

DINNER/DISCUSSION SUMMARY

What are the best ways to promote a culture of enterprise and innovation in Scotland?

Held at The Royal Society of Edinburgh on 25th October, 2012

The Foundation is grateful for the support for this meeting from The Institute of Physics and The Royal Society of Edinburgh.

Chair: **The Earl of Selborne GBE FRS**
Chairman, The Foundation for Science and Technology

Speakers: **Ian Ritchie CBE FREng FRSE FBCS**
Vice President, Business, The Royal Society of Edinburgh
Professor Peter Downes OBE FRSE
Principal and Vice-Chancellor, University of Dundee
Phil Smith
Chairman, Technology Strategy Board and Chief Executive Officer, UK & Ireland, Cisco

MR RITCHIE outlined his approach to the consultation process which led to the RSE Business Innovation Forum Report "The Financing of Business Innovation in Scotland"¹. He had consulted with a number of those in technological industries to find out their concerns. Their prime concern was funding, and the time and effort needed to secure it - the contrast between the ability to raise funds in Scotland with the ease Silicon Valley technological start-ups could raise funds was marked. This process had led to the workshop, which produced important input for Report. It was clear that the paucity of risk capital was the most pressing issue. The combination of the 2001 digital bust/boom and the 2008 financial crisis had dried up the supply of such capital. For the last eight years invested risk capital had shown no return. Business angels still led in making initial investments. The Co-investment Fund had been invaluable in doubling their contribution - but it was limited to £2m. After that venture capital - risk capital - was needed, but venture capitalists would not come in, partly because of the risk, but also because participation with the Co-investment Fund had a requirement that all investors had to take common stock. VCs required preference stock. So if the start up company wished or needed more capital, it had to be sold. The actions recommended in the Report stressed the need to review ways of obtaining further sources of funding - such as

enabling pension funds and local authorities to invest more easily in start ups, using personal investment vehicles, crowd funding and reinstatement of the Scottish Development Fund.

PROFESSOR DOWNES said universities did research, first, because they had a responsibility to preserve and enhance the legacy of knowledge; but also, because individuals had a passion of curiosity, and intense motivation to satisfy it, and the result of satisfied curiosity led to improvement in the welfare of humanity. Universities also needed to act as catalysts of knowledge exchange so that research findings translated into the real world. They needed to do more than "fill up the hopper of research". Even if they did not know what exactly future needs might be, they should pursue a full range of research possibilities - there was no clear distinction between pure and applied research, and research inspired by those inside and outside the university. Pure research was only research for which none had yet found an application. This meant that academics must understand the new technology and search out its possible applications, which involves getting users to discuss their needs with researchers. A key issue was wise use of Intellectual Property (IP) protection. Misuse of this by universities can block application of research, but public money must also be safeguarded. Judgement, on a case by case basis, is essential. The issue goes beyond formal IP, to using know-how developed during the research

¹ The Financing of Business Innovation in Scotland, Royal Society of Edinburgh Business Innovation Forum, September, 2012.
www.rse.org.uk/cms/files/advice-papers/2012/AP12_10.pdf

process. This can be an important element in developing partnerships with industry. The collaborative model of university/industry partnerships was an important path towards greater innovation, as it showed where there were gaps in making research applicable. It is businesses who understand markets and know where the gaps are; it is the researchers who know how and in what time the gaps can be filled. While both large and small (SMEs) companies can benefit, the benefit may well lie with larger companies both because the absorptive capacity of SMEs for innovation is limited, and they are more risk averse. They could use researchers more effectively if some means could be found of de-risking the researchers' involvement with the company - such as transactional measuring.

An academic researcher's prime function was to be the best in the world at his/her speciality. But, it was the University's job to ensure the researcher also had a wider perspective, from understanding cross disciplinary working to a knowledge of the outside world. This was part of knowledge exchange. They could best do this by encouraging all their staff, teachers and researchers, better to understand the outside world, and help their students to understand it. Not all students will want, or be able to be, outstanding researchers, but they should understand the need to innovate, and how to do it. Dundee should aim to emulate MIT, where many graduates set up their own companies several years after graduating. It is because MIT staff know the real world that their students can deal with it. At Dundee he hopes to develop such understanding through projects such as "the Enterprise Gym" to give students and others the tools they need to create and manage viable enterprises.

MR SMITH said that we must not down play the UK and in particular Scotland's strong advantages. We had a strong entrepreneurial culture, first class science, sensible taxation and legal structures, excellent skills and sharp business acumen. The success of staging the Olympics had shown all these features and it should help us build our confidence in undertaking new research and opening new markets. We should not let current economic problems deter us from moving ahead; often, indeed, periods of distress were the best for stimulating innovation in all aspects of business. The Technology Strategy Board's aim was to "Connect The Landscape" - i.e. to try to get funders, businesses, researchers, and educators to understand each others' problems, develop suitable business models; work together and seize opportunities.

Technology would force change, and we needed to pre-empt future changes, which, even if we did not know their precise effects, - such as climate and demographic change and the exhaustion of natural resources - would occur. The TSB had traditionally worked with large companies, but it was now rebalancing its efforts towards greater involvement with SMEs. Scotland with its small economy but strong connectivity would be an ideal place for TSB to work towards this goal. The TSB itself should be better known and the work it has done - he gave some examples - publicized. Most SMEs had never heard of it; its ability to help both universities and businesses should be marketed more effectively.

In subsequent discussion speakers questioned the attitude of universities to spin off companies, and to the direction of their research. How did they measure the "impact" of their research? How did they motivate researchers who might be interested in developing (and profiting from) spin offs? What help did they give academics who had entrepreneurial ambitions, but were worried about risk? No general answer could be given to these questions, as institutes themselves were so different, and, as had been said, the drive and motivation of individuals were very variable. But universities were doing better; they were working on their employment policies to make sure they did not stand in the way of enterprise, and seeking to align research to business needs more effectively. They were aware of the dangers of excessive IP. But realism was essential. No academic would lightly undertake the stress and responsibility of setting up a company, but he might well underestimate its capital needs or potential markets and fail. Risk acceptance was part of entrepreneurial life. The partnership model, which Professor Downes had mentioned was welcomed. It was the best way to align desires to do research on the one hand, with the profit motive, on the other. Business entrepreneurs should be brought into the academic milieu to act as role models for those with ambitions.

The pursuit of excellence went together with higher aspirations. The desire to be "the best in the world" at research was no different an aspiration than a desire to be a CEO of a major company. But, speakers were concerned that Scottish culture was an impediment to both, as the educational system, at school level, did not encourage excellence. It aimed for satisfactory, not outstanding, results. It was satisfied that the number of students doing STEM (Science, Technology, Engineering and Mathematical) subjects were increasing, but

not that there were still too few, and, markedly, too few women. Being the best in class, or having ideas above one's station, or challenging received views, were seen as suspicious characteristics, and were not encouraged. Many entrepreneurs had disruptive educational careers and did not even go to university. These were people - the "street smart" - the school system should seek to capture, give them skills, not simply endure them. For universities, excellence in the discipline chosen should be demanded. But, it is not realistic to expect it always to be achieved. None, however, should go who does not expect that demand to be made on them; university should never be a *rite de passage*. So it is important to give all students, whether or not they will end up as top class researchers or working in outside fields, an understanding of what the outside world expects and needs if it is to pursue innovation. The danger is that the stronger the academic drive, the greater the reluctance to spend time on developing other skills - the "Enterprise Gym" is a means of overcoming this.

The nature of Scottish culture more generally, was also raised. Was it true, as it was alleged, that it was too self deprecatory, too unwilling to stress the global impact of the Scottish Enlightenment; too sunk in envy of its neighbours? This could be exaggerated, but there was force in the unwillingness of individuals to sell themselves. Although they could be very forceful in selling the institution or company or product for which they worked. Why did the Scottish Diaspora seem to turn its back on Scotland, except for sentimental revels on Burns night? They did not appear to boost the Scottish economy, or seek to patronize Scottish companies. Perhaps this is the consequence of seeking sales and markets outside Scotland - adopting the international viewpoint which is essential if companies are to grow. Fortunately, Scotland attracts entrepreneurs as well as losing them, and it is perhaps embarrassing that "imported" entrepreneurs do better than stay-at-home Scots.

It was realistic to accept the facts that Scotland was a small economy, with few big companies. If it was to build on its excellencies in science and research, it needed to start companies with the vision to seek markets internationally. Academia has the key role in ensuring that its researchers understand this and are pursuing research which (sooner or later) will fit into the international markets which will arise from changes such as climate change, and training graduates who know what demands business might place on them. If

business complain "he/she is a brilliant scientist but useless for us" - it is academia's fault.

The RSE Report and the discussion had identified a number of ways in which the Scottish culture of enterprise and innovation could be improved. Briefly these were: increasing the sources for risk capital; emphasizing the importance of knowledge transfer from research to business; bringing together businesses and universities in collaborative partnerships; pressing ahead with reviewing IP; driving forward excellence throughout the Scottish educational system; and delivering the message that growth of Scottish companies depends on international markets.

Sir Geoffrey Chipperfield KCB

The speaker's presentations where available and an audio file of what they said can be found on the Foundation website at www.foundation.org.uk.

Useful web links are:

Financing of Business Innovation Report by the RAE
www.rse.org.uk/cms/files/advice-papers/2012/AP12_10.pdf

The Foundation for Science and Technology
www.foundation.org.uk

The Institute of Physics
www.iop.org

The Royal Society of Edinburgh
www.rse.org.uk

Scottish Enterprise
www.scottish-enterprise.com

Technology Strategy Board
www.innovateuk.org

University of Dundee
www.dundee.ac.uk

A round-table discussion was held in the afternoon on the same theme. The report is on the next page.

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ROUND-TABLE DISCUSSION SUMMARY

What are the best ways to promote a culture of enterprise and innovation in Scotland?

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MR RITCHIE outlined the genesis of the RSE "Business Innovation Forum" report on the Financing of Business Innovation in Scotland. He was looking at the interface of technology and business. After consulting technology managers, it was clear that financing innovation was a major problem, so the group preparing the Report had met to consider the nature of this problem. The UK had a good taxation regime which supported technology and was beneficial for business angels. The Co-investment Fund, which worked with investors, not projects, could double investor equity. But, while this worked well if only £1m was wanted, it did not if £10m was needed. The Fund insisted on common stock, but Venture Capitalists wanted preference stock. Their emphasis was on a quick and profitable exit, no matter what happened to the company thereafter. So risk capital from VCs has dried up. However, it is good sources of risk capital were crucial if companies were to expand and flourish in the long term.

MR SMITH pointed out the UK's advantages. It had good tax regime, strong and stable legal systems, sensible employment structures and entrepreneurial spirit. From the TSB's perspective he wanted these strengths to be used effectively and properly targeted. People downplayed these strengths and part of the Technology Strategy Board (TSB)'s work was to make them better known and to sell them more effectively. TSB itself had rebalanced its work away from big companies to helping

smaller companies, particularly those who were being set up and wanted to expand. The TSB needed to capitalize on successes. TSB's aim was "to connect the landscape"

The following points were made in discussion:-

1. Scotland must think internationally. There were not enough big companies in Scotland to create an effective market.
2. It was not enough to raise only start up - business angel - capital. Scaling up, and international expansion were crucial, and risk capital was vital for this.
3. Scotland suffered from a "paucity of aspiration". It concentrated on the supply side, where it was effective at innovation, but it was not enough to be the "laboratory of technology". The demand side; finding, creating and exploiting markets was crucial. The aspiration to do this internationally was lacking.
4. The problem was lack of both aspiration and realism. Entrepreneurs were not only short sighted, but unfair to investors by failing to make clear from the start that success meant large amounts of capital. An angel would be unwilling, or unable, to provide that above his original investment, and find himself unable to realize his earlier investment. This problem could be

- eased if a secondary market for investors could be found.
5. There was a large market in the UK through public procurement, but only if public authorities (particularly the NHS) realized that there were benefits to the UK in supporting UK firms and technologies. The NHS was reluctant to work with start-ups, and so valuable technology which could reduce costs and benefit was sold abroad (for example a company working on the treatment of bed sores was recently sold to an overseas investor). There should be more incentives to buy UK products, and the TSB should be more proactive in procurement policies.
 6. In spite of some successes, Scotland had a smaller start up rate in proportion to its population than comparable economies. There was no silver bullet to remedy this, but incremental improvement in both institutions and education would help while we were top in science, we were well down in economic benefits from it.
 7. Important factors in inhibiting entrepreneurial drive and ambition were fear of failure and the absence of stimulating role models. Our science graduates were brilliant, but, too often, businesses found they lacked real world skills to operate in the commercial world. The universities which had trained them had failed to understand the business world and had remained locked in the academic universe. It was vital to involve universities with business, and business to understand how they can help universities to answer the questions they need answering by providing role models and by working in partnership. The MIT model, with graduates moving in and out of business and academia was a good example to follow.
 8. Many Scottish born and educated entrepreneurs left Scotland because of the limited opportunities available, and because they could not see their way to wealth and independence. But many non Scots came and settled in Scotland and grew business. They were often in the most productive businesses, both large and small. Sadly, the least productive people were Scots who just stayed at home. Often the most productive were immigrants from outside the EU. An immigration policy that failed to recognise the value of imported skills would be damaging to the economy.
 9. You do not teach people how to be entrepreneurs. You have to give them the opportunity of experiencing it, working hard, perhaps losing money, taking risks and learning by success or failure. To be able just to devise a plausible business plan gets an entrepreneur nowhere.
 10. We must link innovation and enterprise together in areas where growth will occur. 80% of growth industries in the UK is in service industries. Are we concentrating sufficiently on them?
 11. Cultural change in universities will take a long time, but it should be possible to link researchers and businesses more quickly if business understood what universities could offer. Universities need to stimulate the demand from businesses for their research, and this means that they must go out and connect with businesses to understand their need, and to explain how research can help. Personal contact is important; the businesses need to know who, in the university, is the man or woman who can get things done.
 12. Interchange between academia and businesses will always be difficult, because a few years out in a business might well mean that the academic loses touch and misses out on career progression. We need a structure which would enable the academic to work for a start-up company, or join a business without the risk not only of financial disaster, but also of frustrating his or her academic career
 13. Scottish graduates seem often to lack confidence compared with others. They are afraid of standing out; they lack the "global mindset". This goes back to what is said by school teachers - in the US everyone is told you can do anything if you work hard enough to do it. Here in Scotland sometimes we hear - don't try to be above yourself.
 14. Be realistic about the likelihood of growing large companies in Scotland - a small economy with few big companies. Growth can only come from markets outside, and an entrepreneur must understand how to find markets, suppliers and talent internationally. Talent will come to where there is a magnet - and Scottish universities are such magnets. So persuade talented individuals to come and work in Scotland. It is to be noted that Cambridge based companies seem to find

it easier to develop markets abroad than do Scottish based companies.

15. How do Universities evaluate the success or otherwise of the impact of their research programmes? How do they measure "impact"? Do they look at the success rate and growth of spin outs after a few years? What do they know about unmet needs? Can they distinguish successfully between those very good researchers who will, with help, be entrepreneurs, and those who simply would like to be researchers?

19. How do you judge aspiration? Is it through someone claiming he/she wants to be a CEO or win the Nobel prize; or are there more subtle tests?

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