

Technology Strategy Board

Driving Innovation

Connect and **Catalyse**

A strategy for business innovation

2008-2011

Our vision: for the UK to be a **global leader in innovation** and a **magnet for innovative businesses**, where technology is applied rapidly, effectively and sustainably to **create wealth and enhance quality of life**

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The Technology Strategy Board is an executive non-departmental public body sponsored by the Department for Innovation, Universities and Skills (DIUS).

For more information, visit:
www.innovateuk.org

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The Technology Strategy Board has already come a long way. We inherited from government a strong foundation of successful programmes promoting innovation, on which to build. Now, we have new vision and ambition. We want to make the UK a global leader in innovation. That is our destination; this strategic plan is our roadmap for the coming few years.

The journey will involve experimentation and discovery; success and disappointment; challenge and solution; risk and reward.

Innovation, the successful exploitation of new ideas, underpins economic growth. Our job is to ensure that the UK is in the forefront of innovation enabled by technology. To achieve this, we will help businesses on their journeys of discovery.

How?

- By providing strategic innovation leadership and investment
- By bringing people together in partnership and working across business, government and the research community
- By ensuring that the UK has the necessary capability in key technologies
- By taking a global perspective
- By investing in networks and knowledge exchange
- By promoting the importance of innovation and technology.

We are building on Lord Sainsbury's review 'The Race to the Top', the DIUS white paper 'Innovation Nation' and the BERR strategy document 'Enterprise: Unlocking the UK's Talent'. And we take into account leading reports from bodies such as the Commission on Environmental Markets and Economic Performance.



We have listened to many businesses and partner organisations about what is needed; thank you for all your input. Informed by all we have heard, we believe that we need to *connect* and to *catalyse*. And in doing so we are focusing on three specific areas: innovation in response to societal and economic challenges; innovation inspired by the existing and emerging technologies where the UK leads or could lead; and the 'climate' or culture in which innovation can grow.

These themes are at the core of the strategy outlined in this document. It's an exciting, important journey which we are all making together, and it begins now.

Iain Gray
Chief Executive
Technology Strategy Board
May 2008



NovelELS is a collaborative project led by Enfis Ltd, which is establishing the techniques needed for the commercial production of solid-state lighting units. These innovative technologies will deliver energy efficient environmentally friendly, long lifetime lighting with wide applications in the aerospace and computer industries and beyond. 50% of the project cost is Technology Strategy Board investment.

Executive Summary

We aim to make the UK a global leader in innovation. This strategic plan outlines how we will promote and invest in innovation enabled by technology for the benefit of business, to increase sustainable economic growth and to improve quality of life.

We will provide leadership to invest in new ideas, build networks, and promote knowledge exchange.

We will act as a catalyst to stimulate new areas of activity for business and provide a longer-term view of future technology and innovation needs across the UK economy and globally.

Working with the regional development agencies and the research councils, we will jointly invest over £1 billion in the next three years. Our proven ability to obtain matching private sector investment will at least double that to over £2 billion. In addition, we will continue to work with government departments, the devolved administrations and other funding partners to increase the overall total.

With a wide remit covering the whole of the UK economy, we will have to make choices. This document sets out our priorities.

We plan to invest according to three main strategic themes: innovation led by challenges; innovation inspired by technology; and the innovation climate.

We aim for our annual investment to be targeted in these areas, in a ratio of 50%, 25% and 25% respectively by 2011.

Over the next three years we will:

- Increase our focus on challenge-led innovation and helping business find opportunities in societal challenges such as climate change and the ageing population
- Double the number of Innovation Platforms, which take a new cross-cutting approach to these challenges
- Develop strategies in key market application areas representing major societal or economic challenges to the UK
- Understand, strengthen and invest in the UK's capabilities in core, underpinning technologies
- Develop and implement a strategy to promote the rapid commercialisation of emerging technologies and industries
- Carry out a strategic review of the Knowledge Transfer Networks and reinforce and extend their role
- Double the number of Knowledge Transfer Partnerships and increase their flexibility
- Pilot a reformed Small Business Research Initiative
- Work to maximise the positive impact of government procurement on innovation
- Think and act globally.

A message we consistently get from business is to keep it simple. With our focus on innovation enabled by technology, we will:

- Understand the support required by business and provide a coherent view of what is available, from us and from others
- Ensure that our support is flexible and meets the needs of business
- Simplify and streamline our delivery
- Invest in some areas with a higher level of risk, as part of a balanced portfolio
- Evaluate our investments to keep them effective
- Work with partners to make businesses in the UK more open to innovation and share with them the credit for what we all achieve.

'Business as usual' will not achieve our vision for innovation in the UK. We plan to stimulate a debate about the appropriate scale of ambition and how to measure progress.

This strategic plan is the beginning of a long-term programme of action. The rewards are potentially far-reaching. The Technology Strategy Board welcomes the challenge. We are confident in the UK's ability to deliver.

Our world



A collaborative research and development project led by Wireless Fibre Systems Ltd is developing innovative underwater telecommunications devices using advanced radio technology. The picture shows early trials of an underwater broadband data link at Deep Sea World, with resident shark looking on.

The world is changing rapidly. Climate change, globalisation, the ageing population and worries over security pose major societal challenges for us all.

Businesses face additional challenges, including rising energy and raw material costs, growing competition, the search for talent and skills, ever more sophisticated consumers, and a perpetual revolution in business models and methods.

But where there are challenges, there are opportunities. The businesses most likely to succeed are those which see the challenges most clearly, embrace innovative ideas and adopt cutting-edge technologies – in a climate of confidence, aspiration and intellectual enquiry. The task of the Technology Strategy Board is to help them succeed.

Our vision is for the UK to be is a global leader in innovation and a magnet for innovative businesses, where technology is applied rapidly, effectively and sustainably to create wealth and enhance quality of life.

Innovation takes many forms and has many drivers. For the UK to achieve its full potential, we need to focus on:

Challenge-led innovation

Treating the societal and economic challenges of the future not just as threats, but as opportunities for innovative solutions that enhance quality of life and increase wealth

Technology-inspired innovation

Maintaining core expertise and leading edge technologies to underpin UK business growth and to invest in the next generation of technologies and industries

The innovation climate

Fostering a national confidence in the power of innovation to create opportunities and raise sustainable economic growth, and a commitment to making that happen.

Our task at the Technology Strategy Board is to *connect* and *catalyse*. As an organisation we work for business – our customers – and in partnership with government and the research and financial communities. We will embody innovation in our business practices and we will not be afraid to take risks and challenge received wisdom.

Treating the **societal and economic challenges** of the future not just as threats, but as **opportunities for innovative solutions** that **increase economic growth** and enhance **quality of life**

Our objectives

We will:

Promote a culture of confidence in and enthusiasm for innovation.

- Provide innovation and technology leadership to our partners, including government departments and agencies, regional development agencies, devolved administrations, research councils and others
- Celebrate the UK's innovation success stories
- Increase the appetite for technology and innovation
- Foster multidisciplinary collaboration and connections
- Encourage co-ordination between businesses, and between business and partners, to overcome fragmentation in the innovation 'ecosystem'.

Invest to help innovative businesses become and remain successful in the global marketplace.

- Encourage business investment in technology and innovation to increase sustainable economic growth and improve quality of life
- Invest to stimulate the emerging technologies and industries of tomorrow.

Understand and communicate the drivers of innovation.

- Understand markets – and why some businesses are better at innovation than others
- Provide insight into the process of turning innovation into wealth.

Collaborate with business and our partners to stimulate innovation.

- Work with businesses, the financial community and government and other expert bodies to understand how best to stimulate innovation
- Advise government on barriers to innovation and the exploitation of technologies, and make recommendations for removing these barriers
- Align innovation support mechanisms and contributions from partners with our own strategic activities, delivering stronger and more aligned support for business.

Be a high-performance innovative organisation that gets things done.

- Be a great place to work, able to attract the highest quality people and invest in their development.

What this means for business

We will help maintain the competitive position of our world-leading businesses and sectors against global competition. This includes areas of manufacturing such as biosciences and aerospace, as well as high-value services including financial services and the creative industries.

We will identify and grow sectors and businesses with the capacity to be among the best in the world. We will encourage them to fulfil their potential.

We will help to turn today's emerging markets and new technologies into the growth sectors of tomorrow. We will use our investments to reduce the time it takes to bring new products to market.

Our investment strategy

We will invest to generate sustainable economic growth and improve quality of life. We will join up the fragmented technology and innovation landscape in the UK, including international links.

We are open to working with businesses in any part of the economy and we are particularly committed to encouraging knowledge transfer between sectors. But we will not provide support indiscriminately and we will not spread our resources too thinly. We will focus on those areas of the economy where the UK has strength and which will provide the greatest impact.

Budget

Our budget for 2008-2011 is £711 million, plus aligned funding from the regional development agencies of £180 million and at least £120 million from the Research Councils.

With related funding from government departments and the devolved administrations, this will bring investment by ourselves and our partners to well over £1 billion over the next three years. This is a substantial level of resource, and a testament to the progress that we have already made in sharpening support for innovation enabled by technology in the UK.

Yet the scale of the challenge facing the UK should not be underestimated. Innovation is seldom cheap. Our biggest impact has to come through our work as catalyst and connector, rather than through the simple distribution of funds. Fortunately, our track record of success in leveraging both public and private sector funds means we are confident that the total impact of our work will be investment in innovation of well beyond £2 billion over the same period.

Investment criteria

We will have to make choices as to where we invest. We will do so using the following criteria:

- Does the UK have the capability?
- Is there a large market opportunity?
- Is the idea ready?
- Can the Technology Strategy Board make a difference?

We will make informed decisions on where we invest and evaluate performance. We will be willing to stop investments that are not performing.

Investment Criteria

Does the UK have the capability?

- Do we have the capacity and capability and skillbase in the UK to research, develop and exploit the technology or innovation?
- Do we have - or can we build - a strategic presence or a UK centre of gravity in this area?

Is there a large market opportunity?

- What is the size of the global market opportunity?
- Will it create added value in the UK, taking account of the global market potential?
- Will innovation in one company or sector transfer to others, boosting the overall returns?

Is the idea "ready"?

- Is there a clear opportunity to which this is a timely response?
- Is the science or the creative application of technology developed far enough to underpin the innovation?
- Will bringing it to market make enough impact quickly enough to be commercially rewarding?
- Will it speed progress towards more sustainable economic growth?

Can the Technology Strategy Board make a difference?

- Is there a clear Technology Strategy Board role? Can we add value?
- Will our investment promote sustainability and quality of life?
- Can we bring partners or programmes together to create more than the sum of the parts – for example in cross-government co-ordination?
- Will our involvement limit or spread risk, or enhance opportunities? Are there gaps that we can bridge? Can we create challenges to which others will respond? Can we address barriers to progress? Can we inspire a culture of innovation?

We will use a range of mechanisms to foster innovative responses to challenges

Challenge-led innovation

To unleash the UK's full innovation potential we need to change many of the ways in which we all think. It would be easy to feel overwhelmed by the many challenges that the world faces, such as climate change, the ageing population, globalisation and security threats.

But the very things that seem to threaten us can be used to stimulate responses that enhance the quality of life and increase wealth. The Technology Strategy Board will use a range of mechanisms, levers and initiatives to foster innovative responses to challenges.

In doing so, our role will be to connect and catalyse – and then let the market select the best solutions.

Commitments

We will increase our investment in challenge-led innovation activities to approximately 50 percent of our budget.

- We will develop strategies in the main areas where we plan to invest, taking international perspectives into account.
- We will double the number of Innovation Platforms responding to societal challenges to 10 and invest up to £100 million annually in them.
- We will address the energy challenge, including investing up to £20 million annually in the Energy Technologies Institute.
- We will encourage more innovative procurement by working closely with government departments and agencies.

Key application areas

We are developing strategies in a number of broad areas representing major societal challenges or associated with the challenge of maintaining a world-leading position. Currently, they include:

- Medicines and healthcare
- Energy generation and supply
- Transport
- Environmental sustainability
- Built environment
- Creative industries
- High-value services.

What this means for business

We will identify challenges, establish priorities in each of these key application areas and develop strategies which specify the key interventions. We will put into place appropriate responses, aimed at generating an innovation answer to the key challenges. In doing this, we will listen to the voices of others including business, Innovation and Growth Teams, Knowledge Transfer Networks and government departments including the sector teams in the Department for Business, Enterprise and Regulatory Reform (BERR).

Major challenges break down into subsidiary challenges. Examples of these and the possible responses include:

- Promoting UK strengths in low carbon energy generation and oil and gas extraction, by investment in energy generation and supply technologies, including our investment through the Energy Technologies Institute
- Investing to maintain the leading position of the UK's pharmaceutical and healthcare sectors
- Promoting the competitiveness of the UK aerospace sector, by investment in alignment with the National Aerospace Technology Strategy and the UK Civil Space Strategy
- Improving the resource efficiency of UK business by minimising pollution and waste, and increasing energy efficiency
- Addressing the challenges facing the creative industries arising from the rapid pace of change in digital technology, developing and implementing appropriate responses
- Evaluating and prioritising opportunities for the innovative use of technology in other high-value service sectors and acting accordingly.

Changing proportions of Technology Strategy Board financial investment over 3-year period



- The innovation climate
- Challenge-led innovation
- Technology-inspired innovation



The Code for Sustainable Homes shows how government, taking a long term view, can stimulate innovation, create new markets and deliver policy objectives. This national design and construction standard requires all new homes to be zero carbon by 2016, giving business clarity and an incentive to invest in innovative approaches. Our Low Impact Buildings Innovation Platform is bringing business and government together to focus on this area.

Innovation Platforms

Innovation Platforms are one of the principal ways in which we support challenge-led innovation. An Innovation Platform is a new approach to delivering innovation which targets one of today's major policy, societal or market challenges. It means understanding the role of government regulation and procurement in changing markets, working with business and research organisations to identify their response to these changes, and then supporting programmes to deliver innovative solutions.

Innovation Platforms embody our principles of 'connect and catalyse' and we expect them to:

- Bring together businesses which already participate in these markets with those who would not normally do so – and the government departments which control policy, regulation and procurement in these areas
- Adopt a multi-disciplinary approach which fosters all types of innovation, bringing together public and private funding where the two can usefully reinforce one another
- Make something happen that would not otherwise happen, and above all lead to commercial benefit and a change in behaviour.

We are currently investing, along with business partners and a number of public sector organisations, in five Innovation Platforms. These focus on assisted living, intelligent transport systems and services, low carbon vehicles, low impact buildings and network security. They are charged with promoting challenge-led innovation within their respective areas.

For example:

- Climate change is perhaps the greatest challenge we face. At least part of the response is likely to involve accelerating the introduction of low carbon vehicles, which the Low Carbon Vehicles Innovation Platform will address.
- Another challenge relating to climate change is the energy efficiency and environmental footprint of buildings. The Low Impact Buildings Innovation Platform addresses this.
- Meeting the demand for independent living for the elderly and the chronically ill is a challenge already identified, which the Assisted Living Innovation Platform will seek to address.
- Achieving greater security of electronic networks is another large societal challenge. The Network Security Innovation Platform will address this.
- The Intelligent Transport Systems and Services Innovation Platform will work to improve transport efficiency and reduce congestion.

Over the next three years, we will introduce a further five Innovation Platforms in areas which address other major societal challenges.

Challenge competitions

We will pilot competitions where we set the challenge, with both business and government, and allow the market to provide the solution. Such competitions will encourage a multidisciplinary response, bringing together organisations which might not normally work together to create new and exciting solutions. They will also provide a way of testing feasibility of future Innovation Platforms.

Delivering innovation through procurement

UK government procurement currently runs at around £150 billion each year, much of which addresses societal challenges, directly or indirectly. If we can increase the proportion that specifically aims to stimulate innovative responses, rather than 'business as usual' activities, then there will be a direct impact on the UK's overall innovation rate. And if large market opportunities arise from that, then the overall impact could be enormous.

We will work with government departments and the Office of Government Commerce to help identify future procurement opportunities with the potential to stimulate innovation. An initiative in this area may be particularly valuable for small and medium sized businesses. They tell us that a government contract is often better for them than a grant, making it easier for them to attract investment and grow.

We will act on the recommendation in the Sainsbury Review and put forward a proposal for encouraging innovation in small business through government procurement of research. We will work with the Department for Innovation, University and Skills (DIUS) to pilot a reformed Small Business Research Initiative (SBRI) with the Ministry of Defence and the Department of Health, prior to wider deployment from April 2009.

Maintaining **core expertise** and **investing** in the next generation of technologies and industries

Technology-inspired innovation

In the race to innovate, the UK has a stock of assets that few nations can match. Our best universities, and the wider research base in both the public and the private sector, have few rivals. Our track record for innovation is already among the best in the world. Many of our technologies are world-beating, and can be used to inspire new waves of innovation to carry the economy and society forward in the twenty-first century. We are building on strong foundations.

It is vital that the UK maintains core expertise in leading edge technologies to underpin UK business growth. It is no less vital to maintain a pipeline of new advances to keep UK businesses at the leading edge. The venture capital industry has contributed significantly in this regard, as has our financial system generally.

The Technology Strategy Board will seek to build on this, investing in areas where the UK is strong, to provide capability, taking account of the recommendations of business groups such as the Confederation of British Industry and bodies such as the Council for Science and Technology. We will identify emerging technologies that could have a major disruptive impact or the potential to create new industries.

Commitments

We will invest approximately 25 percent of our budget in core technologies that are critical to the UK's success.

Key technology areas

We will invest in specific key technology areas:

- **Advanced materials**
- **Biosciences**
- **Electronics, photonics and electrical systems**
- **Nanotechnology**
- **High value manufacturing**
- **Information and communication technology (ICT).**

We will be clearer about the long-term timing of these investments.

We will invest with partners to promote the rapid commercialisation of emerging technologies and industries

What this means for business

Input from a range of partners has helped us to identify a number of priorities across the key technology areas. In taking forward these priorities we will:

- Develop, publish and implement strategies, and technology roadmaps that justify and prioritise our interventions, and run collaborative R&D competitions focused on these priorities
- Invest in materials technologies, particularly in areas which address the challenges of energy and the environment, promote a 'reduce, re-use and recycle' focus on sustainability, or have healthcare applications
- Review the network of Micro and Nanotechnology Centres to identify areas of real strength and determine how best to further exploit these to the benefit of UK business

- Invest in UK strengths in control systems and power engineering, plastic electronics, displays and lighting, data and image acquisition, integration and interoperability, and communications
- Use the UK's electronics and photonics expertise in system level design and embedded systems to exploit end-use applications
- Invest in the development and exploitation of component technologies and end-to-end ICT systems that are rapidly configurable, informed, intelligent, dependable and user-centric
- Promote a high value approach to manufacturing by investing in product and process technology and by encouraging service innovation and business model innovation to increase UK manufacturing competitiveness
- Invest in modelling and engineering of complex systems across sectors
- Invest in the development and exploitation of second and third generation bio-fuels.

Emerging technologies and industries

The Technology Strategy Board will seek out emerging technologies that offer significant potential to disrupt existing markets and enable new business opportunities. Those that connect across different disciplines create particularly attractive opportunities.

We will work with businesses and government partners on an integrated strategy to promote the rapid commercialisation of emerging technologies and industries. This will embrace the national Emerging Industries Working Group which we will establish and lead.

The innovation climate

Innovation is something that people choose to do. To accelerate innovation in the UK, it is essential to build confidence and raise aspirations. We need a culture that enables, celebrates and ultimately rewards talent and innovation – and that retains and attracts talented people. The market for talent is global. We have to compete in that market.

A vital part of the role of the Technology Strategy Board is therefore to catalyse and connect with our partners, fostering between us a national confidence in the power of innovation. Through our work and by working with other organisations such as the National Endowment for Science, Technology and the Arts (NESTA) and the Design Council, we want to excite people about technology and innovation and provide insight and expertise to the wider community.

Commitments

We will continue to invest in networks and knowledge exchange. Our investment in this area will be approximately 25 percent of our overall budget.

- **Working with our partners, we will double the number of Knowledge Transfer Partnerships and introduce more flexible and short-term partnerships, increasing our annual investment to £35 million**
- **We will invest in networking activities both in the UK and internationally, primarily Knowledge Transfer Networks**
- **To build an innovation culture, we will invest in research to inform our thinking and to help businesses to understand the latest developments**
- **We will undertake a programme to understand the factors which make an innovative culture and where our interventions can make a difference**
- **We will develop a programme of public engagement activities including communicating and celebrating innovation success stories**
- **We will champion entrepreneurial leadership.**

Knowledge exchange

When people with different perspectives share what they know, it enriches them, sparks new ideas and delivers surprising benefits. We want to inspire and enable people to play their part in the innovation economy.

We will:

- Complete the process of doubling numbers of Knowledge Transfer Partnerships by Spring 2011, including an increase in those involving further education providers
- Roll out flexible 'mini-KTPs' in conjunction with the regional development agencies, devolved administrations and the research councils
- Engage a wider range of co-funders, including research charities
- Pilot other ways to increase the scope of Knowledge Transfer Partnerships, including international partnerships
- Investigate other people-related knowledge exchange mechanisms such as mentors, business-to-business exchanges, entrepreneurs-in-residence and fellowships
- Work with research councils and knowledge transfer groups to enhance the openness of research to business.



Hareesh Kallambella, working at Jones Stroud Insulations in a Knowledge Transfer Partnership with the University of Central Lancashire, to optimise manufacturing processes and introduce new product development projects.

Networks

Networks are a central component of an effective innovation culture. Knowledge Transfer Networks fulfil a variety of vital functions and set the tone. They connect broader business and academic communities, with the overall objective of accelerating technology transfer into UK business.

They drive the flow of people, knowledge and experience between business and the knowledge base, between businesses and across sectors, between supply and demand sides of markets, and between experienced and inexperienced innovators.

They also provide an expert forum for a coherent business voice in particular technology areas, acting as the eyes and ears of the Technology Strategy Board and advising on technology needs or on issues which enhance or inhibit innovation in the UK.

We will:

- Review our investment in networks, including Knowledge Transfer Networks, to ensure they support our strategic priorities
- Increase the international outlook of the Knowledge Transfer Networks
- Work at joining up effective local, regional and national networks, as well as linking to international networks
- Work at a regional level with clusters, science parks and science cities.

Clusters

Clusters of innovative activities in cities or regions can be highly productive. Proximity between businesses, and with universities or other institutions, can generate mutually reinforcing relationships – whether supplier, customer, competitor, collaborator or all at once.

Clusters also create local labour markets for highly skilled people. Businesses involved gain brand value and enhance their reputations as innovative organisations.

We welcome the attention paid to cluster development by our partners in the regional development agencies and the devolved administrations. We will engage with regional development agencies, devolved administrations, universities and other partners to invest in existing and emerging clusters, where research and business technology strengths are concentrated.

Thinking and acting globally



Photo by Paul Heyes

Sue Riddlestone, Managing Director of BioRegional MiniMills (UK) Ltd, demonstrates paper made from straw. This collaborative research and development project is developing small scale technology for treating black liquor, the effluent produced during paper making. With applications in many countries around the world, this will enable agricultural residues such as straw to be made into paper locally, putting waste to good use and relieving pressure on the world's forests.

We want to help UK companies succeed globally. To do this, we and they need an international outlook and an understanding of worldwide trends and technical developments, international partnerships and value chains.

In the international arena, we will:

- Strengthen support to generate greater UK business involvement in the EU Framework Programme and other European Union activities such as EUREKA, Eurostars, Joint Technology Initiatives and ERA-NETs, where there is benefit for UK business
- Look at new ways of internationalising UK innovation, for example, collaborative projects involving businesses, governments and researchers from more than one country
- Foster collaboration and support the Knowledge Transfer Networks to link with international networks giving UK business knowledge of leading edge global developments
- Working with our partners, enhance UK influence in European innovation programmes to encourage their funding priorities to reflect UK strengths and needs
- Work with others to enhance international understanding of the UK's innovative capacity and potential, and to promote the UK as a global innovation centre of excellence - with internationally-focused partners such as UK Trade and Investment, RCUK International, the British Council, and British embassies including the Science and Innovation Network
- Benchmark the performance of the UK against other countries and also benchmark the Technology Strategy Board against other similar organisations globally, to assess performance and to share best practice
- In the near term, concentrate particularly on interactions with the European Union, the US and other established and emerging economies which we identify as areas of focus.

The landscape is complex;
there are **many paths to innovation**.
Business requires **greater clarity** and
a more **connected approach**

Connecting innovation

The technology and innovation landscape in the UK is fragmented. According to Lord Sainsbury's 2007 report, *The Race to the Top*, "industry is faced with a bewildering array of organisations and schemes, many of which cover the same ground."

The government's Business Support Simplification Programme is already beginning to address this complexity. From our perspective, a joined-up approach to innovation is vital for the UK's future competitiveness.

Businesses need coherent support from government. To this end, we will create a UK innovation map to help them to access the most relevant support quickly. It will also act as a catalyst to encourage innovative thinking.

The UK innovation map will help business access the right support at the right time and provide a continuum to move ideas much more quickly from early concept to the market. As part of the innovation map, the Technology Strategy Board will work with other organisations providing technology and innovation support, to bring together the different types of support available. A longer-term aim will be to ensure greater consistency in rules and application processes.



The Technology Strategy Board is helping businesses like the Morgan Motor Company to use different elements of innovation support to meet their needs. Matthew Humphries is one of several graduates working to enable rapid development of new vehicle designs, in a Knowledge Transfer Partnership with Birmingham City University. He helped to develop the Morgan LifeCar, a fuel cell hybrid sports car through a collaborative research and development project led by Morgan with Technology Strategy Board investment. The partnership won a Lord Stafford Award in 2007, Matthew was recognised as a 'business leader of tomorrow' at the 2008 KTP awards, and the car made its debut at the Geneva Motor Show in March 2008.

We work in **all sectors of business,**
and with organisations ranging from
the largest to the smallest which are
distinguished by a **commitment to**
innovation and growth

How we will make investments

We work in all sectors of business, and with organisations ranging from the largest to the smallest which are distinguished by a commitment to innovation and growth.

We will use a variety of mechanisms to help business. This will allow us to tailor our service to their needs.

We will:

- Provide more coherent support for business
- Give the most relevant support using a menu of investment mechanisms
- Increase flexibility with different combinations of products
- Refine and enhance the investment mechanisms we use
- Balance our portfolio with some high-risk, high-return investments
- Connect with partners to provide a range of support from initial concept through to market launch.

The rest of this section outlines the mechanisms by which we can invest in business success.

Knowledge Transfer Networks

Knowledge Transfer Networks are national networks which aim to improve the UK's innovation performance by increasing the breadth and depth of knowledge exchange between companies and between business and academia.

There are 24, including a new network for creative industries due to be launched in 2008.

Knowledge Transfer Partnerships

Knowledge Transfer Partnerships, led by the Technology Strategy Board with seventeen other public bodies, enable firms to take advantage of the wealth of scientific, engineering management and technological expertise available in the 'knowledge base'. In a Partnership, a recently qualified person (an 'Associate') joins a company working with staff to embed the knowledge the company is seeking.

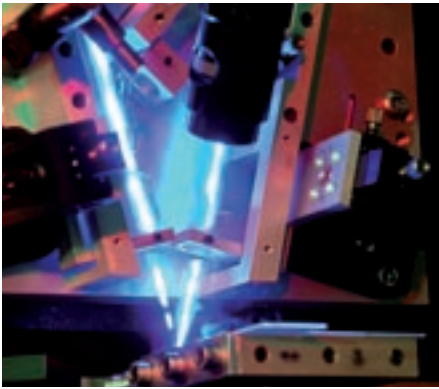
The scheme has been operating for over 30 years and during that time has remained largely unchanged. We believe that to meet a greater range of needs it has to evolve. For example we will introduce shorter placements and look at the potential of other models such as one or more associates working with several businesses in a specific area. We will also look at the possibility of placing people from business in a research institution, increasing partnerships in the further education sector and establishing international partnerships.

Sandpits

A sandpit is a week-long workshop which brings together a range of organisations and experts to develop and articulate problems where the solution seems initially complex or ill-defined. Sandpits are based on a model used by the research councils.

Feasibility Studies

Feasibility studies are a way for companies to carry out exploratory studies which could lead to the development of new products, processes, models, experiences or services. The study could involve for instance investigating the technical feasibility of a new idea.



A consortium led by Stratophase and co-funded by the Technology Strategy Board is developing bio-chemical sensor chips; disposable, highly-sensitive microchips which enable detection of harmful biological pathogens such as anthrax or E.Coli. Applications of the technology include both medical diagnosis and security, for example to detect biological attack. The picture shows part of the production process, using an ultra-precise laser to 'write' an optical circuit onto a blank chip.



Geomerics Ltd is leading a consortium in a Collaborative Research and Development project to bring about a step change in the quality of graphics for computer games. The new technology, called Enlighten, can create realistic illumination effects in real time, in dynamic lighting environments within a game.

Exploratory awards

Small, early investments can stimulate innovation. For many businesses, this initial funding is the difference between an idea taking off or going nowhere. We plan to provide funding for exploratory awards to stimulate activity such as the formation of initial relationships between SMEs and universities. Initially, we will work with the Knowledge Transfer Networks to deliver this type of investment.

Proof of concept

Early-stage and near-market proof of concept projects are part of the support needed to make an idea investor-ready and are often important for raising venture capital. As part of our toolkit, we will work with DIUS and the RDAs in establishing a more co-ordinated approach to the proof of concept support available.

Collaborative Research and Development

The Collaborative Research and Development mechanism supports innovative proposals in which the business and research communities work together on projects to deliver new products and services. Projects must involve two or more collaborators, at least one of which is from a business. The level of grant support varies between 25 percent for projects nearer to market and 75 percent for those more concerned with looking at the commercial potential of ideas coming from the knowledge base.

Large projects and demonstrators

We plan to continue investment in large validation projects and demonstrators seeking public funding greater than £5 million. These projects must address our strategic priorities and promise a significant impact.

Centres

A network of 23 micro and nanotechnology centres around the UK was established by government to create a recognised and sustainable infrastructure of centres of strength in this area, for the benefit of UK business. We will review these centres to identify areas of greatest value and determine how best to exploit them for business benefit.

Innovation and knowledge centres are centres of excellence designed to accelerate and promote business exploitation of an emerging research and technology field. They offer a shared space and entrepreneurial environment in which researchers, potential customers and professionals from academia and business can work side-by-side to scope applications, business models and routes to market. We are investing in two such centres, in association with the Engineering and Physical Sciences Research Council and the Biotechnology and Biological Sciences Research Council, and will consider further opportunities.

Standards, regulation and measurement

Standards, regulation and measurement are important drivers for innovation.

Standardisation and metrology facilitate the pull through of products, services and processes into the market. Standards – as with the Code for Sustainable Homes – can also be used to set longer term targets.

Regulation can be seen as an innovation inhibitor, but used effectively it can in fact act as a driver and a source of new business opportunities. We can encourage regulators to think more about innovation and help businesses to take advantage of opportunities arising from new regulations.

Across all our activities, we will work with a range of organisations to look at how standards, regulation and metrology can stimulate innovation and provide competitive advantage to UK business.

We will:

- Work with the BSI British Standards to pilot standards activity in areas where we can provide the UK with a competitive advantage
- Work with the National Measurement System including institutes such as the National Physical Laboratory to ensure UK business is taking best advantage of the effective use of measurement
- Examine the potential innovation opportunities arising from the implementation of EU regulations.

Any UK company can be our customer irrespective of size, maturity, sector or national ownership

Our customers and partners

We occupy the space between business, government and the research community. Our main focus and the main reason for our existence is to support UK business in the area of innovation enabled by technology. This is our purpose. We see businesses as our customers.

We want to provide leadership in technology and innovation, both in the UK and internationally. Through our own staff, the expertise that resides in our Knowledge Transfer Networks and by bringing together experts from many disciplines and business sectors, we will lead the debate and address key questions of relevance to UK business and government.

Working with business

The Technology Strategy Board has an enabling role in supporting UK business, as a champion, influencer and investor. Our primary focus is providing UK based business, irrespective of size, maturity, sector or 'national' ownership, with the technology and innovation insights and support required to make a difference. We support business by:

- Providing guidance, expert knowledge and opportunities
- Providing funding to invest jointly in research and innovation
- Working with business to overcome barriers to innovation.

UK business currently invests far more in research and development than we have at our disposal. In 2007 alone, the total was more than £16 billion. We will work with business in areas that we both consider important and jointly leverage our investment and skills to maximise the benefit.

We will:

- Provide business with a clear view of the support that is available from us, from others in the UK and internationally, and work to ensure that it is a coherent offering
- Be relentless in simplifying the support we provide and ensure that it is efficient, effective and meets the needs of individual businesses
- Bring people together to generate new ideas, transfer knowledge and create new relationships
- Work with the UK Intellectual Property Office to provide advice to businesses, helping them to capitalise on the benefits of innovation
- Help businesses to see new opportunities with a longer-term view of technology and innovation.

Working also with other potential providers of funding such as venture capitalists and business angels, we will build on the strengths of UK business and provide the opportunities for business to be at the forefront of technology and innovation globally.

Working with the knowledge base

Universities, further education providers, research and technology organisations, and other research providers are an integral part of many of our activities to foster innovation. Bringing them together with business in collaboration stimulates new ideas and generates an exchange of knowledge which can help drive future business and economic growth. The UK has a world-leading knowledge base in many areas and we need to ensure we capitalise and build on that expertise.

Working with government

We will only be able to achieve our objectives by working in partnership with government bodies. We work closely with three distinct groups of government partners – government departments and their agencies, devolved administrations and regional development agencies, and the research councils. We view these organisations as our partners.

We will work together, leveraging our skills and jointly supporting activities, and we will use our leadership role for working across government and co-ordinating technology and innovation activity.



The Assisted Living Innovation Platform, launched in November 2007, brings together The Department of Health, the Engineering and Physical Sciences Research Council and the Economic and Social Research Council. It will develop innovative technology-enabled products and services to meet the increasing demand for independent living from the growing numbers of elderly people, who may suffer from chronic conditions.

Government departments

We will work closely with departments right across government, particularly in the area of societal challenges.

This means understanding governmental policies and how we can work with them to good effect. It means helping to ensure that public procurement acts as a stimulus to innovation and that longer-term goals are set which provide business with the confidence to invest. It involves working closely with the chief scientific advisors. It means using standards, measurement and regulations to stimulate innovation and working with bodies such as the BSI British Standards, National Physical Laboratory and the UK Intellectual Property Office to make this effective.

Finally, it means advising government where there are barriers to UK business innovation and feeding back what we learn to improve future thinking.

Devolved administrations and regional development agencies

The Technology Strategy Board has a UK-wide role and will work with the devolved administrations of Scotland, Wales and Northern Ireland and the English regional development agencies to understand how their strategies and activities align with our national strategy, and to support activities which address national and regional priorities.

We will:

- Identify and follow through on priority areas where the Technology Strategy Board and the devolved administrations and regional development agencies will work together
- Use the recently established Strategic Advisory Group to provide advice on how regional support should be aligned.

Lord Sainsbury's review 'The Race to the Top' recommended that the regional development agencies should invest £180 million over the next three years in activities aligned with the Technology Strategy Board. We will aim to exceed this figure, focusing on shared priorities.

Research councils

The research councils are the main public investors in fundamental research in the UK. We will work with them to understand the capabilities and outputs of the UK universities and to support areas of research that show commercial promise. We will do this by strengthening business engagement with the research base, by maximising the potential for commercialising basic research and accelerating the process of doing so.

The broader remit of the Technology Strategy Board will make it easier to work with those research councils where perhaps there has not been any significant previous activity.

We will work with research councils on areas we both consider a priority. Over the next three years, the research councils will commit at least £120 million in support of Technology Strategy Board activities.

We will also work with the research councils on their strategic cross-council research programmes, enhancing links between areas and links with other partners such as regional development agencies and devolved administrations. These programmes include energy, living with environmental change, global security, ageing, nanoscience and the digital economy.

Measuring success

UK innovation trends

The UK has one of the most innovative economies in the world, according to the 2007 European Innovation Scoreboard. This places the UK among Europe's leading nations for innovation (along with Denmark, Finland, Germany and Sweden) and ahead of the USA. Indeed, the 2007 UK Innovation Survey indicates that the majority of UK firms (64 percent) surveyed had actively engaged in innovation in the previous three years.

Innovation is not, however, easy to measure. There are many other indicators, such as R&D spending, and they are only part of the picture.

That means that the trends in innovation are hard to spot. For example, the 2007 UK survey showed only a marginal increase in reported innovation compared with the 2005 survey. But other indicators, such as trends in the commercialisation of university research, paint a much more positive picture.

It is vital to know what the trends in innovation really are. A new Innovation Research Centre will be established by DIUS, NESTA, ESRC and the Technology Strategy Board to ensure a steady supply of high quality innovation research into the UK innovation policy community. And we will contribute to a range of initiatives including the Annual Innovation Review, to be published by DIUS for the first time in autumn 2008, and the Innovation Index, a pilot version of which is to be published by NESTA in 2009.

Measuring our impact

We also need to measure the Technology Strategy Board's contribution to raising the innovation performance of the UK. As a publicly funded organisation, we will evaluate all of our activities, to assess both their impact and their value for money.

The very nature of innovation presents some challenges. First, it takes time for innovation to bear fruit in the market. Second, many of the benefits ultimately accrue to other companies or even other sectors. Because of these lags and diffusion effects, separating out our own impact from that of other drivers is bound to be difficult.

To address these challenges and begin measuring our impact, we will draw on the experience of other public sector organisations, including similar organisations around the world, as well as business exemplars, to establish a best-practice appraisal and evaluation regime for all our own activities.

We will extend into other areas the good measurement practice already seen in Knowledge Transfer Partnerships in capturing the real business benefits of the investments made.

This is a **journey** of partnership to put **innovation** at the **heart of business life** in the UK

In conclusion

Innovation and the application of technology are vital to boost the UK's economy, address social and environmental challenges and help commerce to thrive. To achieve these ambitions, businesses need inspiration and investment. They need access to breakthrough thinking. They need to join forces with experts and business partners. And they need to operate in an environment that is open to new ideas and which supports them.

This is the mission of the Technology Strategy Board over the coming years.

We will **connect** and **catalyse** to address these needs, concentrating on three main priorities:

- **Challenge-led innovation**, finding opportunities for innovative solutions in current and future societal and economic challenges
- **Technology-inspired innovation**, maintaining the UK's expertise in technologies where it leads, and investing in the next generation of technologies and industries, and
- **The innovation climate** – fostering confidence in the power of innovation to create sustainable economic growth and a climate in which this can happen through knowledge sharing, networking and celebrating success.

The DIUS white paper 'Innovation Nation,' published in March 2008, highlighted the core role the Technology Strategy Board will play in driving innovation in the UK. In this strategic plan we have outlined how funding of £1bn for the years 2008-11 (with partner contributions), together with matching funds from business, will provide a total investment of at least £2 billion in innovation over the next three years.

Working with our partners, we will have many tools at our disposal to help make connections happen, invest in research and drive innovation. This is the start of a journey of partnership which we hope will put innovation at the heart of business life in the UK. We believe that this is an urgent and vital task.

We are ready. Let's go.

Glossary

BERR The Department for Business, Enterprise and Regulatory Reform; the government department primarily responsible for business in the UK.

BSI The BSI Group includes BSI British Standards, which as the national standards body of the UK develops and sells standards and standardisation solutions to meet the needs of business and society.

Collaborative Research & Development

A Technology Strategy Board programme which invests in innovative research and development projects. Competitions are held inviting proposals from business-led consortia, often including knowledge base partners. Formerly part of the DTI's Technology Programme.

DIUS The Department for Innovation, Universities and Skills. The government department which sponsors the Technology Strategy Board.

Devolved administrations (DAs)

The devolved governments in Northern Ireland, Scotland and Wales.

Energy Technologies Institute (ETI)

A public/private partnership organisation established in 2007 to develop secure sustainable and affordable energy supplies for present and future generations. The Technology Strategy Board is a funding partner of the Energy Technologies Institute.

EU Framework Programme

The Framework Programme for Research and Technological Development, the EU's main instrument for funding research in Europe. The Seventh such programme is currently in progress; known in short as FP7, it will run from 2007 to 2013.

Eurostars A programme launched in October 2007 by EUREKA. Eurostars provides public/private funding for research by high-tech small and medium-sized enterprises (SMEs) in Europe. The programme issued its first call in February 2008.

EUREKA A pan-European network for market-oriented, industrial R&D, created as an intergovernmental initiative in 1985. EUREKA aims to enhance European competitiveness through its support to businesses, research centres and universities who carry out pan-European projects to develop innovative products, processes and services.

ERA-NET The European Research Area (ERA), is a concept in which different national funding agencies work to create a joint approach to funding and to promote free movement of researchers and ideas across the continent. European Research Area Networks (ERA-NETS) have been set up in specific areas of research, to help co-ordinate national research policies and activities in terms of objectives, expertise and resources, with funding from the European Commission.

Innovation Platform An approach to innovation which addresses a major policy or societal challenge by working with business and research organisations to identify their response to the issue and the market opportunity, understanding the role of government regulation and procurement, and supporting programmes to deliver innovative solutions.

Key application areas A framework of broad areas of enterprise which the Technology Strategy Board has identified as key fields where the application of innovation and technology can address societal or competitiveness challenges.

Key technology areas A framework of core technologies in which the UK leads or which are critical to its success, designed to focus and prioritise Technology Strategy Board investments.

Knowledge Transfer Network (KTN)

National networks, funded primarily by the Technology Strategy Board, which aim to improve the UK's innovation performance by increasing the breadth and depth of knowledge exchange between companies and between business and academia in specific areas of technology.

Knowledge Transfer Partnership (KTP)

A UK-wide programme, funded by the Technology Strategy Board and 17 public sector partners, in which high-calibre, recently qualified people from the research base work within a business on innovation projects.

National Contact Point (NCP)

A Technology Strategy Board service providing information and advice to help UK business participate in the latest European Framework Research and Development Programme.

NESTA The National Endowment for Science, Technology and the Arts, a non-departmental public body devoted to supporting talent, innovation and creativity in the UK.

Research councils The seven primary government-funded basic research organisations in the UK. Comprised of the Engineering and Physical Sciences Research Council, the Economic and Social Research Council, the Scientific and Technical Facilities Research Council, the Natural Environment Research Council, the Arts and Humanities Research Council, the Biotechnology and Biological Sciences Research Council and the Medical Research Council.

Regional development agencies

Government funded bodies based in the regions of England which co-ordinate regional economic development and regeneration.

RCUK Research councils UK, a strategic partnership of the seven research councils.

Sainsbury Review A review of government's science and innovation policy by Lord Sainsbury, entitled *The Race to the Top* and published in October 2007.

Small Business Research Initiative (SBRI)

A government procurement programme designed to make it easier for smaller firms to obtain procurement contracts from government bodies to conduct research and development.

UK Trade & Investment (UKTI)

The government organisation which works to enhance the competitiveness of companies in the UK through overseas trade and investments and attract a continuing high level of quality foreign direct investment.

About the Technology Strategy Board

The Technology Strategy Board is an executive non-departmental public body sponsored by the Department for Innovation, Universities and Skills.

It is made up of a team of executive directors and staff who develop strategy and tactics, provide management and deliver the organisation's work programmes, while a Governing Board sets the overall direction.

The current members of the Governing Board are:

Dr Graham Spittle (Chairman)

VP Software, UK, Ireland and South Africa, IBM

Dr Graeme Armstrong

Director, Research, Development and Innovation, Akzo Nobel

Eur Ing Nick Buckland

Board member, South West RDA

Dr John Brown

Chairman, BTG plc

Dr Joseph Feczko

Chief Medical Officer, Pfizer

Anne Glover CBE

Chief Executive, Amadeus Capital Partners Ltd

Dr David Grant CBE

Vice Chancellor, Cardiff University

Jonathan Kestenbaum

Chief Executive, NESTA

Professor Julia King CBE

Vice Chancellor, Aston University

Andrew Milligan

Head of Global Strategy, Standard Life Investments

Dr Peter Ringrose

Chair, BBSRC

Dr Jeremy Watson

Director of Global Research, Ove Arup & Partners

Iain Gray (Chief Executive)

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