your gateway to Glasgow Caledonian University's expertise – partners with industry to design and deliver flexible and bespoke staff development programmes which incorporate our clients' own strategic objectives for immediate impact.

Through our Scottish Centre for Work-Based Learning, we specialise in bringing academic and work-based knowledge together. Join our network of business clients from leading organisations, including ClydeUnion Pumps, Howden and the Institution of Railway Operators in building collaborative and bespoke Work-Based Learning programmes with GCU.

By providing you with direct access to niche services and knowledge in business and law, health and life sciences, engineering and computing, and the built and natural environment, we can help sharpen your workforce's skills and unlock the potential of your business.

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www.gcu.ac.uk/business/educatingpeople

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