

## Innovation – a strategy for the UK and its regions

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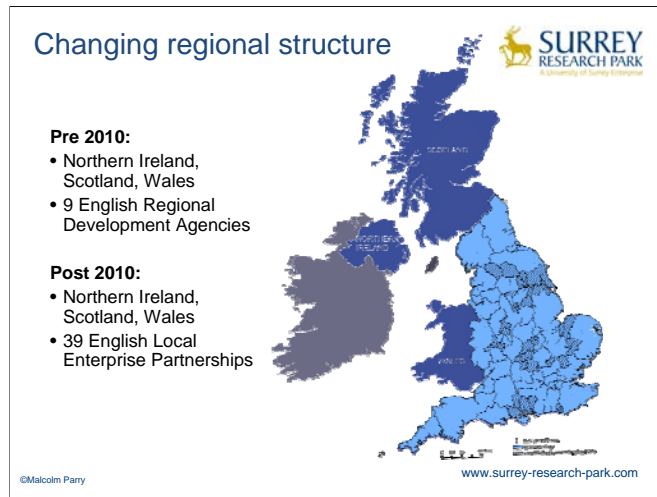


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Good afternoon and thank you to UNECE and to the organisers of this meeting for the invitation to talk about the current Innovation Strategy in the UK and its role in regional development.

Some context to this national policy is that it is based on research into innovation which has been conducted over the past 50 years.



However, in contrast the delivery of this policy for regional development has been shaped by politics.

Before 2010 the national policies were delivered by the 9 fully funded English Regional Development Agencies and the Scottish, Welsh and Northern Ireland Investment Agencies.

In 2010 the 9 English Agencies were swept away by the new government.

What remains today are the 3 regions of Wales, Northern Ireland and Scotland with their own budgets and some developed powers and 39 new based English Local Enterprise Partnerships.

These new Partnerships have no budget, they are run by volunteers, such as myself (I have been elected by business to sit on the LEP Board in my region).

To deliver policy we have to rely on firstly building local partnerships between creators, inventors and entrepreneurs and then turn to the Central Government National Innovation programmes to fund these linkages.



This central programme is delivered through the UK's innovation agency known as The Technology Strategy Board or TSB

Its long term aim is to accelerate the UK's economic growth by stimulating and supporting business-led innovation.

The TSB is governed and given direction by a high powered Board which is governed by representatives from business and academia.

For example it is chaired by the CEO of CISCO UK and Ireland, and the rest of the Board are senior industrialists who are drawn from main stream finance, the venture and Angel finance sectors, construction, bio-technology, aerospace, telecoms, advertising and media and higher education.

There is also an equally strong Executive Management Team that all come from a business background.

As I mentioned the policies and programmes the TSB has put in place are all underpinned by research findings on innovation.

- Business drives innovation
- Not linear
- Involves stakeholders, collaboration and networks
- Usually incremental not disruptive
- Few innovations reflect technological change
- Most innovative impacts are new combination of existing elements
- Radical change is largely unknowable
- Most companies are risk averse - avoid radical change
- Innovation needs to cross the whole economy not just technology



These findings include:

That it is business not government that drives innovation – many governments forget this and try to over regulate business.

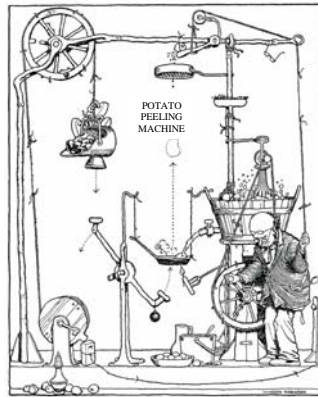
Innovation is most effective where it is not linear and comes from distributed or community-based models with a number of stakeholders. So it normally relies on networks and collaboration and the most effective networks are those that draw in external resources.

Most innovative change is evolutionary and is based on incremental adaptations of products and technologies. This normally involves new combinations of existing elements, bodies of knowledge or technology.

Most companies are risk averse so don't try to drive radical innovation because the impact in most cases is unknowable and they want to protect their existing investment – this is particularly the case in large companies.

This means there is an important role for micro and small businesses in driving national innovation.

Also innovation occurs across whole economic systems which means that support programmes should not just concentrate on the technology sector but include the service sector, management and government.



- Support creativity, invention and innovation
- Most innovators fail to capture reward
- Those with complementary skills often benefit most
- Many kinds of innovation.

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The reality of innovation in the business environment is that creativity and invention are inter-related, but separate and distinct elements of the process. And they are different again from the practical application of novel ideas which then need to be commercialised.

This means there needs to be a focus on supporting these 3 parts of the process.

Because most innovators fail to capture returns from their efforts there needs to be a system that supports their activities which is why there is a need to subsidise research environments.

Also it is clear that most often it is those that own the complementary assets that are in a better position to profit from the innovation which is why these organisations are drawn to centres of creativity and invention and why science parks, technology incubators and Angel Investor Clubs have proliferated in number.

There is also a vast array of different types of innovation from radical to incremental innovation and a distinction between product innovation and the creation and launch of goods and services.

So how does UK policy serve all of these elements?

## Innovation programmes need to...



- Innovation follows a pattern – firms vary pattern in product life cycle
  - Innovation tends to be geographically based
  - Advanced organisational practices support the process.
- ...need to tailor innovation policy to local conditions..



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Firms vary their emphasis on product and process innovation according to the life-stage of a technology.

This means there needs to be a variety of support programmes to suit different stages of development.

Innovation is a 'sticky' activity in which geography matters. This means policy has to work on building this sticky environment by trying to encourage the formation of clusters.

And businesses need to build advanced organisational practices to manage the innovation process effectively.

In fact some businesses have two separate groups doing this with one exploring creative, radical new ideas and another for exploiting and developing incremental improvements in existing ideas.

Taking these observations as a whole it is possible to see that any national and regional strategy has to be tailored to local conditions.

**Technology Strategy Board  
policy direction**



- Accelerating the journey between concept and commercialisation
- Connecting the innovation landscape
- Turning government action into business opportunity
- Investing in priority areas based on potential



**Technology journey**

Technology push → Proof of principle (Basic research) → Proof of concept (Applied research) → Proof of viability (Early demonstration) → Proof of scalability (Full demonstration) → Proof of value (Marketable product) → Proof of quality (Vetted product) → Market pull

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The policy direction that broadly drives the TSB recognises that:

The journey of an idea from concept to market can be uneven and indirect. Policy needs to speed this up.

The innovation landscape can be fragmented and difficult to navigate so policies need to help to build strategic relationships with other innovation players.

Government can act as a 'lead customer' for businesses that can solve public sector challenges which means public procurement can help stimulate innovation by looking for new ways to solve many of its problems.

It recognises funds are finite so current UK policy only invests in priority technology areas in which the UK is most likely to generate economic growth by assessing whether:

There is a large (global) market opportunity?

Whether the UK has the capability to develop and exploit the technology?

Is the idea 'ready' so is the timing right?

Can the TSB make a difference and if so how?

## Technology Strategy Board (TSB) programmes and tools



Biomedical Catalyst	Catapult	Collaborative R&D
_Connect	Demonstrators	Feasibility studies
IC Tomorrow	Innovate UK	Innovation Vouchers
International programmes	Knowledge Transfer Networks	Knowledge Transfer Partnerships
Launchpad	Micro and Nano Technology	Missions
SBRI (Small Business Research Initiative)	SMART Awards	

[www.innovateuk.org/deliveringinnovation.ashx](http://www.innovateuk.org/deliveringinnovation.ashx)

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Based on this research and broad principles of investment the TSB has put in place 17 tools and programmes.

These are listed in this table and the details of all these programmes can be found on the TSB website; however in this presentation I am going to touch on these.



## Technology Strategy Board (TSB) programmes and tools



- Investment for growth
- Networking and partnership
- Government contracts
- Expertise and advice
- Specialist facilities



These 17 programmes fall into 5 categories, although there is some overlap.

11 of the 17 programmes are aimed at investment for growth - this helps to share the financial risk of innovation.

With innovation often being driven by collaboration 6 of the programmes are aimed at building networks and partnerships.

The realisation that government is an important market for companies one of the programmes is specifically aimed at using government contracts to drive innovation in areas of significant national challenges.

The complexity of innovation has led to 4 programmes which cover expertise and advice.

And with some complex new technologies emerging there are two programmes that provide specialist facilities on national basis.

Funding for growth –  
reducing risk and cost



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- Biomedical Catalyst – worth £180m
- Collaborative R&D – links business and researchers – technology specific
- Demonstrators – to prove the case
- Feasibility studies – checks technical feasibility
- IC Tomorrow – links digital innovators

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Biomedical catalyst is aimed at SMEs that are working on government healthcare challenges where help is required by business because of technical risks and regulation in medicine. An illustration is where spinouts from Imperial College and Cambridge are using the fund to develop tests for Alzheimer which can be used to measure cognitive effects of medical intervention.

The Collaborative R&D funds support business and researchers to work together in strategic technologies to encourage knowledge exchange, supply chain development and parallel working on complex challenges.

Examples of successes for the demonstrator programme include low carbon vehicles, home retrofit to reduce carbon emissions and most recently a four-year demonstrator programme within the Assisted Living Innovation Platform.

The Feasibility Studies fund supports single-company and collaborative R&D in assessing technical feasibility of a new idea.

The IC Tomorrow programme is based in London's Tech City and is aimed building a digital cluster. So far it has a network 3000 digital innovators that cover music, publishing, games, film & TV, culture and fashion. A current programme is encourage Digital Innovation in Fashion and is being run by the British Fashion Council and Tech City.

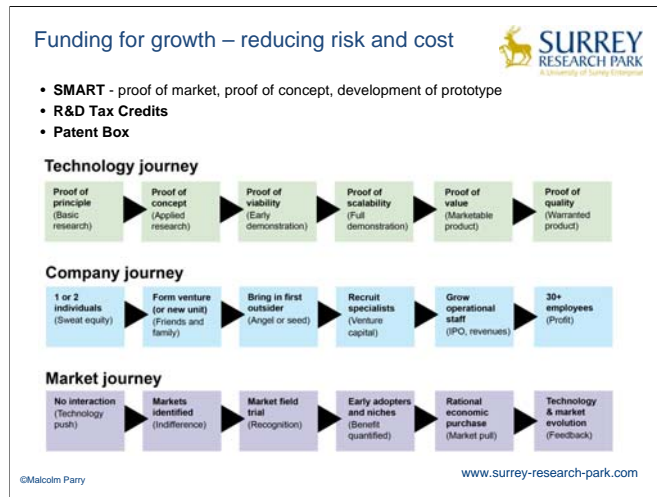


The innovation voucher scheme has been re-launched. This provides start-ups and SMEs with a grant of £5,000 to encourage them to look outside their network by paying for knowledge or technology transfer from external suppliers which are most commonly universities.

The key features of the Launchpad programme is to try to build sticky clusters in specific theme areas. This has proved to be very successful in helping to build a series of commercially funded incubators in a “cool or hip” part of the east end of London.

The SBRI programme is aimed at using the power of government procurement to drive innovation.

This is based on putting up funding competitions for SMEs to attract contracts to solve specific national problems. In this programme any IP remains with the company, it helps create a route to market and if successful it can help companies secure further funding.



The SMART awards are for funding SMEs to engage in R&D projects in the strategically important areas of science, engineering and technology.

This offers three types of grant to cover: proof of market, proof of concept and the development of prototypes.

All companies are also eligible for research and development tax credits. This tax allowance has always played an important role in supporting innovation in the UK.

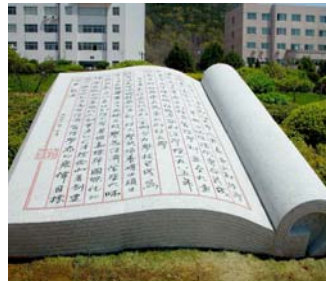
From April this year this allowance has been improved to encourage investment.

In 2010 the Patent Box arrangement was also put in place. Corporation tax in the UK is 23% but under Patent Box it reduces this to 13% on profits from patents.

## Funding for growth – reducing risk and cost



- International programmes
- Health
- Information and Communication Technologies (ICT)
- Nanosciences, nanotechnologies, materials and new production technologies (NMP)
- Surface Transport – road, rail and marine
- Space
- Aeronautics
- Security
- SMEs



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The TSB's international programme is aimed at helping UK business gain access European research and development through national contact points in relation to a range of specific technology sectors and international programmes.

These are numerous and by way of example include the clean sky initiative that is concerned with reducing the environmental impact of air transport.

It also involves collaboration with organisations such The European Institute of Innovation and Technology, the pan European Eureka programme, the Inno - partnering forum, the Innovative Medicines Initiative, working with Taftie the network of National Innovation Agencies, engaging in the ERA-IB network related to industrial biotechnology and the SIINN ERA-NET nanoscience and nanotechnology network.

However, to work with these takes a significant degree of skill and my experience is that few SMEs have the time or inclination to engage in these.

To overcome this problem some LEPs are taking action to encourage participation.

Networking and partnership



**Catapult**

- high value manufacturing
- cell therapy
- offshore renewable energy
- satellite applications – University of Surrey is part of this centre
- connected digital economy
- future cities
- transport systems.



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The new Catapult Centres are a flagship programme to help business to translate ideas into successful commercial products for export.

These are a network of elite technology and innovation centres established and overseen by the TSB but aimed at attracting private sector investment.

In the current funding of £1bn the Technology Strategy Board has established seven Catapults which are listed here.

Each is different but share the idea of combining a local existing skills base with state of the art technology and knowledge to attract business there to innovate.

Surrey, my university is part of a Space Catapult because of the University of Surrey's interest in space and the presence on the Surrey Research Park of the UoS spin-out Surrey Satellite Technology.



- Innovate UK
- Mission
- \_Connect



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Innovate UK - is an annual conference and exhibition that focuses on innovation.

In part it's a network opportunity to link people from business, government and academia to support innovation and also showcase success.

With the need to export the TSB supports missions which take new early stage innovative companies in priority areas such as digital, healthcare or clean technology to countries strong in innovation and enterprise, such as the US.

The idea is for these companies to make new connections and meet potential investors, suppliers and customers.

\_Connect has 70,000 users in an on line business network and open innovation forum that gives information on such issues as funding, policy and regulations in relation to the current 15 Knowledge Transfer Networks and other related TSB programmes.



Expertise and advice

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RESEARCH PARK

- Catapult
- \_Connect
- Innovation Vouchers
- 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

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Under the 17 TSB programmes there are some which support a number of the 5 themes. I have already mentioned the first three items in this list in the context of other themes.

As we know knowledge transfer is critical in enabling businesses to compete successfully at the forefront of global technology and innovation.

The 15 Knowledge Transfer Networks listed here are one of the Technology Strategy Board's key tools for doing this. These are virtual networks that help innovators to connect, collaborate and find out about new opportunities in key research and technology sectors.





The Knowledge Transfer Partnerships (KTP) programme has been operating for many years.

This funds post-graduate students to work part time in a company and in the academic environment to try to solve a company based problem and helps to build the skills base in participating companies as they often go on to employ the post grad in a full time post.

Specialist facilities



- Catapult
- Micro and Nano Technology
- High growth coaching programme – the business accelerator



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As I have already noted the Catapults Centres; however, in addition the government has funded over the last 10 years 24 Micro and Nano technology centres around the UK.

Most of these have been absorbed into their hosts; however, they provide business with access to this capacity and are trying to encourage business to engage with this technology.

The government has also established a national programme of high growth coaching branded as growth accelerator.

This offers companies an opportunity to pay for a service that helps them learn about innovation and is supported with business development, help with access to finance to support the growth and developing the appropriate leadership skills to do this.

The government has given contract to a number of different providers to deliver this. All of 800 experts in the programme have a proven track record in business and can deliver expertise to the needs of the company. The ambition is to deliver more than 20% growth per annum.

Government contracts

**SBRi**

- Improved experience for people at the end of their lives
- The Challenges of Countering Terrorist Networks
- Low-Size, weight, power and cost, intelligence, surveillance, target acquisition and reconnaissance
- Preventing fraud in mCommerce
- Strengthening the security of maritime operations

**BIS Higher Education Innovation Fund**

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The image shows the Surrey Research Park logo in the top right corner, featuring a yellow lion and the text 'SURREY RESEARCH PARK'. Below the logo is a photograph of the Elizabeth Tower (Big Ben) in London, showing its intricate Gothic architecture and clock faces.

I have already mentioned the SBRi programme under funding for innovation but it also falls within the policy category of supporting innovation through government procurement.

A few examples of recent calls for bids from business include those listed here: it is clear that these range from dealing with our ageing population through to national security.

In the final programme the UK Government Department of Business Innovation and Skills has created the Higher Education Innovation Fund.

Bids to this vary but one of the most successful of these has been to fund a business early stage incubator on the Surrey Research Park

Business Innovation and Skills



- Higher Education Innovation Fund
- Pre Incubator
- Angel Club
- Mentoring
- Entrepreneur in residence

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Using these funds we have set up a pre – revenue business incubator in our Surrey Technology Centre that offers support to start up companies on The Surrey Research Park.

This is supported by an active Angel Club, it has a business led mentoring programme and an entrepreneur in residence who himself has significant business experience.

This pre incubator has raised £17m in investment for its members in the last 5 years and has proved to be highly effective in supporting pre revenue companies become established and grow.




On a national scale there are also now over 70 locally planned and funded S&TPs.

These are active in supporting the process of linking entrepreneurs to knowledge creation and, by using pre and full incubation, support the entrepreneur led selection process of testing new business ideas against competition and demand



And where these ideas appear to have an edge in the market they help them to mobilize resources to support driving towards business customers, consumers, government customers as well as build a business competence.

The other aspect of this relationship has been that companies that fail are a valuable part of system because they build help to develop a local and regional business competence.

Summary



- Regional development is now nationally led
- 39 Local Enterprise Partnerships
- 3 Regions
- Overarching Technology Strategy Board programmes
- Business led
- Links to universities



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In summary the current regional development strategies in the UK are highly centralised despite government plans to localise development by creating 39 LEP's to replace the 9 Regional Development Agencies.

However, the real potential is that these LEP's are business led, they are all currently producing economic development strategies but in the knowledge that there is no new government money to fund these plans the majority of these plans are looking to encouraging companies to work with the existing Technology Strategy Board programmes and working with universities to deliver impact.

These programmes are business led and together with local initiatives such as science and technology parks provide a strong foundation for continuing to support regional economic development.

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Thank you