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Is Britain nurturing SciTech innovation?

How innovation and knowledge exchange are essential for growth

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SCI-TECH INNOVATION – The key to addressing global challenges

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The NEF Institute of Innovation and Knowledge Transfer (IKE) www.IKEInstitute.org, has been established to develop a body of knowledge that enables members to evolve their thinking and practice, build new values through intelligent behaviours, inspire opportunities for economic growth, support innovative leadership and improve social well-being. The Institute's programmes help organisations large and small identify new market insights and create sustainable opportunities for growth. Guided by its Innovation Council, IKE brings together business and educational leaders, financiers, entrepreneurs, inventors, thinkers, researchers and policy makers to improve capability to stimulate innovation, fostering a spirit of openness to new ideas and promoting active horizon-scanning.

That 'innovation' is a word and a concept being used increasingly in politics and the media is to be welcomed. But, argues Professor Sa'ad Medhat, words need to be supported by actions to create an environment where innovation can solve our biggest challenges.

Many business and political leaders would argue that for the UK to rebalance its economy, a move must be made away from consumption, and imports financed by borrowing, and a focus made to increase exports of manufactured goods and services. Today's challenges of weak output growth, increased unemployment and continued public debt frequently claim the news headlines. Other symptomatic challenges such as a declining and ageing working population, coupled with the diminishing returns on investment in physical capital to strengthen long-term growth, call for an alternative approach to transform our economy and society. Innovation is a key instrument to achieve such a transformation. Innovation generally, and science and technology innovation (SciTech Innovation) particularly, enhances competitiveness, helps to diversify the economy, and pushes countries towards high value-added activities.

It is easy to speak about innovation. President Obama cited 'innovation' six times in his State of the Union address; the UK Chancellor of the Exchequer in his 2012 Budget Statement put innovation and entrepreneurship at the top of the Government's agenda for growth. Everyone wants to be seen as innovative. As any business leader will know, changing focus mid-stream (or even diverting energies to consider something new) is not an easy action to take. Many organisations don't even know where to start.

THE NEED TO INNOVATE

Translating science and technology innovation into socially responsible action requires creative leadership and a shared commitment by both public and private sector organisations. This is greatly needed, for by 2050, nine billion people will inhabit the world. Societies will be faced with unprecedented demands for energy, food, goods and services and housing against a back-drop of diminishing natural resources, a commitment to raise people from poverty and to protect the environment. A sustainable future will need to balance economic stability and growth. Finding solutions to overcome today's problems presents a challenge, but also an opportunity, and one that will be afforded through innovation.

The Emerging Markets in the East have become the world's innovation hotbed, producing breakthroughs in all elements of modern business, from R&D and systems of production through to marketing, pricing and supply-chain management. They not only significantly reduce cost; they redesign entire business processes to do things better and faster than their rivals in the West. For Britain to compete, new models for business, policy and education are needed to invigorate innovation within our society. They are needed to inspire creativity and enable leaders and decision-makers to be visionaries, challenging the status quo and seeking new answers.

There are many types of innovation relevant to an organisation's growth; and in some cases their ability to thrive. Changing the business model to drive innovation brings much higher risk due to the potential for internal disturbance. However, for large organisations, recognising and managing this kind of transition can be critical to long-term survival. For Kodak, it was not a lack of fresh ideas that caused them to file for bankruptcy in January 2012, (indeed, they were among the first to take out patents on digital photography in the 1970s), it was a failure to manage these ideas into successful reality.

The rise of ubiquitous broadband and the move to everything digital resulted in many organisations having to reposition rapidly and move away from trusted business models. Innovation became the clarion call and the only way to maintain business. Organisations had to be 'innovative by design', and the endgame had to be radical transformation.

For example, Lateral Group CEO Jason Cromack, FIKE, says: "The increasing volume of data

generated through multiple channels, including social media and online trading, has transformed our business. In order to adapt to this changing environment, Lateral have to manage these data, by creating strategic innovative solutions. This required big thinking, driven by insight, using a combination of the right technology and expertise."

MODELS OF INNOVATION

Most innovation undertaken in organisations is incremental, involving 'tweaks' to an existing feature of a product or process to make it better. It doesn't involve ground breaking exploration. Product development is regarded as incremental innovation when technology enhancements are used to improve performance or reduce production cost. Strategic innovation is the form most associated with research and development (including new product development), and is linked to long term business planning and investment. This form of innovation is tightly controlled and often requires long development cycles. Given the need for return on investment, staff are under constant pressure to deliver on R & D targets.

A much talked about form is disruptive innovation, which creates a significant step change in market behaviour through the introduction of a new science or technology. A familiar example is the Apple iPhone and associated mobile applications which have impacted hugely on professional and personal communications.

Looking closer to home, additive manufacturing (3D printing) is another disruptive innovation. Renishaw PLC produces rapid, waste-free complex components that could never be made conventionally. "Whilst widely used in prototyping, additive manufacturing is transforming industries such as restorative dentistry, where it is replacing manually intensive investment casting. Other possibilities are in the aerospace sector, where the weight savings achieved in optimising complex components yield enormous fuel savings" says Renishaw Director Marc Saunders, FIKE.

Start-up businesses have an advantage since they can iterate and adapt their business model rapidly to respond to changing market dynamics and take advantage of new technologies or practices. This suggests why many disruptive innovations come from start-up businesses. For example, Celbius is a start-up company that combines two specialised technologies: ultrasonication and biocatalysis. Celbius Co-Founder, Dr Graham Ruecroft FIKE, says: "By bringing these two technologies together, chemicals can be made at lower cost. Any bioprocess is a potential candidate for improvement by this technology."

Often for innovation to happen, organisations need to engage in 'creative destruction', a literal tearing down of what has been and a building of something fresh and new. People need to change mind-set and 'unlearn' what has been done in the past to instil the 'creative habit'. In SciTech Innovation, such sacking of past citadels of success is a natural process to advance new scientific and technological breakthroughs.

CREATING THE ENVIRONMENT FOR INNOVATION

Innovation can be applied at many levels and across a myriad of situations whether in the creation of new products, innovative approaches to health care and education or in providing solutions to support sustainability. However, we need to create a better understanding of the role of innovation, how to apply it to our day-to-day lives and make it core to an individual's thinking processes through continued education. At the same time, exploitation of innovation can only really be achieved through the exchange of knowledge at all levels, in education, through industry and government.

Creating the environment for innovation is essential. Giving people freedom and the latitude to think and explore is critical if an organisation wants to embrace an innovative culture. If an idea doesn't work, 'fail fast and move on' behaviours should be encouraged. In the UK, unlike the US for example, 'not succeeding first' is akin to 'losing altogether', but how many famous entrepreneurs have had to go through idea after idea before they hit pay dirt? Driving out old preconceptions requires radical thinking and development of new structures that take advantage of the interconnectedness of the world, and build opportunity through knowledge exchange.

NEW STRUCTURES

Some organisational structures defer more naturally towards innovation. For example, the SME working in high-tech or emerging-tech areas has immediate affinity with innovation through necessity. Research has shown[1] that a new type of organisational model is evolving which is known as the Micro-Multi National Company (Micro-MNC) – an entity that is small, nimble, highly connected and global in its outlook. Market sectors such as biotech, financial services and gaming have seen a rise in Micro MNC type behaviour.

Another new structure used to innovate is clustering, in itself not new having been used by universities and their research partners. The new aspect is the approach used today, which brings together supply chains, customers, adjacent markets, researchers and even competitors to form clusters to address specific issues facing their sector. New product development in SciTech companies is not only driven by internal experiment and discovery; clusters that include supply partners and key customers have resulted in breakthroughs in new product innovations. An example is Aquamarine Power's Oyster wave power technology. Aquamarine CEO, Martin McAdam FIKE, says: "We have successfully raised over £70 million to date towards the commercialisation of Oyster technology capitalising, on the multi-billion pound wave energy market."

A PROFESSIONAL BODY FOR INNOVATION

IKE's Chair, Dr Rosie Bryson, of BASF says: "Fresh thinking and innovation is vital to business, education and policy. A professional body which encourages the development of innovation and provides a voice to those putting innovation at the heart of our economy is a major step in the right direction".

Reference

1 Transformation: Dig for Realism. ISRS 2012.