

**Speech by Phil Smith, Chair, Technology Strategy Board
The Foundation for Science and Technology
Royal Society of Edinburgh
25 October 2012**

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

Good evening. Thank you, Lord Selborne. It's always a pleasure to come home to Edinburgh

There are several observations as well as pragmatic answers to what can we do to promote a culture of enterprise and innovation in Scotland.

The **first** of my observations is that I think we have to recognise that we already have a culture of enterprise and innovation in Scotland and, indeed, throughout the UK. As we just heard eloquently from Ian and from Peter, there is no shortage of excellence in skills, in research, in business acumen and in enterprise and innovation.

The following characteristics are clear:

- Of top-world-leading research, the **UK has the second-most citations**, and **Scotland has the third most public research citations** in the world. Scotland produces more academic papers and citations per 10,000 of the population than any other country in the world.
- The **UK is the number one location for business –**
- **European headquarters**: more overseas companies set up their European headquarters in the UK than anywhere else. And as well-reported in the news, according to Ernst and Young's annual survey, **overseas companies looking to invest in jobs in the UK are more likely to choose Scotland than any other part of the country – and** jobs that were created in Scotland through overseas investment last year were up by 50% on 2010.
- The UK is home to four of the world's **top ten universities**, and **Scotland has 25% of the UK's students**. Skills and capability are fantastic – biggest challenge is getting young people to take the entrepreneurial risk
- We still have one of the **biggest manufacturing sectors in the world**.
- We are also the **world leader in inward investment in Research and Development**
- From a technology perspective: The UK has **one of the world's strongest digital markets**. The ICT, software and digital content sectors are together worth £100bn.
- The **UK internet economy** is estimated to be larger per head than in any other country. It is expected to grow to **10% of GDP by 2015**.

It's an impressive list of UK and Scottish excellence when strung together, and there are many more stories to tell that demonstrate we have best-in-the-world businesses and research. Number one. Absolute gold-medal standard. And we must exploit our strengths.

And as for gold medals.....Cisco....a sponsor of the Olympics - communication technology infrastructure..... It truly was an outstanding Olympics for all of the UK and I think we are all very proud of the many British and particularly Scottish athletes.

As someone who felt personally very fortunate to witness some of the great moments in the best games in history, I also was able to watch first-hand the great British skills, manufacturing, and technologies at work as the Olympic Park infrastructure took shape.

But what was also remarkable for those of us who had the privilege of being in that spirited environment was an inexplicable but marked cultural shift that was occurring around the Park – it was less of a “blind patriotism” and more like an infectious positive attitude, almost a dawning realisation – that winning golds was sweet, but that the silver and bronze wins - and even just the massive achievement for qualifying to be an Olympian at the 2012 Olympics – were also true excellence.

So coming to my **second** observation would be that when we are second- or third-best in the world in business – that’s often even second- or third- “best in the world” without the “golf-handicap” adjustments such as rating on a per capita basis....being second- or third-best on the same global playing field amongst all of the countries with goliath-sized populations...that means we still ARE excellent.

If businesses were to accept defeat for not being first, many top-notch, extremely profitable Scottish and UK businesses would not exist.

Not only should we acknowledge and be proud of UK and Scottish business and research, whatever our “medal” standing, it’s also vital that we trumpet our excellence to the world. To compete in a global marketplace, we must continue the good work, well-led by SDI and UKTI and industrial bodies, to market our strengths and achievements to continue to attract inward investment and keep up the true and much-deserved buzz as the best place to do business.

My **third** and final observation is about what is needed to promote a culture of enterprise and innovation reminds me of my Scottish upbringing and that’s to “get on with it.”

If we have time to wallow or time to finger-point at the real or imagined causes of our woes, it’s only time wasted that we could have been using to find a solution. And since timing is everything in business, taking your eye off of the ball and missing your opportunity can cause severe if not irreparable damage.

Yes, the climate has been dreich. However, it is never a viable business option to hide below deck to wait out bad weather. In a global economy with tremendous competition, no business survives by doing absolutely nothing. Successful businesses adapt to the conditions and press on even harder.

American William Ward expressed this Darwinian necessity probably best in saying: “The pessimist complains about the wind; the optimist expects it to change; the realist adjusts the sails.”

And entrepreneurial businesses very much know and capitalise on the knowledge that there are many business opportunities in even seemingly very difficult situations. The

question is how to find the silver linings....and to figure out exactly what “suitable clothing” is needed to survive this particular weather that will provide real growth today and beyond.

But, to be clear, when I say “get on with it”, I’m NOT suggesting that sole responsibility lies with businesses to pull themselves up by their boot straps, as the American phrase goes. It’s also a kindly intended reminder for all of us in leadership positions in business, academia, and government that time stops for no one, and government, universities’ and corporate enterprise and innovation strategies today are absolutely paramount to business success and we need to find a way of better connecting those innovation systems.

Pragmatic action

And so we ARE getting on with it and Scotland, as a connected community, is a great place to champion and grow businesses.

We need to continue to find new ways to deliver sustained economic growth if we are to get past the current problems and restore our economy to strength. As recessions end and economies start to grow, nations whose knowledge-based businesses are most innovative, are the ones that recover the fastest and grow the most. We must do all we can to keep up and get ahead.

You have heard significant evidence of this already from Ian and Peter who have covered much of the issues around enterprise, venture capital, skills and research.

As Chair of the UK’s innovation agency, the Technology Strategy Board, I can say that **the urgency to bring new products to market is as high as ever.** We can only deliver this through innovation. Innovation in business, **and** in Government.

The Technology Strategy Board’s job is to ensure that we exploit our strengths to deliver a stronger, more innovation-based economy and I am very keen to hear in this debate tonight your feedback on the effectiveness of TSB and its interventions.

This means, **without serious investment in supporting innovation now**, the UK and Scotland may have a small amount of short-term growth but **could lose ability to compete in the future.**

We need a clear strategy to play to our biggest strengths in the UK. A well-coordinated industrial policy needs to be very different from industrial policies of the past which in the 70s focused on backing losers rather than focusing on picking races and capitalising on our strengths.

The game has changed. Technology is driving the speed of change like never before, creating completely new businesses, markets and sectors almost overnight. **No business is exempt from technological advancements**, not just technology businesses.

TSBs role is to :

- 1) **bring together the right resources to create excellent new technologies**
- 2) quickly identify & **capitalise on technological opportunities**

- 3) **avoid** bad “fad” tech investments that dead-end in **destructive market bubbles** although some failure is clearly a key characteristic of entrepreneurship and pushing the edges

And the other biggest force on future markets will be the “**challenge-led opportunities**” – these are the giant supply-and-demand challenges we can anticipate – those caused by global seismic changes in population and the environment.

Working closely with Scottish Government, SDI, Scottish Enterprise, Highland & Islands Enterprise and with UK government and businesses, together we have identified **those future markets where the UK has real potential to win big** and throw serious support behind the businesses, universities, training programmes and necessary infrastructure in a coordinated way that delivers real tangible momentum.

We are addressing the challenges – **energy supply, climate change, congestion, ageing population and so on** – **that will shape future market opportunities.**

Clearly these are very important **if we just look at the pace of change around us....By 2030:**

- The **world’s population will rise 30%: 6-8 Bn**
- **Demand for food will rise by 50%** and demand for water will rise by 30% - supply chains are under more pressure
- And **demand for energy will rise by 50%**

The unified theme is that these trends, against the backdrop of technological advancement, globalisation and economic uncertainty - **are not happening in silos** – our industries – whether they be Transport, Retail or ICT are being transformed like never before and the interdependencies are becoming greater.

So...it **can no longer be about piecemeal pushes** into silos of skills, regional aid, R&D and infrastructure.

It has to be about **building the highly competitive knowledge-based sectors, markets and value chains** through highly integrated strategies that bring together all of these things.

These challenges needs focus and “**orchestration**” to bring together the right people and resources with **intelligent oversight and “project management”**, much like large corporations do within their “Future Projects” teams. Innovation requires people working together who don’t “naturally” intersect. This is what we call in the TSB strategy “connecting the landscape”

- Cross-sectoral
- Cross-disciplinary (academia)
- Cross-departmental (government)

Not to interfere with markets or to duplicate VC investment, but to stimulate innovation and growth where there is little support, such as very early-stage investments in high-growth companies, or to amplify investments where scale is needed.

- **To sit at the interface of the research base, business, investors and government** and deliver increased and faster business innovation for economic growth.
- **To bring together the various players necessary** to grasp the opportunities presented by future markets/challenges – for example connecting universities to businesses

The innovation ecosystem is very complex, just a few deficiencies anywhere in the innovation landscape can skew the whole pH balance to form destructive bottlenecks in the innovation pipeline for businesses.

And now more than ever, businesses need a “connected landscape” when working with government. Businesses don’t recognise government department boundaries.

The old DTI looked at big technology projects in the traditional big industries - **we are now working all the way across the economy: from healthcare to the creative industries, from financial services to satellite engineering. We’re working with big and small businesses, joining up value chains and cross fertilizing.**

The Technology Strategy Board is an organisation **driven by business and run by business people** who engage at the very coalface of the latest technologies and with small and large companies engage in innovation.

Let me share a few facts with you about what the Technology Strategy Board has been doing:

- 1) Despite the potentially very long game that is innovation, the Technology Strategy Board has **created an exponential £7 return on every £1 invested in Collaborative R&D.**
- 2) **The TSB has successfully leveraged other public and private sector monies, domestic and abroad, in total with our partner and business contributions, we have invested about £2.5bn in innovation projects in our first five years.** TSB budget for year 2012-13 is approximately £390m.
- 3) **Working with more than 4,000 businesses a year and nearly all UK universities**
- 4) **Our networks now have more than 50,000 members,** looking to find ways to work together – because after all, successful innovation is most often built on collaboration and cooperation.

Some of our programmes and their specific impact in Scotland:

- 1) **Demonstrators – large-scale validators of consumer confidence and markets**

Ultra Low Carbon Vehicle Demonstrator Competition in Scotland

- A range of partners, including **Lotus, Nissan and Jaguar, Scottish Power,** the **University of Strathclyde and Glasgow City Council** playing a participant part in big projects like Reevolution (£20 million public-private programme) to demonstrate

consumer confidence in electric vehicles, the Lotus Evora being featured in auto journals as we speak.

- **Dundee's Axeon** has been part of the Demonstrator, and is Europe's largest independent designer and manufacturer of lithium-ion battery systems for electric and hybrid vehicles, as well as high volumes of batteries for e-bikes, power tools and mobile technologies.

- **Another example is Dallas** - The *dallas* programme (**delivering assisted living lifestyles at scale**) will help hundreds of thousands of older people to live more independently by using innovative products, systems and services. The programme has been developed by the Technology Strategy Board and joint funded by the National Institute for Health Research and the Scottish Government. **With £10.4m invested in Scotland helping 55,000 elderly people in Scotland. The area of health has huge scope for innovation.**

2) Catapults – centres of innovation excellence – seven centres in

- High Value Manufacturing
- Cell Therapy
- Satellite Applications Catapult
- Future Cities
- Transport Systems
- Connected Digital Economy and
- **Offshore Renewable Energy**

Offshore Renewable Energy Catapult – capitalising on Scotland's strong renewable energy market.

Will support UK firms working on new technologies and components for the fast expanding offshore renewables sectors, such as offshore wind and wave and tidal power.

We have invested in the following way

- **Offshore Renewable Energy Catapult will be anchored at Strathclyde University**
- **Total of £89 million**
 - £50 million from the TSB
 - £24 million from Scottish Enterprise
 - £15 million from the Scottish Funding Council
- **Attracting top talent to the Offshore Renewable Energy Catapult):**
 - **Andrew Jamieson, CEO, was Policy & Innovation Director of ScottishPower Renewables.**
 - **Colin Hood, Chairman, was COO of Scottish and Southern Energy.**

3) Skills placement through **Knowledge Transfer Partnerships** (KTPs)

4) Helping SMEs with **Proof of Market, Proof of Concept and Prototype Development (UK Smart Awards)**

5) And **we are helping small businesses win government business through pre-commercial R&D contracts** and helping government deliver more effectively and save money with the innovative ideas that SMEs can provide (**SBRI**)

6) Knowledge Transfer Networks

- Aerospace, Aviation and Defence
- **Biosciences**
- Chemistry Innovation
- **Creative Industries**
- **Electronics, Sensors, Photonics**
- **Energy Generation and Supply**
- Environmental Sustainability
- Financial Services
- **HealthTech and Medicines**
- **ICT**
- Industrial Mathematics
- Materials
- Modern Built Environment
- Nanotechnology
- Transport

Scottish Government and TSB working together to amplify innovation investment

In Scotland, the Technology Strategy Board has worked closely with colleagues in Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise and other partners to increase awareness and engagement of Scottish business in our programmes, to align our activities and to identify opportunities for joint working, collaboration and (increasingly) co-funding.

Scotland's six identified priority sectors of Energy, Life Sciences, Creative Industries, Financial Services, Food and Drink and Tourism have strong alignment with the TSB's key sectors.

We have good links with Scotland in a number of areas including:

- **Health and Life Sciences:** working closely with Scotland on Stratified Medicine, Regenerative Medicine, and are working with the Edinburgh Bio-Quarter and others on links with the Cell Therapy Catapult.
- **Creative industries:** strong links with the clusters in Glasgow, Edinburgh.....games industry in Dundee
- **Energy:** Strong links between TSB Energy team and their counterparts in Scotland. We have recently run a jointly funded £10m Marine Energy competition; with Scottish Enterprise putting in £3m. And Scotland is now a major player in the Marine Renewable Catapult..
- **Enabling Technologies:** TSB and Scottish Enterprise jointly funding a £15m Technology Inspired Collaborative R&D competition with Scottish Enterprise putting in £2.75m of additional funding.
- **Sustainable Agri-Food:** TSB Team working closely with Scottish Government and others; Scottish Govt have co-funded competitions with us in this area in both 2010 and 2011 and we hope they will again this year.
- **High Value Manufacturing:** Developing strong links with Scotland – and especially with the Advanced Forming Research Centre (AFRC) now a key part of the HVM Catapult.
- **Space Technologies:** We are building some really good connections in this area with business and key partners in Scotland, and supported the Scottish Space Symposium in Glasgow earlier this year..
- **Sustainable Construction:** Good links with Construction Scotland and other businesses and industry bodies. Hoping to run joint programmes in future.
- **Future Cities:** Scotland has been involved from the outset in this programme. Future Cities demonstrator projects currently underway in Dundee and Glasgow

- **KTPs:** Knowledge Transfer Partnerships have been a success story in Scotland – and we are very grateful for the additional funding (about £1.5m) that Scotland puts into this to match our own funding. Currently there are around 850 live KTPs in the UK, and of these 99 (12%) are in Scotland.
- **Scottish universities:** working very closely with Scottish Universities on many projects over the past five years.
- **Working with the Technology Advisory Group (TAG), Scottish Technology Showcase, and Scottish National Economic Forum**

But there is still more to do. We know that we need to do more outreach in Scotland, and we need your help to help businesses in Scotland

- TSB has a real issue with its visibility and we have to find a way of improving that to improve its impact nationally and internationally

With over 99.2% of all businesses in Scotland are SMEs (under 250 employees), and account for 52% of all private sector employment and 40% of turnover, it's a task that needs good collaboration to find the ones that need the help.

So it is with that I ask you that for those of you passionately working on innovation and growth, that we work on closer collaborations to help Scotland realise its growth potential through innovation and enterprise.

Thank you.