

Technology Strategy Board  
Driving Innovation

# Delivery Plan

Financial year 2014-15



Accelerating  
economic growth

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Any questions about the contents of this delivery plan? Email [support@innovateuk.org](mailto:support@innovateuk.org)

Cover image: Asha Peta Thompson, co-owner of Intelligent Textiles Ltd. Read how the Technology Strategy Board and Ministry of Defence have helped the company succeed at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)

# Foreword

## Welcome to our delivery plan for 2014-15.

The Technology Strategy Board is the UK's innovation agency. We have a vital role in UK economic development – helping to accelerate growth by stimulating and supporting business-led innovation. Taking our 2011-15 strategy, *Concept to Commercialisation*, as the start point, this delivery plan explains what we are doing to achieve this during the financial year beginning April 2014.

After a difficult period, the economic situation is improving – but long-term growth is as big a priority as ever. UK plc now has an opportunity to capitalise on the improved climate and invest strongly in innovation to lay the foundations for our future competitiveness and growth.

A new analysis published by the Department for Business, Innovation and Skills in January 2014 benchmarked the UK science and innovation system internationally. It found that we have world-class strengths in many areas such as research, higher education and the business environment, but also historically a long-term pattern of under-investment in public and private research and development and publicly funded innovation.

The Technology Strategy Board's role addresses this directly. But our work to identify the market and technology areas with the greatest potential for growth has been complemented by new strategic thinking in central government on growth drivers. In 2012 the Government, led by the Department for Business, Innovation and Skills, began to develop a new long-term approach to industrial strategy.

Under sector-based leadership councils, which include government, business and organisations such as ours, a set of strategies has been created to plan the way forward and give business the confidence to invest. Many of our programmes are also helping to deliver on the strategies. To complement this, in 2013 Universities and Science Minister David Willetts identified 'eight great technologies' in which the UK is strong and which have great potential to disrupt current models or underpin other developments – and generate growth. There has also been a strong and growing recognition of the vital role of small and medium-sized businesses, as expressed in Lord Young's 2012 report, *Make business your business: Supporting the start-up and development of small business*. Together, this aligned thinking across government is creating renewed momentum for innovation and growth.

As well as contributing at a strategic level, we have formed close working relationships with many central government departments – from energy and climate change, to health, to transport. We act as delivery partners for their innovation programmes, and link policymakers with the businesses that actually develop and commercialise innovative products and services. Working with all our other partners in the innovation 'ecosystem' is also vital. But key to all innovation is the role of business, driving forward the development and commercialisation of ideas. In this plan you will discover the range of ways we have to help business innovate – and particularly a renewed

focus on supporting SMEs with high-growth potential.

As the Technology Strategy Board has developed in strength and maturity, our portfolio has grown. And it is set to grow further; the announcement in June 2013 of an additional £185m budget for the year 2015/16 will allow us to achieve more in a number of important areas. This is good news for us but also makes the current year a challenging one, as we ramp up towards a significant growth in activity next year.

We have clear objectives, a range of highly effective tools and mechanisms to support business and accelerate innovation, and a team of over 200 highly skilled and committed people dedicated to our cause. But we can only achieve success through business and with the help of our strong partner relationships – so I encourage you to study this delivery plan and the activities it describes, and look at the part you and your business or organisation can play in this great purpose – accelerating economic growth through innovation.



**Iain Gray CBE**  
Chief Executive

# Our Strategy: *Concept to commercialisation*

Our 2011-15 strategy sets out how we stimulate and encourage innovation and drive economic growth.

The world faces major challenges, not only from the recent economic turmoil but also from societal challenges such as climate change and an ageing population. These challenges are creating global market opportunities for novel solutions. The countries that continue to invest in innovation and can innovate most rapidly will be most likely to benefit from these shifts in markets.

Across business, higher innovation investment is associated with higher levels of new product innovation. More product innovation is in turn associated with higher overall productivity in firms, and productivity growth is the central driver of overall economic growth. Innovation investment is core to creating a competitive position in rapidly changing global markets.

However, there are financial and technical risks in investing in early-stage technologies and markets, and the return on investment is uncertain. Small companies can struggle to raise funds and larger companies can find it hard to justify early-stage investment, tempted instead to wait for the market to become clearer and the uncertainties to reduce.

As a result, business investment in innovation is often lower and later than desirable for strong economic growth, and opportunities to capitalise on the UK's excellent research base and emerging global markets may be missed. Innovation can also disrupt existing value chains and business models. In complex systems and supply chains, a 'disruptive' innovation can mean that many partners, suppliers and customers need to adapt and innovate concurrently and collaboratively, making it difficult to capitalise on the opportunity.

Some companies, focused on their day-to-day activities, may not even see the opportunities created by new technologies, or technologies with potential to cross over from one market to disrupt another. Information flows imperfectly in what is a complex and organic innovation system; businesses may need help to identify opportunities, access information and knowledge and respond to disruptive developments.

Finally, government influences markets – through how it chooses to buy, how and where it chooses to regulate or set standards, and how it applies fiscal incentives. All too often government action has been taken without a view as to how it can stimulate innovation and maximise the potential benefit for UK industry.

It was to help tackle these types of market failures and innovation bottlenecks that the Technology Strategy Board was set up.

Our role is to help accelerate economic growth through the stimulation and support of business-led innovation. We are business-focused and business-led; our governing board and our staff have strong experience of R&D and innovation and the commercialisation of technology. We work across business, academia and government, helping companies take concepts through to commercialisation.

This means supporting business innovation through:

- tackling the barriers to innovation
- reducing financial and technical risk
- promoting collaboration
- helping knowledge exchange
- encouraging open innovation
- creating a more effective innovation environment, using our convening power and connections to bring different partners together.

## Our strategy has five key aims:

### 1 Accelerating the journey from concept to commercialisation

Taking a more holistic view of the innovation journey, identifying the areas where government support is justified and can make a difference. Working with business and other partners to develop and deliver cohesive and co-ordinated support that helps business overcome the barriers to innovation and commercialise new products and services.

### 2 Connecting the innovation support landscape

Broadening our role to build mutually beneficial relationships with other UK organisations, to help join up the players in the innovation support landscape and create a more effective innovation 'ecosystem'. We aim to increase the ability of companies to access multiple forms of support in the UK, EU and internationally.

### 3 Turning government action into business opportunity

We work with government to identify areas where policy and regulation can stimulate business innovation and pursue areas where government can act as a 'lead customer' or market shaper, engaging with business to find new solutions to public sector challenges.

### 4 Investing in priority theme areas based on potential

Working across business, academia and government we identify and prioritise areas where the UK has academic and business strengths that can address global challenges and create opportunities for UK economic growth. We work with the community to identify barriers to innovation and reduce them through appropriate support mechanisms.

### 5 Continuously improving our capability

We continue to develop our business processes to be fast, flexible, and focused on the needs of the businesses we support, and develop our benchmarks and impact measures to ensure that we remain highly effective and deliver value for money. We aim to support and develop our staff, and ensure that our organisation provides a positive and stimulating environment where they can thrive and work effectively together.

Working with all our partners, we translate these aims into a programme of action to accelerate business innovation. In all we do, we ask ourselves one question: **will it promote UK economic growth by helping business to bring new products and services more rapidly to market?**

## One question

Will it help UK business to bring new products and services rapidly to market?



# Delivery Plan: Executive summary

## Delivering our strategic aims for 2014-15.

2014-15 will be another year of intensive activity for the Technology Strategy Board, as we work to stimulate and support business-led innovation.

These are our main plans for the year, as they link to our five strategic aims.

### Accelerating the innovation journey and connecting the landscape

We have a growing armoury to support business in taking their ideas towards commercial reality. Over the years we have improved our existing programmes for supporting innovation, and put in place new ones – and this will continue in 2014-15. We will also prepare for increased activity and budget in 2015/16.

Our help for business includes:

- **Access to innovation funding and finance:** whether from ourselves and our partners, EU innovation funding, or other sources such as investors, see page 19
- **Access to knowledge, skills, equipment and partners:** such as the Catapult centres, sectoral networks, Knowledge Transfer Partnerships, and overseas entrepreneur missions, see page 26

- **Access to entrepreneurial expertise, mentoring and advice:** specifically for small and medium-sized enterprises, see page 28
- **Access to 'lead customers':** particularly in the public sector, through the SBRI programme, see page 29.

### New support for innovative high-growth-potential SMEs

Innovative small and medium-sized enterprises (SMEs) with high growth potential are a foundation of the future economy. We have been increasing our focus on these companies and the support they need – and this year we are taking a major step to build up the help we provide on their innovation journeys.

These firms need more than grants to bring their ideas towards commercialisation. After a successful pilot, we are working with partners to set up a new programme offering a package of skills, mentoring and coaching support – giving micro and small companies the capability to progress, attract potential investors, and grow their businesses. In 2014-15 we will help more of these high-potential companies succeed. We will:

- embed entrepreneurial training and access to coaching and mentoring into the support we provide to SMEs, working with GrowthAccelerator and others
- increase funding for our successful Smart programme to at least £50m (from £40m last year) so we can support more of the good ideas proposed



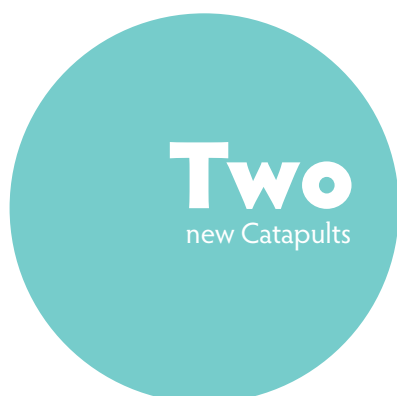
- bid to run the Enterprise Europe Network in England, Wales and Northern Ireland to help SMEs better access support (see *international partnerships* on page 8)
- expand Venturefests into a linked series of national events, helping SMEs highlight their ideas to potential partners and investors
- partner with GrowthAccelerator, the British Business Bank and the UK Business Angels Association to develop a new online platform to showcase innovative companies to potential investors
- partner with the Intellectual Property Office (IPO) and UK Trade & Investment (UKTI) to help SMEs access intellectual property and export advice
- run at least five Launchpad competitions supporting developing clusters of SMEs
- run at least three overseas Missions, with UKTI, to support high-tech SMEs in finding partners, investors and markets abroad.

### Helping companies connect, raising awareness and creating dialogue

Engagement between the business and research communities, and between businesses, is essential to drive innovation. An important part of this is the knowledge transfer networks we have built up, which have more than 90,000 members in specialist communities. We know that innovation increasingly happens at the boundaries between sectors, and that bringing together different groups (or people from different sectors who would not normally meet) often stimulates unique ideas. In April 2014, we transformed the 15 separate networks into one single dynamic, fluid and flexible network where people can interconnect better both within and outside the current communities.

Part of our work to accelerate innovation is building awareness of opportunities, talking to business, and creating face-to-face opportunities for businesses and researchers to work together. This year we will:

- bring over 2,000 business people and innovators together in November 2014 to find new ideas, partners and inspiration at the Technology Strategy Board/UKTI annual event, InnovateUK
- further develop the ways we communicate with our customers – through the internet, **\_connect**, social media, direct communications and events.



### Access to centres of expertise, skills and equipment

Catapults are world-leading centres of innovation which form a major long-term investment in the UK's innovation capability. They bring the best of UK businesses, scientists and engineers to work together and transform ideas into commercially viable products and services. The first seven Catapults are up and running, and we will grow the network this year.

We also invest with the research councils in a number of innovation and knowledge centres, and will continue this work during the year.

In 2014-15 we will:

- set up two new Catapults, focusing on precision medicine and energy systems
- develop and expand the existing Catapults
- work with Hermann Hauser on his review of the future direction and scale of the Catapult programme
- explore the potential for an innovation and knowledge centre focusing on research technologies avoiding the use of animals.

Innovators need many kinds of support at different stages of the journey – and the Technology Strategy Board only provides part of it. But we also connect the various resources that can help companies innovate, and so make the journey easier and quicker.

### Linking and leveraging public sector support

We have established strong collaborative working with many key partners such as the research councils, which has paid dividends, joining up innovation support for business benefit. More recent partnerships, such as those with GrowthAccelerator and UKTI, are already showing good results.

This year we will continue to build effective partnerships with organisations whose work complements or enables business innovation. As well as the work with UKTI, IPO and Growth Accelerator mentioned above, we will:

- continue pilots with the British Standards Institution to help use standards to support UK business innovation
- work with the devolved administrations of Scotland, Wales and Northern Ireland, and the local enterprise partnerships (LEPs) in England
- continue to build strong collaborations with the research councils, including the potential for taking a more co-ordinated and stage-gated approach to the emergence of commercially exciting new technologies
- work with the Higher Education Funding Council for England and the SetSquared group on a pilot scheme to facilitate the commercialisation of academic research and the development of high-potential spin-out companies.

## International partnerships

Horizon 2020, the EU innovation and research funding programme, has a €79bn funding budget and is a huge opportunity for UK business. We provide advice to help business access this funding and to build collaborations and partnerships overseas.

This year we will further boost this by:

- developing the Horizon 2020 website ([www.horizon2020uk.org](http://www.horizon2020uk.org)) as a source of UK-centred information on the programme and its opportunities
- building up our team of specialist National Contact Point staff, who give expert advice on Horizon 2020 opportunities, and integrating them more closely with our programmes
- establishing a permanent office in Brussels to better support UK business in accessing opportunities.

The Enterprise Europe Network is a multi-country network part-funded by the European Commission. In the UK, it can be a powerful resource for SMEs in accessing support for business growth, including building overseas partnerships, enabling access to funding programmes such as Horizon 2020, and developing supply chain partnerships and export opportunities.

This year we will lead a consortium bid to deliver the Enterprise Europe Network in England, Wales and Northern Ireland – aligned with a bid by Scottish Enterprise for Scotland – to provide a nationally consistent and appropriately resourced set of local networks that will help connect SMEs in their areas to EU and national innovation support.

Beyond Europe, we will help businesses to take advantage of global markets. We will continue to develop deeper strategic relations with India, Brazil, China and the US, and identify innovation hotspots globally where we will develop activities in specific thematic areas – such as



manufacturing or digital – to help UK business take best advantage of the opportunities. Will we also play a part in supporting the delivery of the Newton Fund, which provides £375m over the next five years to strengthen links between the UK and a number of emerging economies.

## Turning government action into business opportunity

The actions of government departments and agencies can have dramatic effects on markets and create opportunities for innovative businesses, whether through policy, procurement or new regulations and standards. We work with and across government to maximise these opportunities in many ways (see page 29).

### Innovation Platforms

Our innovation platforms are a powerful approach to innovation and are having a major impact for businesses in many fields. They bring together the public and private sectors to work on societal challenges, where government action creates global business opportunity – such as the need to reduce transport emissions. This year we will:

- continue to maximise the opportunities created by our five existing innovation platforms
- establish three new innovation platforms, working with business and government, to focus on urban living, energy systems and transport systems.

## SBRI

We promote the role of government as a 'lead customer' for businesses – articulating problems and challenges, engaging with business to find solutions, and providing a route to market. The main tool for this is SBRI (the Small Business Research Initiative), which since 2009 has provided more than 1,500 contracts, helping small companies to develop new products and services. This year we will:

- further champion SBRI across government – helping departments solve their challenges and helping innovative smaller businesses grow as a result
- continue to provide these departments with expertise and help, to support the Government's drive to increase the use of SBRI five-fold, to £200m in a year.

## Other government actions

There are many other ways in which we help government become a force for innovation. This year we will:

- work with the emerging NHS structure, helping develop its ability to encourage the creation of innovative products and services – and to rapidly adopt them
- work with the BIS sector teams and industry to help deliver the industrial strategies through innovation.





## Investing in priority areas based on potential

The bulk of our investment is in our 'thematic' priority areas – areas we identify as having the greatest potential for innovation to drive UK economic growth. During 2014-15 we will launch around 88 competitions for R&D and innovation across these 12 thematic priority areas, committing over £400m of funding. Co-funding from our partners, such as research councils, will further boost this investment – and the overall public sector funding will then be matched by the private sector.

Our investments use a variety of competition models and tools, from collaborative R&D and feasibility studies, to demonstrators.

The Catalyst model, which we established with research councils, is proving its worth – the Biomedical Catalyst set up three years ago is having a major impact. This year we will continue to roll out the Agri-tech and Industrial Biotechnology Catalysts, and establish a new Energy Catalyst.

In our priority areas, we will publish updated strategies in the areas of digital, transport, health and care, agriculture and food, low impact buildings, urban living, resource efficiency and emerging technologies and industries.

We are also introducing a new focus on urban living, following last year's future cities demonstrator and alongside the work of the Future Cities Catapult. We will make significant investments in collaborative R&D to meet these complex challenges and set up a new Urban Living Innovation Platform.

*For the key actions in the thematic priority areas see the table on pages 10-13, and for the full details see pages 36 onwards.*

## Continuously improving our capability

We see 2014-15 as a key year for our organisation, with a primary focus on our people and our operational development.

Since 2007 our scope and responsibilities have increased, as has the need for people with varied skills and capabilities. It is only through their expertise and dedication that we can achieve our objectives.

During the year we will:

- enhance the service and support we provide to our customers through telephone, online and other communications
- make our application processes easier to engage with and more focused on clear business propositions
- develop our benchmarks and measures to develop a deeper understanding of the impact we deliver
- complete the transition to a new leadership team structure geared to the successful delivery and development of our strategy
- continue to develop our leadership senior management teams and through recruitment, training and support.



*This plan supports the delivery of our 2011-2015 strategy, Concept to Commercialisation. During the year we will build on the approaches that we know work, and develop new approaches to meeting the needs of business as we continue to drive innovation for UK economic growth.*

*This document shows plans as at the start of the financial year 2014-15 and these may change. New developments are communicated on our website [www.innovateuk.org](http://www.innovateuk.org) and the [\\_connect](#) online networking platform.*

*Access [\\_connect](#) at <https://ktn.innovateuk.org>*



# Key actions 2014-15

PAGE	KEY ACTION 2014-15	DETAIL
28	Enhancing our support for innovative high-growth-potential SMEs	<p>We will create a new programme to support these SMEs on the journey towards commercialising their ideas; connecting them to opportunities from partners including coaching and mentoring, intellectual property and export advice, and to the investor community.</p> <p>We will enhance our application process to make it simpler and clearly aimed at articulating a business proposition.</p>
26	Expanding the network of Catapults and establishing them as a key part of the UK innovation system	<p>We will continue to develop the Catapult centres as a key part of our support for innovation and of the overall UK innovation eco-system. We will build the seven existing Catapults to ensure they meet the needs of business, and create new Catapults in the areas of precision medicine and energy systems.</p> <p>We will work with Hermann Hauser on his review of the future scope and ambition of the Catapult network.</p>
22	Supporting companies accessing Horizon 2020	We will help more UK businesses benefit from participating in the EU Horizon 2020 scheme, by building a strong in-house team of expert advisers and planning to develop the Enterprise Europe Networks into a powerful support resource.
27	Developing our EU and international strategy	We will look for opportunities in Europe and beyond to help companies develop collaborations and supply chains in innovation hotspots. We will run at least three entrepreneur missions in the year and will continue to develop strategic partnerships with the emerging economies of India, China and Brazil.
29	Developing the role of government as a lead customer and expanding SBRI	We will champion the SBRI process energetically across government, to help deliver a five-fold increase in the programme – in which government departments tackle the challenges they face by seeking the help of innovative small companies.
32	Stimulating collaboration and partnerships for innovation, joining up the innovation landscape, and engaging and communicating with business.	<p>We will transform our Knowledge Transfer Network programme into one fluid, dynamic and diverse network, sparking innovation more effectively within and between its many communities.</p> <p>We will create new opportunities for businesses to share knowledge, create collaborations and accelerate innovation, with a growing national series of Venturefests and our major event, InnovateUK 2014, in November.</p> <p>We will connect our national programme to local innovation work, with the devolved administrations, local enterprise partnerships, cities and growth hubs.</p> <p>We will use communications to build dialogue with businesses and help them tell their innovation success stories</p>

PAGE	KEY ACTION 2014-15	DETAIL
42	Energy	<p>This programme is addressing the challenges of delivering secure, affordable and sustainable energy for the 21st century. This year we will:</p> <ul style="list-style-type: none"> <li>– commit up to £81.5m in energy, including 11 new competitions</li> <li>– launch an Energy Systems Innovation Platform</li> <li>– establish the Energy Systems Catapult</li> <li>– launch an Energy Catalyst with the research councils and DECC</li> <li>– co-fund international activity in Europe (solar and marine), Canada and the US</li> <li>– develop a programme to demonstrate energy supply chain innovation.</li> </ul>
44	Built environment	<p>The focus of the Low Impact Buildings Innovation Platform for the next five years is to transform the sector to a more industrialised approach to deliver high-quality, carbon-efficient buildings. This year we will:</p> <ul style="list-style-type: none"> <li>– commit £12.5m in four new competitions, including competitions in digital design and engineering – specifically in building information modelling.</li> </ul>
46	Urban living	<p>Our vision is to help UK firms develop the products and services to meet the changing needs of cities and urban areas, and to sell them to the world. We will commit up to £63m. We will:</p> <ul style="list-style-type: none"> <li>– establish an Urban Living Innovation Platform.</li> <li>– continue to support the Future Cities Catapult</li> <li>– run five new competitions that support integration of city systems</li> <li>– develop an approach to national urban modelling</li> <li>– develop competitions to explore the wider use of environmental, social and economic data in planning and managing cities.</li> </ul>
48	Agriculture and food	<p>We will support the UK agri-food industry to sustainably intensify food supply chains, and continue to partner with industry and government to deliver the agri-tech industrial strategy. Our commitment will be up to £46m. We will:</p> <ul style="list-style-type: none"> <li>– deliver the Agri-tech Catalyst to help commercialise UK agricultural innovation</li> <li>– run collaborative R&amp;D competitions focusing on agricultural diseases and food supply chain resource efficiency</li> <li>– run a competition focused on agri-food supply chains</li> <li>– support the development of future agricultural centres.</li> </ul>
50	Transport	<p>We work to help UK industry profit from a transport system that allows efficient, cost-effective and sustainable movement of people and goods. Our commitment will be up to £70m. We will:</p> <ul style="list-style-type: none"> <li>– launch a Transport Systems Innovation Platform</li> <li>– continue to develop the Transport Systems Catapult</li> <li>– run six collaborative R&amp;D competitions covering on and off-highway vehicles, marine, aerospace and rail transport</li> <li>– support a further European competition for marine vessel technology</li> <li>– support and deliver R&amp;D activities for the Aerospace Technologies Institute and the Advanced Propulsion Centre for automotive technologies.</li> </ul>

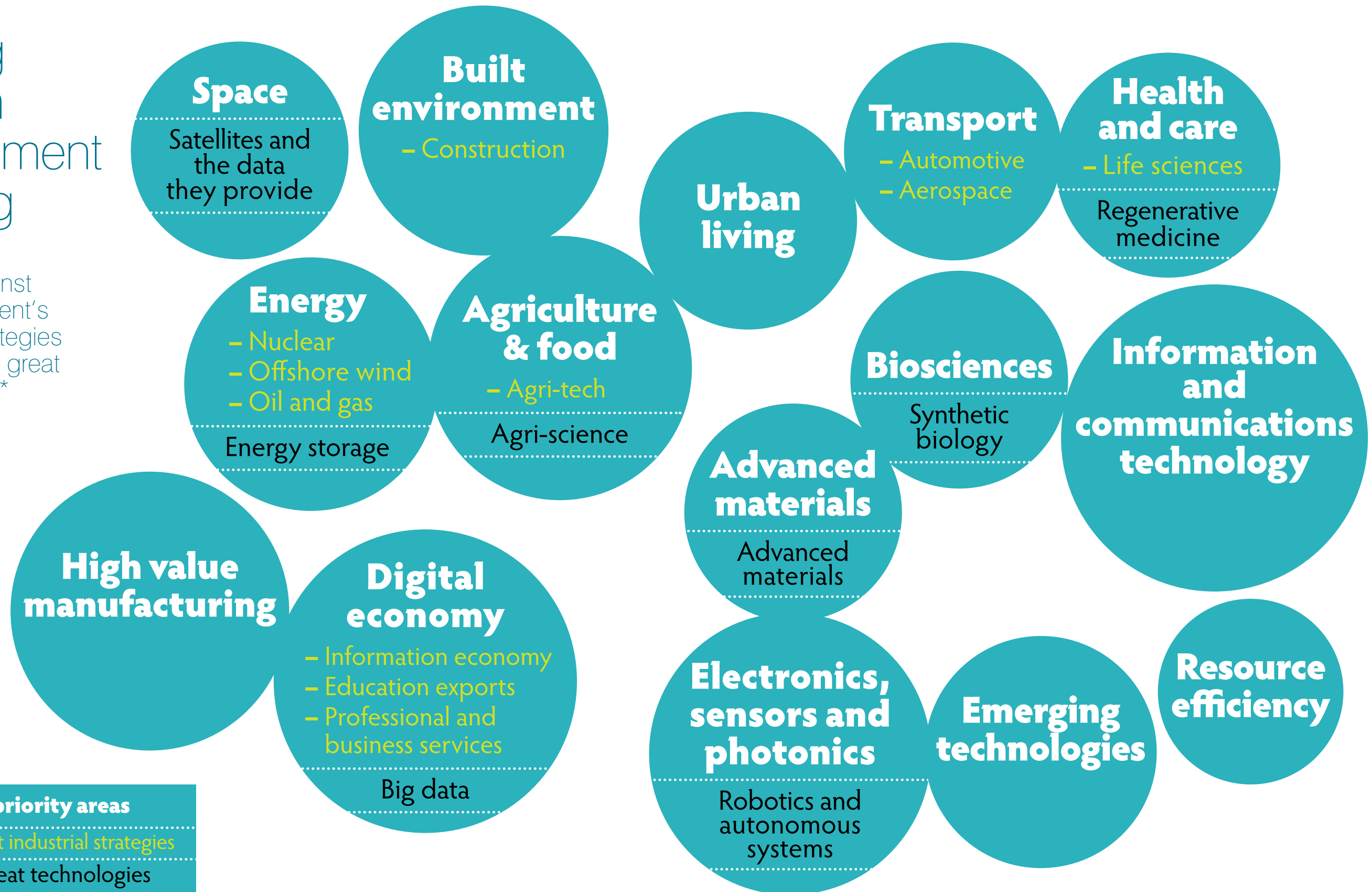
PAGE	KEY ACTION 2014-15	DETAIL
52	Health and care	<p>Our focus is on growing sustainable businesses that can deliver step-changes in efficient and effective health and care. Our commitment in this area will be up to £79.5m. We will:</p> <ul style="list-style-type: none"> <li>– launch nine new competitions</li> <li>– establish the Precision Medicine Catapult and continue support for the Cell Therapy Catapult</li> <li>– continue support for the Biomedical Catalyst and launch the 'grand challenge' for the second phase of the long-term care revolution.</li> </ul>
54	High value manufacturing	<p>Our high value manufacturing programme aims to grow the contribution of manufacturing to UK GDP by investing in innovation that will maintain or improve competitiveness and increase the commercialisation of new technologies. Our commitment will be up to £72m. We will:</p> <ul style="list-style-type: none"> <li>– launch 10 new competitions</li> <li>– continue support for the High Value Manufacturing Catapult</li> <li>– continue the roll-out of the Industrial Biotechnology Catalyst in partnership with the research councils.</li> </ul>
56	Digital economy	<p>The internet, connectivity and computing are developing more quickly than many businesses can adapt. This programme addresses the use of digital technology by UK businesses. Our commitment will be up to £42m. We will:</p> <ul style="list-style-type: none"> <li>– launch 11 new competitions</li> <li>– support the Connected Digital Economy Catapult, the Open Data Institute and Tech City UK</li> <li>– continue the IC tomorrow programme for digital micro businesses, including networking support and further funded competitions</li> <li>– develop an open-source toolkit to help business with data handling</li> <li>– continue support to develop Internet of Things systems, and apply this capability in real-world contexts</li> <li>– support the UK's creative Industries.</li> </ul>
58	Space applications	<p>This programme aims to support innovation in new applications using satellite data and space-based satellite systems. Our commitment will be up to £20m. We will:</p> <ul style="list-style-type: none"> <li>– continue to develop the Satellite Applications Catapult</li> <li>– develop competitions on in-orbit validation (TechDemoSat)</li> <li>– further support space application SMEs and the Harwell cluster</li> <li>– support the UK Space Agency's National Space Technology programme</li> <li>– continue to manage and deliver agreed elements of the European Space Agency programme.</li> </ul>
60	Resource efficiency	<p>In this area we help UK industry generate wealth through better management and use of material resources. We will commit up to £5.6m. We will:</p> <ul style="list-style-type: none"> <li>– run three new competitions in resource efficiency.</li> <li>– organise an entrepreneur mission to San Francisco in 'clean and cool' technologies</li> <li>– ensure that the benefits of resource efficiency are captured in a wide range of our competitions.</li> </ul>

PAGE	KEY ACTION 2014-15	DETAIL
62	Enabling technologies	<p>Our enabling technologies programme recognises that technological developments can inspire innovation across a range of market sectors. We will commit up to £20m in this area. We will:</p> <ul style="list-style-type: none"> <li>– run three ‘technology-inspired innovation’ competitions for feasibility studies in enabling technologies – including one focusing on the interfaces between the enabling technologies to simulate new partnerships across industries and new technological developments</li> <li>– invest in activities focused on identified technology challenges, with impact across a wide range of sectors, including materials for aggressive environments, the integration of ‘omics’ technologies, robotics and autonomous systems, electronics systems, user experience, and software quality and testing.</li> </ul>
64	Emerging technologies	<p>We will increase our work to accelerate the development and uptake of high-potential disruptive technologies emerging from the research base. Our commitment will be up to £16m. We will:</p> <ul style="list-style-type: none"> <li>– invest in collaborative R&amp;D projects to build on the 2012 feasibility studies in energy harvesting and energy efficient computing</li> <li>– build technology roadmaps in non-animal technologies and quantum technologies</li> <li>– run feasibility studies competitions in graphene and quantum technologies</li> <li>– invest in a collaborative R&amp;D competition to accelerate non-animal technologies towards market.</li> </ul>
66	Other opportunity areas	<p>We evaluate significant new technology-related business opportunities for the UK and, where appropriate, turn them into coherent programmes. This year we will:</p> <ul style="list-style-type: none"> <li>– continue to implement the strategy for the creative industries</li> <li>– continue to encourage the earlier use of excellent design in technology innovation</li> <li>– run a £1.1m competition to support the use of design in learning technologies</li> <li>– evaluate the potential for innovation platforms in the areas of global challenges and antimicrobial resistance.</li> </ul>
70	Improving our processes and developing our support for innovation	<p>We will continue to develop our people, resources and business processes so that we can be fast, flexible, and focused on the needs of business – and enhance benchmarks to ensure that we are effective and deliver value for money.</p>
71	Using evidence to steer strategy and measure impact	<p>We will extend our research on the impact of our programmes, to demonstrate the impact of our work and steer our future strategy.</p>



# Joining up with government thinking

Mapping our priorities against the Government's industrial strategies and the eight great technologies\*



\*More information: <https://www.gov.uk/government/publications/industrial-strategy-explained>  
<https://www.gov.uk/government/publications/eight-great-technologies-infographics>





## In detail: how we help business

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Four friends turned a college project into a business turning over hundreds of thousands after winning Innovate 10 Launchpad funding.

Read Bare Conductive's story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)

**Five new  
Launchpads**  
set for 2014-15

# How we help business

Getting an idea from concept to commercialisation, whether involving a start-up or large multinational company, usually requires a combination of factors – not just finance but also knowledge, skills, equipment, partners and, ultimately, customers.

We have developed a range of ways to address these needs, tackle market and system failures, and support businesses on their innovation journey, including:

- access to funding and finance
- access to knowledge, skills, equipment and partners
- access to coaching, mentoring and advice together with development of entrepreneurial expertise
- access to lead customers
- making connections between business, government and academia.

Much of our work is focused on 12 priority themes or areas – whether challenges that drive innovation or technologies that enable it.

For our activities in these areas see page 36.





## Access to funding and finance

A key issue faced by a business developing an idea is how best to finance that development. Options may include family or friends, a loan from a bank, or funding from the private equity market.

However, private sector finance is not always easy to find for businesses with innovative ideas, which may be seen as high risk. Investment may come too late, if at all. There is a well-recognised seed finance gap for start-up and early-stage companies, as well as for small innovative enterprises that want to invest in their own development and growth.

### Technology Strategy Board funding: responding to innovators' needs

To help overcome the challenges faced by companies in finding the finance to support the development and commercialisation of an idea, and to help reduce risk, the Technology Strategy Board provides a range of funding support for innovative projects.

We offer grants for ideas through competitive applications. Our funding programmes fall into two broad types:

- funding open to ideas from any technology or market sector – through schemes such as Smart and Eurostars
- support focused on specific priority themes and challenges – which includes collaborative R&D, Catalysts and feasibility studies (see *Investing in priority areas based on potential*, page 36).

Programmes focused on specific themes also include Launchpads, which help kick-start innovation in clusters of high-tech companies, and SBRI, which uses the power of procurement to give businesses fully funded contracts from public bodies to tackle challenges faced by the public sector.

We continue to increase our funding for Smart to meet the high demand from small businesses to support more of the excellent proposals we receive. In the Smart programme, around 70% of recipients are micro companies (with fewer than 10 employees) and over half are younger than five years.

#### Targets

- increase our funding to at least £50m for the Smart programme to support SMEs to develop their ideas
- run five new Launchpad competitions providing support to SMEs in the clusters:
  - internet of things businesses in London and Cambridge
  - healthcare technology businesses in Wales
  - manufacturing process industry businesses in the North East
  - space applications businesses in Harwell
  - digital media businesses in an emerging cluster of small creative businesses.

*For a full description of all our thematic funding competitions and programmes in priority areas see pages 36-67.*





"Running a business is really, really hard work and everyone needs a few lucky breaks. We are fortunate in that these lucky breaks came in the form of the Technology Strategy Board and their fellow agencies, in particular GrowthAccelerator."

Neill Ricketts, chief executive, Versarien  
Read Versarien's story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)

**Full  
roll-out**  
of SME growth programme  
starts this year

With growth in staff from three to 55 people in the last four years, Versarien epitomises the sort of company that we are well-placed to help. Starting from a Smart award soon after start-up it has gone on to develop new products, list on AIM, as well as win awards and blue-chip clients. Equally important have been the benefits of 'growth coaching' through the pilot SME programme.



## Accessing funding from EU programmes

There is a great deal of innovation funding available through European programmes – in particular Horizon 2020, the European Commission's new programme for research and innovation. With a budget of €79bn over seven years, this represents a major opportunity for UK business and academia to gain support for innovative projects. It also brings much more than funding; the feedback we get from businesses participating in EU programmes is that the real benefit is in forming partnerships, building networks and collaborating with potential customers.

Despite the opportunities, UK businesses have historically underperformed in gaining EU funding. Of the private commercial organisations participating in Framework Programme 7 (the predecessor to Horizon 2020), 11.2% were from the UK compared to 11.4% from France and 15.8% from Germany. We need to ensure that more UK businesses take advantage of the benefits and opportunities offered by Horizon 2020, in the interests of economic growth.

There are many areas defined by Horizon 2020 where the UK has strong capability and there are major opportunities – that is, the societal challenge areas of health, food, energy, transport, climate change, innovative societies and security. We will strengthen the help available for businesses wanting to take up these opportunities and, where appropriate, we will ensure strategic alignment between our national programmes and those of Horizon 2020.

We are strengthening our network of National Contact Points (NCPs) – experts who provide advice on accessing European funding – by integrating their work better with our other activities to reinforce the help they provide to business.

Central to the support we provide is the UK's Horizon 2020 website – [www.Horizon2020UK.org](http://www.Horizon2020UK.org) – which we launched in 2013 and will enhance.

We are also establishing an office in Brussels so that we can better support businesses seeking involvement in EU programmes and strengthen our contacts with the European Commission.

The Enterprise Europe Network is a multi-country network part-funded by the EC. This provides a potentially powerful resource for SMEs in building overseas collaborations to enable access to EU funding programmes as well as supply chain partnerships and export opportunities. In the UK this network has had limited national support and funding, which has limited the impact. We are working with key players in the existing networks to bring together a nationally consistent and appropriately resourced set of local networks which will help connect SMEs in their areas to access EU and national innovation support. In 2014 we will lead a consortium bid to deliver the Enterprise Europe Network in England, Wales and Northern Ireland – aligned with a bid by Scottish Enterprise for Scotland – as another part of our offering to help businesses accelerate innovation and achieve growth.

The Knowledge Transfer Network, which from 2014 has new coherence with its many communities served by one organisation, will also have an important role in working with the NCPs and helping to support the participation of UK businesses in the different areas of Horizon 2020.

### Targets

- ensure good strategic alignment between our national programmes and EU programmes such as Horizon 2020, to gain maximum impact
- create more coherent support to help business make the most of the opportunities in EU R&D and innovation programmes – by integrating National Contact Points, creating a permanent office in Brussels, and bidding to manage the Enterprise Europe Network.

## Accessing financial support from others

Providing a Technology Strategy Board grant to a company's R&D project may not on its own be enough to propel it to rapid commercialisation. Companies often need more help – whether finding the funding to match our grant offer, or financing a scale-up to take the idea to the next stage. As part of our offering we are developing ways to help businesses access private funding, for example from venture capitalists and business angels. We have found that these private sector investors see companies that have been awarded Technology Strategy Board support as good investment prospects, carrying less risk because their ideas have been independently assessed and backed by government funding.

We aim to help innovative SMEs to connect more successfully to sources of private sector finance, either to match or follow on from our grants.

Introducing opportunities to investors virtually can be a powerful approach. In a new project aligned with the Government's own aim to support high-growth SMEs, we are working with GrowthAccelerator, BIS, the British Business Bank and the UK Business Angels Association to create a new online resource – showcasing selected high-quality, investment-ready SMEs which we support, to qualified investors looking for innovative companies with potential.

Face-to-face engagement is also important – for example through Venturefests, local entrepreneur/investor events with strong potential. We will facilitate the development of Venturefests into a coherent series of powerful events held around the UK, which bring together innovators, entrepreneurs, local service providers and investors, and enable face-to-face engagement between innovative businesses – often supported by the Technology Strategy Board – and the investment community.

We will also develop other, more sector-specific events, showcasing the companies we are working with to potential investors.

### Targets

- help the businesses we support open doors to private finance by connecting them with the investment community through the new online 'GrowthShowcase' of investment opportunities developed with public and private sector partners, and through the national series of Venturefest events.

See **Investing in priority areas** from page 36 on, for all our thematic funding opportunities



Working out of the Satellite Applications Catapult in Oxfordshire, Rezatec has been able to access the expert facilities needed to make its land asset management platform possible. The Climate and Environmental Monitoring from Space (CEMS) facility enabled Rezatec to download and process up to 400 terabytes of earth and ground observational data.

An **innovation voucher**

paid for an expert to help with the statistical analysis. See our plans for Catapults and Innovation Vouchers on the following pages

“Working with the Catapult really helps us in educating the market. It’s great to have their support.”

Philip Briscoe, marketing director, Rezatec.  
Read Rezatec’s story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)



## Access to knowledge, skills, equipment and partners

In accelerating the journey of an idea from concept to commercialisation, funding is only part of the answer. Equally important are other kinds of resource – scientific and technical knowledge, state-of-the-art equipment, or new skills and expertise. Effective innovation rarely happens in isolation, and working with partners to develop new products, processes or services brings powerful advantages – the more so as products and services become ever more complex. A great deal of our work is focused on helping business tap into such resources.

### Knowledge Transfer Network

For years we have helped business access knowledge and expertise through thriving knowledge transfer networks serving different communities of interest aligned with our priorities – from biosciences to transport, and from creative industries to electronics, sensors and photonics. These communities create knowledge flow, connect business to academia and other partners, and enable two-way dialogue to inform our strategies.

We have transformed the organisational model of this support to form one coherent Knowledge Transfer Network serving the distinct communities. This recognises that innovation happens across sector boundaries, when people, ideas and issues which do not normally connect come together. The combined network will still serve distinct sectors but will be more flexible, dynamic and better suited to the innovation ecosystem and challenges of today.

### Knowledge Transfer Partnerships

The long-established Knowledge Transfer Partnerships programme (KTP) unlocks innovation capability in a business by working with a further or higher education body such as a university. In a partnership, an associate – usually a graduate – is placed in the business to deliver a challenging innovation project. In 2014-15 we will continue to effectively manage and develop the KTP programme.

### Innovation Vouchers

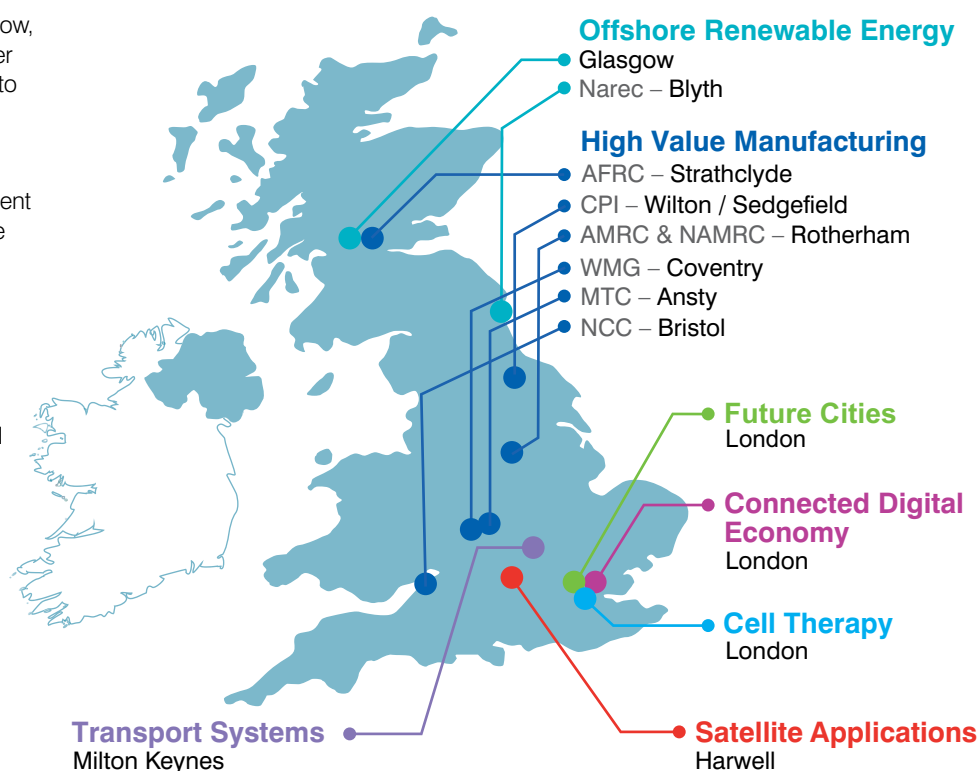
Innovation Vouchers offer SMEs up to £5k to access knowledge from external providers such as universities and colleges, research and technology

organisations, design advisers and intellectual property advisers. We launched our vouchers in 2013 and will continue to develop the scheme into new areas such as manufacturing. Our Innovation Voucher web pages (<https://vouchers.innovateuk.org>) also signpost to the other innovation voucher schemes available from different providers in the UK.

### Catapults

The Catapult centres are a powerful new force in the UK economy and innovation system. In a Catapult the very best of the UK's businesses, scientists and engineers work side by side on research and development, transforming ideas into new products and services to generate economic growth.

### Current Catapult locations



Catapults help businesses develop relevant and exciting ideas in receptive and invigorating environments and add an important new dimension to complement our existing research, development and innovation programmes. They help businesses to adopt, develop and exploit innovative products and technologies, offering concentrated expertise, access to cutting-edge equipment and specialist facilities to develop and test ideas in reality.

Successful implementation of the Catapult programme is strategically important for the UK globally.

Since 2011 we have established seven Catapults, which are all now operational, covering high-value manufacturing, cell therapy, offshore renewable energy, satellite applications, connected digital economy, future cities and transport systems. In 2014-15 we will develop and build the existing Catapults.

We will ensure they are operating effectively as part of the support we provide, continue to establish them as a key part of the UK innovation system and work to expand the network further. We will be initiating the graphene application centre and scoping the £55m cell therapy manufacturing centre – both announced in the 2014 Budget – as well as planning new Catapults in the areas of precision medicine and energy systems.

We will also work with Hermann Hauser on the review looking at the future scope, scale and ambition of the Catapult network.

### Targets

- set up the Precision Medicine and Energy Systems Catapults
- work with Hermann Hauser to review the Catapult programme by Q3
- ensure the Catapults are delivering their business plans, supporting SMEs and help them to raise their international profiles
- consolidate Narec (the National Renewable Energy Centre) into the Offshore Renewable Energy Catapult.

### International partnerships

An estimated 90% of R&D and innovation happens outside the UK, and so we are actively helping companies to access knowledge and build partnerships with organisations in other countries.

The new EU Horizon 2020 programme is an opportunity for business not only to access funding but also to develop new relationships with businesses and other organisations across the EU and beyond. Our support for this programme, through the National Contact Points, KTN and the Enterprise Europe Network, will open new doors for business.

We will continue to develop more strategic innovation partnerships with a few priority countries including India, Brazil, China and the US. These partnerships will involve a range of bilateral activities including missions and collaborative R&D programmes such as the recent competitions with India in the areas of energy and affordable healthcare, and with China in sustainable manufacturing.

Both in Europe and beyond, we look for opportunities to help companies develop collaborations and supply chains in specific innovation hotspots around the world, and take advantage of the opportunities.

A successful approach to this has been entrepreneur missions, which take small groups of innovative SMEs to overseas locations strong in innovation and opportunity in a particular sector. Working with UKTI, we have supported 11 such missions since 2008, including last year's Web Mission to India, Clean and Cool Mission to Brazil and Manufacturing Mission to China. We will run at least three further missions in 2014-15.

We will develop the role the Catapults play on the international stage so that they achieve global recognition and support the needs of UK business through building strong international links.

We will develop joint programmes with Research Councils UK (RCUK), where they align with our priorities, to build on investments RCUK have already made in specific countries. And we will support the development and delivery of the Newton Fund, which aims to develop science and innovation partnerships between the UK and a number of emerging economies, helping to build capacity.

### Targets

- publish an EU and International strategy setting out our approach and priorities and continue to develop activities with India, China, Brazil and US
- identify innovation hotspots to prioritise international engagement in specific thematic areas
- support the development and delivery of the Newton Fund building sustainable partnerships with a number of countries, including India, China and Brazil
- run at least three missions overseas, covering robotics, clean and cool technologies, and assisted living.



## Access to entrepreneurial expertise, mentoring and advice

We recognise the key role that high-growth-potential small and medium-sized companies play in delivering economic growth.

Applying for funding from a scheme such as Innovation Vouchers or Smart is often the first contact an early-stage business has with us. We are building a new programme of ongoing engagement, to provide companies with holistic support on the innovation journey.

In 2013 we carried out research on the needs of SMEs engaging with us and ran a successful pilot programme of extended support. Building on this, in 2014 we will further develop how we support such companies and connect them to other opportunities – increasing the commercialisation success of their ideas and maximising overall impact. We will do this by:

- connecting SMEs to support from partners including entrepreneurial training, coaching and mentoring, intellectual property and export advice
- enhancing our application process to make it simpler and clearly aimed at articulating a business proposition
- connecting grant-winning companies looking to raise private finance with the investor community.

Our goal is to help businesses develop the core capabilities required to realise the value of innovation, gain access to further funding and facilitate growth.

### Targets

- ensure that SMEs in receipt of our funding have their business needs identified at an early stage and are connected to the right forms of support throughout the life of the project
- offer a new programme of relevant skills, mentoring and coaching support to small companies in receipt of our funding, enabling them to improve their capability to grow
- develop a simple application process which adds value to all applicants, whether or not successful, providing additional support through rich online multi-media content and helping them create an effective business case or business plan for use beyond the application.

# Access to lead customers

## SBRI

The government is the largest single purchaser in the UK but little of that purchasing power is currently directed at supporting innovation and economic growth. How the public sector addresses its needs and behaves towards its suppliers can do much to foster innovation.

The SBRI (Small Business Research Initiative) scheme gives public bodies a way to tackle the challenges they face by sourcing innovative ideas from business and gives a business a contract to develop their idea and potentially a government 'lead customer' and a route to market.

This is an area where great impact could be achieved – the SBRI equivalent in the US awards more than \$2bn annually to small businesses. The Government has recognised this potential with a commitment to increase the SBRI scheme fivefold compared to 2012 levels – from £40m to £200m – by encouraging departments to use the scheme to help solve public sector challenges.

In 2014-15 we will continue to energetically champion the SBRI process, working across government to increase its use by departments and other public bodies, working to make this growth a reality.

### Targets

- continue to work with and across government to increase the scale of SBRI, helping to realise the target of £200m of new contracts issued this financial year
- work with the emerging NHS innovation organisation, particularly through the new Academic Health Science Networks, to help the NHS behave as a lead customer and become an engine for growth
- encourage the Ministry of Defence to work more with innovative businesses through SBRI to develop new technologies addressing operational needs
- carry out an evaluation of SBRI's process and impact by February 2015.

Innovative digital business MyTourTalk helped tourist boards in Northern Ireland and Wales to develop new ways to inspire visitors, after winning two SBRI contracts. The company, based in Belfast and London, devised apps for Belfast's Titanic area and a guide to the Welsh coastal path. It is now partnering with the *Guardian* on a series of destination apps.

**£200m**

in SBRI contracts targeted  
for 2014-15



**“Contract funding allowed us  
to continue our R&D.”**

Julie McNeice, founder, MyTourTalk  
Read MyTourTalk's success story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)



# Making connections

## Linking and leveraging public sector support

Support provided by the public sector can be complex and difficult to navigate for businesses. Many organisations have an important role to play in the innovation journey, and as the UK's innovation agency we can help businesses to access these many forms of government support.

We have developed strategic relationships with organisations such as UKTI, IPO and The British Standards Institution (BSI) that enable us to improve the support we give to companies we work with.

There are also regional and local aspects to the way we can link public sector support. As a national organisation we work across the UK and support innovation projects with the greatest potential to generate growth regardless of where in the UK they are based – but at the same time there are many situations where geographical location and local strength offer opportunity. Examples are the introduction of Catapult centres and the Launchpads in support of specific clusters, which bring a clear local dimension to our work.

The local enterprise partnerships and the growth hubs being established locally in England to support businesses are now part of the innovation landscape, and we will increase our work with them on shared aims and objectives. We hope that our local help to business will be further enhanced through the Enterprise Europe Networks.

In summary we will continue to develop and build partnerships with organisations offering support to UK business including with:

- the research councils: continuing our strong strategic collaboration with research councils, from major co-funded programmes such as Catalysts or collaborative research and development, to initiatives such as innovation and knowledge centres
- UKTI: better connecting companies with UKTI support for exporting, helping them to internationalise and to work together to maximise the potential of global opportunities
- the IPO: linking companies with intellectual property support provided by the IPO and others
- GrowthAccelerator: ensuring companies get appropriate mentoring and coaching support to facilitate growth
- the devolved administrations of Scotland, Wales and Northern Ireland and local enterprise partnerships (LEPs) in England
- BSI: supporting the development of standards, particularly in emerging areas of technology
- the British Business Bank: helping to showcase innovative companies to potential investors
- Nesta, an innovation charity with a mission to bring great ideas to life: working to understand the evidence base around innovation support and supporting its activities on prizes
- the Design Council: helping businesses understand how design can play a key part in their development
- the UK Commission for Employment and Skills: better aligning skills provision to support innovative companies, including piloting a new approach for SMEs in the power electronics sector
- the Higher Education Funding Council for England and the SetSquared group: a pilot scheme to facilitate the commercialisation of academic research and the development of high-potential spin-out companies.

## Building awareness and creating dialogue

A vital aspect of our work is engaging with a wide range of organisations – business, academia, government, media, investors and business support intermediaries.

Dialogue enables us to understand business priorities and innovation support needs and to find out what is and is not working. We also explain what help and support is available, and raise awareness in business of the opportunities that exist and the latest developments as they happen.

Events are an important way to reach businesses and organisations and to trigger and deepen collaboration. InnovateUK, delivered jointly with UKTI, is our major conference, exhibition and showcase and has become the leading multi-sector innovation and trade networking event. In autumn 2014 we will run InnovateUK 2014, taking advantage of a new venue to make the event even more effective in enabling opportunities for new relationships and innovation to flourish.

We also participate in many other existing local and national events run by third parties, for example reaching out to SMEs through events for early-stage companies and investors, and working with science parks and incubators.

We will continue to develop our online communications to provide clarity, support and inspiration for business, and particularly to tell the success stories of business innovation. In addition, we are reviewing our brand and how we can simplify the journey of discovery and participation for businesses who want to work with us.

The Knowledge Transfer Network communities are also an important channel for dialogue, engagement and new ideas. In 2014-15 the new unified Knowledge Transfer Network structure (see page 26) will enhance this by providing greater flexibility and extend the breadth of the network. The KTN communities' online activity is hosted on a virtual network platform called **\_connect** (<https://connect.innovateuk.org>) which we are reviewing this year as part of optimising networking and communication activities.

#### Targets

- further improve the way we communicate with business and stakeholders through channels including online, **\_connect**, social media, direct communication and events
- work with other agencies to raise our profile and that of the opportunities we offer amongst SMEs and small business groups
- run InnovateUK, our annual innovation, networking and exhibition event, in partnership with UKTI in November 2014.

## Working with and across government

We work with government departments, both centrally and in the devolved administrations, helping them to develop policy and strategy and to identify where business innovation is needed and how it can be best stimulated.

Naturally we work closely with our sponsor department BIS in a range of areas, including the development and implementation of the industrial strategy and sector strategies, and on the 'eight great technologies' identified by the Government as those with particular potential to drive UK growth.

We will continue to provide input to the industrial strategies and support their implementation and, specifically in 2014-15, we will support the development of the Government's new science and innovation strategy.

We also act as an effective, proactive and trusted delivery partner to government organisations, helping them to maximise the impact of their support for innovation.

Many government departments are key partners in our innovation platforms approach – both in providing visibility of the societal challenges and policies that create opportunity, and in co-funding the innovation programmes that result. These strong relationships include the Department for the Environment, Food and Rural Affairs; and the Department for Energy and Climate Change. Similarly, We are the delivery partner for the innovation work of the Department for Transport and the Office for Low Emission Vehicles.

We have a service level agreement with the UK Space Agency (UKSA) as its delivery partner for telecoms, navigation and integrated projects funded through the European Space Agency.

Other partnerships which we will continue to manage this year include the delivery of the programmes related to the Aerospace Technology Institute and the Advanced Propulsion Centre for automotive technologies, and working with BIS and Birmingham City Council on the delivery of the Advanced Manufacturing Supply Chain Initiative.

The SBRI approach, which helps public bodies find innovative companies to solve their challenges, has been extensively used by some – such as NHS England with its SBRI Healthcare programme. This year we will continue to work across government to champion and increase the take-up of SBRI.





“Submitting a bid to the Technology Strategy Board for funding for a low carbon vehicle demonstrator project created the impetus for us to start discussions with Nissan, Smith and smaller vehicle manufacturers.”

Liz Gray, senior consultant, Future Transport Systems  
Read Future Transport Systems's story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)

### **Innovation platforms**

in urban living, energy systems and transport systems – all launching in 2014-15

The Low Carbon Vehicle Innovation Platform has brought together partners from government, multinational manufacturers, small suppliers, local authorities and in fact any organisation involved in the industry – driving innovation, supply chain development and therefore the uptake of low carbon vehicle technologies. There have been 10 funding competitions to date with more to come in 2014-15. A 2012 survey of companies involved in the low carbon vehicle programme estimated return of £35 for every £1 of public sector investment.

## Investing in priority areas based on potential

We have identified a number of priority areas, or themes, to focus our investment in innovation. These fall into four categories:

- **challenge-led areas:** driven by societal and market challenges and the resulting market opportunities
- **cross-cutting competences:** areas that enable the translation of technologies into products and services
- **enabling technologies:** technologies that underpin capability
- **emerging technologies:** high-potential-technologies just emerging from the research base.

These areas align well with the Government's sectoral industrial strategies and 'eight great technologies' (see diagram on page 14).

### Challenges

We have identified six potential markets where innovation is led by societal challenge:

- energy
- built environment
- urban living
- agriculture and food
- transport
- health and care.

It is always difficult to predict the future of markets and what products and services will be required, but since these are driven by societal need, they are almost certain to grow and will require innovative solutions to meet demand.

They are also areas where the markets are influenced by government action – such as standards, regulation and procurement – making it possible to specify aspects of the future products and services.

### Competences

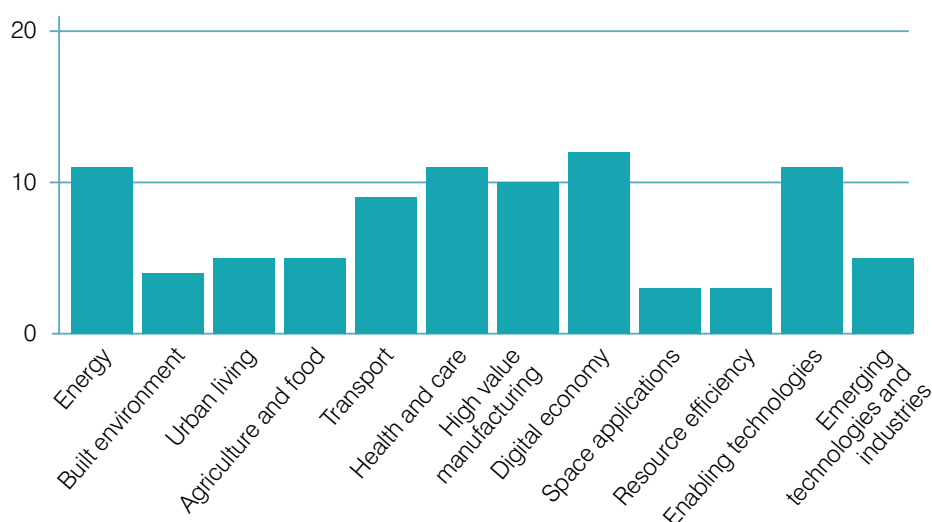
We have also identified four priority 'competence' areas – themes which are hugely influential in setting the rate of change in many industries and sectors.

These underpin the challenge-led areas and markets and link them to the technologies we support. They are:

- **high-value manufacturing:** by linking technologies to markets and by focusing on high-value elements of manufacturing, UK businesses can differentiate themselves from the global competition
- **digital economy:** with the increasing digitisation of markets, digital services present a major opportunity for the UK to compete globally
- **resource efficiency:** we need to use resources more efficiently in a way that helps provide a high standard of living for the population but does not compromise the planet's ecosystems
- **space applications:** this is a focus area where future markets can drive innovation in technology.

### Number of funding competitions planned in 2014-15

Total: 88





## Enabling technologies

Enabling technologies are areas with a key role to play in helping business to develop high-value products and services to meet market needs across all economic sectors.

The areas on which we focus, and where there are important links to the knowledge base, are:

- advanced materials
- biosciences
- electronics, sensors and photonics
- information and communication technologies.

Single developments in any one of these may unlock several market opportunities across multiple sectors.

## Emerging technologies

This part of our work identifies high-potential technologies just emerging from the research base and helps to accelerate their commercialisation. It includes areas such as synthetic biology, energy-efficient computing, non-animal technologies, emerging imaging technologies, graphene, quantum technologies and energy harvesting.

## Sustainability

The world faces major issues such as climate change, limited natural resources, and changing age demographics – and using resources, energy and social capital effectively is a pre-requisite for long-term economic success.

The need to move to a more sustainable economy is creating global market opportunities, and the countries and businesses that can find sustainable solutions most rapidly will be most likely to benefit. The challenge for business is to introduce the 'triple bottom line' of environmental, social and financial sustainability from the start.

For this reason many of our programmes have a clear theme of environmental or resource sustainability as a driver of innovation, and about two-thirds of projects we fund have a sustainability objective.

In 2013, we launched Horizons (<http://horizons.innovateuk.org>), our sustainable economy framework developed with Forum for the Future. We use this tool to help us to evaluate candidate areas for Catapult centres, updates to our technology strategies, and potential new areas of investment – but it is also a resource for businesses themselves to help embed sustainability factors into their early planning.

It details the environmental and social drivers and risks that will become common currency over the next decade and provides a set of questions to build into business innovation processes. This year we will provide further guidance in using Horizons for scoping innovation projects.

## Identifying investment areas

In selecting areas, programmes and projects for investment we apply four key criteria:

- is there a large (global) market opportunity?
- does the UK have the capability to develop and exploit the technology?
- is the idea 'ready' – is the timing right?
- can the Technology Strategy Board make a difference?

## How we support innovation in priority areas

Within each area, we analyse available data and consult with business, academia and government to ensure we have identified how innovation support could make a difference, and we then plan our programmes and activities for the greatest impact.

We publish strategic reviews in each area. Last year we published an updated strategy for creative industries, and this year will follow with strategies in the areas of digital, transport, health, agriculture and food, built environment, and emerging technologies and industries.

We are working to ensure that these strategies align with and complement the BIS industrial strategies and the eight great technologies. We support our thematic areas with the most appropriate response to the needs of the challenge, market or technology area. The main ways in which we provide support are innovation platforms, large and small-scale demonstrators, competitions on specific themes and support through community engagement and knowledge sharing.

## Innovation platforms

In innovation platforms we bring industry, academia and government together to focus on a specific challenge, such as vehicle emissions or affordable healthcare; identify the innovation and business opportunities; and create a long-term commitment to a programme of support through the Technology Strategy Board to help business address the challenge.

Bringing key stakeholders responsible for policy and delivery together with business provides unique insights into where the Government and markets are moving, and the long-term commitment to the programme gives industry the incentive to invest.

We have five innovation platforms:

- **low carbon vehicles:** established 2007
- **assisted living:** established 2007
- **low impact buildings:** established 2008
- **sustainable agriculture and food:** established 2009
- **stratified medicine:** established 2010 (since then incorporating the detection and identification of infectious agents innovation platform).

Over the next year we intend to establish a further three innovation platforms:

- energy systems
- transport systems
- urban living.

Evaluating whether to set up an innovation platform involves defining the magnitude and scope of a particular challenge, establishing that a range of new technology solutions are needed to resolve it, understanding the impact on the future market of government action, and ensuring that the UK is well placed to develop and commercialise the necessary solutions and that a Technology Strategy Board programme would add value.

Last year, we evaluated the case for establishing an innovation platform in personal security. Whilst we concluded that this was an area where we would support further activity, we did not feel that an innovation platform would be what was required to best support the area. Over the next year, we will evaluate the case for an innovation platform in global challenges – those challenges that are significant in other parts of the world but not necessarily within the UK.

### Targets

- publish new strategies in the priority areas of digital, transport, health and care, agriculture and food, low impact buildings, urban living, resource efficiency and emerging technologies and industries
- launch three new innovation platforms: urban living, energy systems and transport systems
- evaluate the potential for an innovation platform focusing on 'global challenges'.

## Large-scale demonstrators

Large-scale demonstrators bring partners together to validate ideas, overcome barriers and move new products closer to wider application. They provide opportunity for real-world user testing and trialling prior to commercialisation. We have enabled effective demonstrators in areas such as low carbon vehicles, retrofitting of buildings and digital products.

Current demonstrators include dallas (Delivering Assisted Living Lifestyles at Scale) and the future cities demonstrator in Glasgow, with smaller ones in Bristol, London and Peterborough.

## Catalysts

Our catalyst programme is a highly effective way to offer businesses joined-up support from the research base – through our partnership with the research councils – from early-stage ideas all the way to commercial readiness.

Catalysts offer funding opportunities throughout the year, when innovators need it, in a joined up and progressive way – with higher levels of funding than our other 'always open' schemes such as Smart. Following the success of the award-winning Biomedical Catalyst we launched two more, in agri-tech and industrial biotechnology, last year and will launch an Energy Catalyst in 2014-15.

### Targets

- continue the roll-out of Biomedical, Agri-tech and Industrial Biotechnology Catalysts
- launch an Energy Catalyst.

## Thematic competitions

Competitions for R&D and innovation funding focused on a specific theme or area of challenge, technology or application form the bulk of our funding programmes.

During 2014-15 we plan to run 88 such competitions for R&D and innovation funding using collaborative R&D, feasibility studies, SBRI, demonstrators and Launchpad formats.

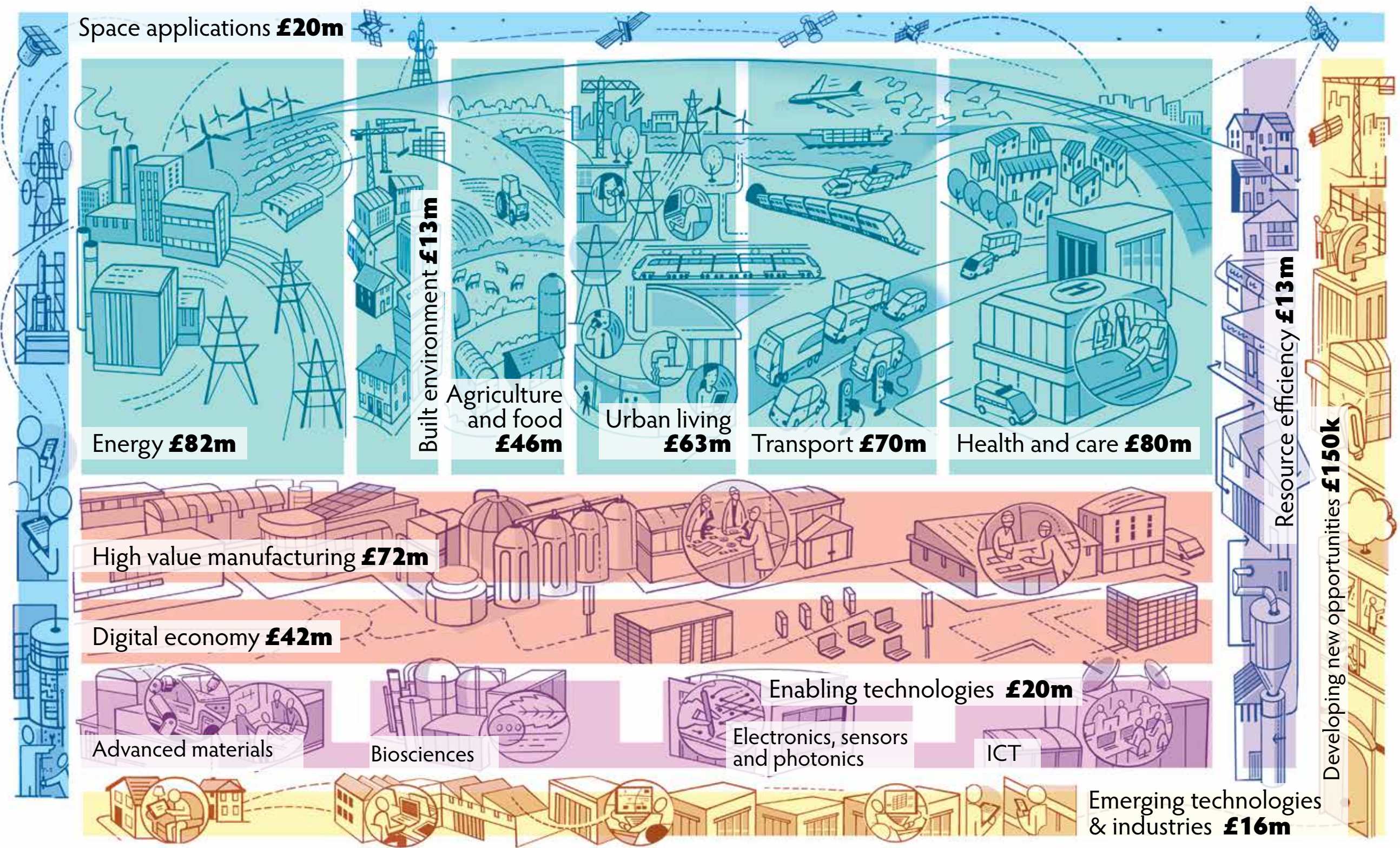
The details of competitions and other activities planned for 2014-15, and the anticipated funding commitments, are shown in the following sections.



Anticipated investment commitments in 2014-15, by priority area\*

The Technology Strategy Board's total committed spend on thematic programmes will be up to £536m. The planned Core funding for 2014-15 is £421m – this can change in year.

\*Note that the figures quoted in this illustration are indicative only, subject to change over the spending period, and represent budgets under Technology Strategy Board control only. These funding commitments will usually be spent over a number of years.





## Challenge-led areas: Energy

Energy underpins almost every aspect of our day-to-day lives. We have learnt to take energy for granted as a commodity that will always be able to meet our increasing demands. However, global legislation and domestic energy policies are now making us appreciate the complexity and value of energy in a way we have not before. We therefore believe UK domestic policy and legal requirements offer real opportunities for UK business to develop innovative new products and services.

In 2012, the energy supply industry in the UK contributed approximately 3.5% of GDP, 10% of total investment, and 52% of industrial investment, directly employing around 176,000 people, and more indirectly (source UK Energy In Brief 2012, DECC). We are aiming to help UK business profit from the changes the world will have to make to address the 'trilemma' of energy security, affordability and sustainability.

Against this background, and within the sustainability framework developed with Forum for the Future, we focus our strategy on three overarching strategic opportunities where we believe UK business can make a real difference and generate wealth:

- development of affordable and secure sources of energy supply that also reduce greenhouse gas emissions
- integration of future demand and energy supply into a flexible, secure and resilient energy system
- reduction of greenhouse gas emissions at point of use.

### The barriers to innovation

The future energy system will need to be flexible, resilient and affordable to integrate the changing mix of energy supply and demand technologies.

There are a number of key challenges to overcome but they also offer businesses an opportunity:

- **cost:** developing new energy technologies can be very expensive and lengthy. R&D investment is often seen as too risky for private funding until the technology is de-risked by further development
- **supply chains:** new technologies in energy often need new supply chain players which may not naturally find the right collaborators or routes to market or demonstration projects
- **skills:** a skilled workforce is needed to build a successful energy technology business. Often these skills are not easily accessible for small companies, where they are held in academia, or potential business partners
- **infrastructure:** innovation in energy is often inter-dependent with energy infrastructure. Lack of visibility of the future development of infrastructure can prevent new products being developed
- **policy:** to invest in new infrastructure, new generating capacity, new supply chains and new skills, businesses need longer-term certainty regarding regulation, planning and capacity targets.

### Focusing our investments

In 2014-15 we will put extra focus on the following areas:

- **expansion of work in energy systems:** we will progress setting up the Energy Systems Catapult – and work with business and government to launch a new Energy Systems Innovation Platform. This will pull together activity across the energy systems area, joining up roadmapping, funding, Catapult programmes and demonstrator programmes across industry, academia and the public sector
- **launch an energy catalyst:** in partnership with DECC and EPSRC, we will launch a new Energy Catalyst competition
- **increase international activity:** we will increase international activity by better enabling innovative UK energy businesses to develop the partnerships and connections in Europe and beyond
- **grow and support the SME supply chain:** we will grow and support the SME supply chain in energy by supporting those already in the sector, and by joining up parallel sectors to enable new entrants from businesses currently working in manufacturing, digital, communications and materials development.

## Energy action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Offshore Renewable Energy Catapult:</b> provide a world-class centre of expertise to support rapid commercialisation of cutting-edge technologies in offshore renewables with global potential.	Catapult	Q1–Q4 Up to £10m
<b>Energy Systems Catapult:</b> establish a world-class centre combining assets and expertise to enable the UK to be a global leader in developing new services and products for energy systems – taking a whole-systems approach.	Catapult	Q1–Q4 Up to £1.5m
<b>Energy Technologies Institute (ETI):</b> maximise value of public sector investment by inputting into ETI strategy, utilising programme outputs and ensuring coordination.	Co-funding of the ETI	Q1–Q4 Up to £10m
<b>Energy Catalyst:</b> establish a Catalyst with EPSRC and DECC to accelerate energy innovation by providing constant and joined-up support.	Catalyst competition	Q1 and Q3 Up to £35m
<b>Shale gas:</b> working with DECC and NERC, to develop new technologies to exploit the UK's resources responsibly.	Feasibility studies competition	Q1 Up to £2m
<b>International bilateral energy collaboration:</b> opportunities for UK companies to collaborate internationally. We will enable collaboration with the US in fuel cell technologies, and with Canada in marine energy sensing and cost-reducing measurement technologies (through a Eureka competition).	Collaborative R&D competition and Eureka competition	Q2 Up to £1.5m
<b>Energy systems toolkit:</b> procurement of modelling tools and/or data to fill gaps in UK's energy systems modelling capability.	SBRI competition	Q2 Up to £1.5m
<b>Energy systems supply chain demonstrator:</b> develop a programme to demonstrate energy supply chain innovation.	SBRI competition	Q3 Up to £10m
<b>Conventional fuels – maximising efficiency, minimising emissions:</b> to ensure that the UK makes the most efficient use possible of fossil fuel resources.	Collaborative R&D competition	Q3 Up to £5m
<b>Ocean energy:</b> this ERANET comprises a four-year programme of co-ordinated activity among nine European partner countries to support research and innovation in the ocean energy sector.	EU competition	Q3 Up to £1m
<b>Next-generation solar technologies:</b> supporting the next of the Solar ERANET focusing on next-generation solar technologies. We will also set up a solar special interest group on <u>_connect</u> .	KTN community EU competition	Q1 Q4 Up to £1m
<b>Enabling technologies for energy:</b> aiming to pull in latest digital, manufacturing, advanced materials, sensors, communications and electronics technologies into the energy sector.	Feasibility studies competition	Q4 Up to £3m

Budgets shown refer to funding commitments in the year, which may be spent over several years

## Challenge-led areas: Built environment

### Low impact buildings

The demands we make on our built environment are changing rapidly. Increasingly stringent legislation, growing urbanisation, concerns about energy security, and resilience and adaptation to environmental change all require new approaches to the design, construction and operation of buildings.

To meet these requirements the construction industry needs to transform from a traditional craft-based sector to an industrialised, outcome-focused and process-driven sector. This trend is underpinned by government policy which will reduce build times and costs; improve predictability, precision and quality; and deliver high carbon efficiency.

The UK boasts five architecture, engineering and design firms in the world's top 25 by turnover – making the UK second only to the US – and three of the top 25 contractors in Europe.

The UK also produces a healthy £18bn of higher-value building technologies and energy management solutions and exports £11bn of high-value architecture and design, engineering, construction management, building technologies and energy management solutions.

Our investment in the construction sector has been developed in collaboration with the Government's industrial strategy for construction, *Construction 2025*, creating a strong alignment, with clear opportunities for working together in supporting UK-based firms.

### The barriers to innovation

These include the following factors:

- globally and in the UK, construction has a strong subcontracting culture. This means that information, and innovation, spreads slowly
- contracting practice results in risk being passed to the smallest players in the supply chain, which limits novel approaches or technologies due to concerns over product and professional liability
- the majority of design decisions are taken on-site, impacting on the quality of the outcomes and speed of build, and reducing the opportunity to develop repeatable practices
- innovation tends to be on a project-by-project basis, rather than within the context of a continuous learning culture
- both the industry and the consumer are conservative and risk-averse.

### Focusing our investment

The focus areas are:

- digital design and engineering
- high-performance materials and building technologies
- energy eco-systems
- energy management and diagnostics tools.

## Built environment action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Digitising the construction sector:</b> exploiting the power of building information modelling (BIM) to enable new and more industrial approaches to construction.	Collaborative R&D competition	Q1 Up to £6m
<b>A digital tool for building information modelling:</b> building new BIM standards into software tools that can be used by industry.	SBRI competition	Q1 Up to £1.5m
<b>Enabling collaboration in the construction supply chain:</b> exploring new ways to increase collaboration and information flow along the complex construction supply chain.	Feasibility studies competition	Q2 Up to £2m
<b>Demonstrating whole-life value:</b> exploring how managing the whole-life value of a building can benefit all involved.	Collaborative R&D competition	Q3 Up to £3m

Budgets shown refer to funding commitments in the year, which may be spent over several years.



## Challenge-led areas: Urban living

Our cities matter more than ever. Three quarters of us will be 'urban' by 2050, and cities outperform rural areas in every economic indicator.

However, our urban areas face a wide range of challenges which transcend the buildings in which we live and work, including a changing climate, population growth, shifting demographics and resource crunches. As cities grow, issues such as overheating, congestion, supplying water and removing waste, become more and more significant. Urban infrastructure becomes overstretched and brittle, leading to the risk of systemic failure.

Cities around the world say that to be successful in the future they need to deliver three things: a strong economy, an excellent quality of life and a reduced environmental footprint.

Our vision is to help UK firms develop the products and services to meet the changing needs of cities and urban areas, and to sell them to the world. Considerable investment has gone into improving key urban infrastructure – from energy and transport systems, to buildings and water and waste. However, the consensus is that we cannot reach the levels of performance that are needed for the future by optimising the individual systems. Integration across urban living is the critical capability that is missing – the ability to treat a city as a system of systems.

This will require innovation across many areas – from sensors, use of large packages of data (big data) and advanced simulation and modelling, through energy and transport systems to communications and financial services.

The size of the market for integration of urban living is estimated to be £200bn a year by 2030. The UK is well-positioned to exploit this growing market. We have world-leading companies in project management, engineering, architecture, energy and transport systems, communications and the digital economy, finance, legal and insurance.

Our ability to bring together the cluster of companies needed to design, finance, risk manage and execute large infrastructure projects makes the UK a major global centre for such projects.

### Barriers to innovation

These include:

- technical complexity: innovation requires collaboration across multiple sectors to integrate disparate systems
- complex ownership structures: an essential requirement for developing future city systems is interoperation of infrastructure. Multiple ownership structures make it difficult to open up critical data sources
- weak evidence base for investment: there is a lack of evidence of performance in use for integrated city systems
- need for new financing and business models: existing methods struggle to justify the financing for city-scale innovation.

### Focusing our investment

The main focus areas are the following:

- **tools for integration:** overcoming incompatibility between urban living, and solving the problems of capturing and using the rich data streams in cities
- **simulation and modelling at a city scale:** developing the potential to ask 'what-if?' questions at a city scale. To observe, understand, predict and act
- **innovation from integrated platforms:** re-thinking urban infrastructure and services based on new levels of integration
- **demonstration of performance in use:** providing practical evidence of the effectiveness of integrated urban living.

As part of our plans we will work to establish an Urban Living Innovation Platform, which will bring businesses, researchers and policymakers together to focus on the challenges and opportunities of this complex area.

## Urban living action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Future Cities Catapult:</b> the Catapult will create and demonstrate integrated city-wide systems, bringing together city governments, business and the knowledge base.	Catapult	Q1-Q4 Up to £11m
<b>National urban systems model:</b> integration of urban systems requires the ability to make models from key infrastructure pillars integrate and inter-operate.	SBRI competition	Q2 Up to £6m
<b>Integrated by design:</b> extending existing infrastructure projects to support integration with other urban systems.	Collaborative R&D competition	Q2 Up to £20m
<b>Product and service innovation:</b> exploiting integrated information platforms to develop new products and services for future urban environments.	Collaborative R&D competition	Q2 Up to £15m
<b>Environmental and social data:</b> building on a successful feasibility study competition, combine environmental and other data to develop new solutions for urban environments.	Collaborative R&D and feasibility studies competitions	Q2 Up to £5m and significant co-funding
<b>Reimagining the High Street – Phase 2:</b> the implementation and demonstration phase of our rethinking the high-street challenge.	SBRI competition	Q4 Up to £6m

Budgets shown refer to funding commitments in the year, which may be spent over several years.

## Challenge-led areas: Agriculture and food

Nearly four million people in the UK are employed in the food, feed and drink industry. These supply chains connect researchers, agro-chemical providers, machinery manufacturers, farmers, producers, manufacturers, wholesalers and retailers – providing the food and drink that sustains us.

The sector contributes around £96bn to the UK economy or 7% of GVA. And with exports of £18bn per year, we are already one of the top global exporters of food, feed and drink. The UK already has recognised centres of excellence across the agri-food supply chain, and we plan to further support the sector, to help it grow further.

Providing a sustainable food supply chain is a societal challenge. In the UK the population is expected to grow by 10–15% by 2030. On top of this there is competing demand for land – whether from a growing built environment or competition from energy-based fuel crops such as for biomass or transport fuels. And, as we have seen, the changing climate can wreak havoc on crops and livestock. In a global context, the world population is expected to hit nine billion by 2050; around a quarter more people on the planet. Diets are changing too, towards a greater intake of meat and dairy foods, and developing nations are expecting similar levels of choice and nutrition as developed countries.

It is estimated by The United Nations Food and Agriculture Organisation (FAO) that at current consumption levels, 60% more food will need to be produced globally by 2050. Simply put, there are huge pressures to increase the amount of food produced owing to growing populations, whilst resources are dwindling, and the climate is changing. We need to find new ways of providing food to our societies, and the need is pressing.

### The barriers to innovation

Barriers to innovation include:

- a fragmented supply chain with many small players with low capacity for innovation, and the slow spread of ideas
- skills shortages
- conservatism, particularly among many small and medium-sized primary food producers
- insufficient applied research on the key challenges identified in the strategic research and innovation agenda
- slow uptake of ideas from other areas of industry and from the knowledge base.

### Focusing our investment

Our programme seeks to increase the productivity of crops and animals and, simultaneously, decrease the environmental impact of the industry. It will focus on four interlinked areas.

- **Crop productivity:** we are looking at two areas of crop productivity: crop protection, and crop nutrition and management
- **Sustainable livestock production (including aquaculture):** development of livestock production solutions that are environmentally and commercially sustainable and meet regulatory requirements
- **Waste reduction and management:** farm storage and food processing: a whole-chain approach to waste reduction, and post-gate food processing and packaging for retail and food distribution

- **Greenhouse gas reduction:** technologies and methodologies to tackle by far the biggest sources of greenhouse gas emissions in agriculture – nitrous oxide from fertilisers in soil and methane from livestock.

As part of the UK Strategy for Agricultural Technologies (<https://www.gov.uk/government/publications/uk-agricultural-technologies-strategy>), the Government has set up the Agri-Tech Catalyst to further support science and innovation in the sector, with the vision to make the UK a world leader in agricultural technology, innovation and sustainability.

Through the Catalyst £70m will be made available to businesses and academia over the next five years. The Technology Strategy Board is running the Catalyst, with support from the Biotechnology and Biological Sciences Research Council.

The Catalyst will fund proposals relating to:

- primary crop and livestock production, including aquaculture
- non-food uses of arable crops (for example, for biomass)
- food security and nutrition challenges in international development
- challenges in downstream food processing, provided the solution lies in primary production.

## Agriculture and food action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Crop and livestock disease challenges:</b> effective solutions to control agricultural diseases to realise the yield potential of crop and livestock production systems.	Collaborative R&D competition	Q1 Up to £10m and £6.5m co-funding
<b>Agri-Tech Catalyst:</b> to advance the sustainable intensification of agriculture and deliver economic impact for the UK agri-tech industry.	Catalyst competition	Q1 and Q4 Up to £30m
<b>Agriculture and food supply chain:</b> knowledge transfer to improve the competitiveness, resilience and responsiveness of the agriculture and food supply chain.	Knowledge Transfer Partnerships	Q1 Up to £1.25m with the potential of further co-funding
<b>Resource efficiency in the food supply chain:</b> improving the use of resources and minimising post-farm-gate waste generation in food production supply chains	Collaborative R&D competition	Q3 Up to £5m and significant co-funding
<b>Centres for agricultural innovation:</b> working with BIS, Defra and BBSRC to establish centres as part of the implementation of the industrial strategy. The first centre planned is the Centre for Agricultural Informatics and Sustainability Metrics.	Collaborative proposals	Q2 Government funding as per the BIS <i>Agri-Tech Industrial Strategy</i>

Budgets shown refer to funding commitments in the year, which may be spent over several years.



## Challenge-led areas: Transport

The way that people use transport today is unsustainable in terms of energy use, impact on the environment, system efficiency and cost to businesses. Transport generates about 25% of UK greenhouse gas emissions, and congestion, if unchecked, will cost the economy £22bn by 2025.

Increasing demand for capacity and capability is already outstripping supply. We now require a major transformation in performance (along with a societal change) to deliver a more sustainable and accessible transport system.

Transport provides employment for more than 1.3 million people and is worth almost £40bn to the UK economy. UK business can make a significant difference and generate wealth by:

- reducing vehicle emissions whilst increasing their efficiency
- supporting the acceleration of new vehicle technologies
- improving the operation, efficiency and cost-effectiveness of the transport system
- integrating different energy sources into transport systems and vehicles
- exploring integrated and sustainable solutions for future infrastructure
- developing a longer-term strategy towards sustainability.

To benefit from these opportunities, the key players will need to continue to engage with the UK supply chain as well as the growing number of SMEs in the field to develop and commercialise new technologies.

### The barriers to innovation

The barriers to innovation include:

- short-term demands on particular forms of transport that can divert businesses and academics from addressing the longer-term opportunities of integration
- the need to re-engineer automotive manufacturing supply chains to provide the components for new electric, hybrid and fuel cell vehicles
- a need in the marine sector to share capabilities between the major shipbuilders, the leisure sector and their supply chains
- the long-term nature of investments in new aircraft, which generates specific challenges to innovation in aerospace
- in rail, the relative lack of processes and capabilities in clients and the supply chain to collaboratively bridge the gap between research and procurement
- the lack of facilities for demonstration and validation at scale and in the real world.

### Focusing our investment

This year, we will establish a Transport Systems Innovation Platform to address the challenges of integration – helping business to develop market-driven solutions in the form of end user products and services that are delivered through the integration of systems across different modes of transport.

We will continue to work closely with the Office for Low Emission Vehicles and the Automotive Council, and will support the Advanced Propulsion Centre as it provides a way for the industry to move new technologies into production.

We will broaden our support and engagement with rail businesses and support the BIS Rail Technical Strategy and the department's Enabling Innovation in Rail team.

We will continue to work with the UK marine industry, and in line with the Marine Growth Strategy, to identify specific areas for support. There is an immediate need to further improve vessel efficiency and to respond to the challenge of autonomous operation.

In aerospace, the medium-term focus is on improving manufacturing systems to increase capacity and deliver innovative technologies to aircraft programmes. We will continue to work with the industry, in particular to support the activities of the recently established Aerospace Technology Institute, the work of the Aerospace Growth Partnership and work of the UK Centre for Aerodynamics.

## Transport action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Transport systems competitions:</b> addressing commercial and public acceptance challenges in developing new integrated transport systems and solutions.	Feasibility studies and collaborative R&D competitions	Q3 Up to £30m
<b>Transport Systems Catapult:</b> developing a world-class centre of expertise in transport systems to support rapid commercialisation of cutting-edge technologies.	Catapult	Q1–Q4 Up to £10m
<b>Niche vehicle research and development:</b> supporting the UK niche vehicle sector, recognising that smaller companies are often able to develop and demonstrate new products more quickly than the global original equipment manufacturers (OEMs) and tier 1s.	Collaborative R&D competition	Q1 Up to £1m (with an additional £0.5m co-funding from OLEV)
<b>Off-highway vehicles:</b> encourage the OEMs and supply chain to collaborate with road vehicle organisations to cut emissions, improve efficiency and further increase their value to UK Plc.	Collaborative R&D competition	Q3 Up to £3m
<b>Integrated Delivery Programme competition 11:</b> development of advanced technologies in low carbon vehicles, growth of SMEs, and enhanced opportunities in the UK supply chain.	Collaborative R&D competition	Q2 Up to £7m
<b>Rail supply chain:</b> developing innovative solutions and supply chains for rail.	Collaborative R&D competition	Q3 Up to £3m
<b>Highly innovative technology enablers in aerospace competition 3:</b> continue to encourage new entrants into the aerospace supply chain by supporting development of more risky highly innovative technologies and solutions.	Collaborative R&D competition	Q3 Up to £5m
<b>Maritime technologies (MARTEC) 2015 call:</b> support UK businesses to take their technologies to a new market and help them work in new Europe-wide collaborations.	EU competition	Q3 Up to £1m
<b>Vessel efficiency:</b> to continue the support for UK businesses to meet the challenges and exploit the opportunities around improved vessel efficiency.	Collaborative R&D competition	Q4 Up to £5m
<b>Maritime autonomous systems:</b> support UK businesses to maintain and build on their global reputation for services and products in maritime autonomy.	Collaborative R&D competition	Q3 Up to £3m

Budgets shown refer to funding commitments in the year, which may be spent over several years.

## Challenge-led areas: Health and care

Healthcare providers are facing greater challenges from a growing, ageing population and an increasing burden of disease. Countries in the Organisation for Economic Co-operation and Development (OECD) collectively spent over \$4.6tr on healthcare in 2008 and, for many, this has been increasing as a proportion of GDP.

The UK has key strengths. The life sciences sector in the UK consists of around 4,980 companies developing, producing and marketing products and services in the pharmaceutical, medical technology, medical biotechnology and industrial biotechnology markets. In total the sector employs 176,000 people.

The industry sells into a global industry with current total market values of £612bn for pharmaceutical and biologics, £223bn for medical technology and £32bn for the rapidly growing industrial biotechnology market. These markets have historically strong growth, and forecast growth rates are 8-10% a year. Life science companies based and operating in the UK generate £52bn in turnover from sales into the UK and overseas and this represents approximately 6% of world market sales.

### The barriers to innovation

The barriers to innovation are:

- innovation in medicines and healthcare technology must be carried out within a regulatory environment designed to protect patients, meaning development timelines are longer than some other technology sectors and that the risks and costs can deter investment
- the conservative nature of patient care can limit the adoption of new technologies as can the fragmented nature of procurement
- the pace of technology innovation is outstripping the ability of users to adapt to the way healthcare is delivered.

We must ensure that innovators are working towards users' needs and thinking about how adoption of technology will require changes in patient care pathways, or the way that services are used.

### Focusing our investment

Current healthcare models are facing greater challenges, both physically and financially, in providing for a growing, ageing population with an increasing burden of disease. For companies to devise solutions to these challenges, they must recognise the drivers behind the healthcare challenges and look at models of:

- an increasing emphasis on health and wellbeing, disease prevention and proactive management of long-term conditions

- earlier and better detection and diagnosis of disease leading to better patient outcomes
- highly effective treatments tailored to patients' needs which either modify the underlying disease or offer potential cures in increasingly efficient and cost-effective ways.

We are addressing these challenges through the following activities:

- the Assisted Living Innovation Platform: helping businesses to deliver products, systems and services to help people live independently for longer – how they want and where they want
- the Stratified Medicine Innovation Platform: supporting companies to create cost-effective solutions for delivering the right treatment to the right patient at the right time
- our regenerative medicine and cell therapy programme: helping UK businesses take advantage of the next generation of treatments to deliver long-term relief or cures for diseases
- the Biomedical Catalyst, allowing a more open approach to innovation to bridge academic and commercial activities in therapeutic development, medical devices, diagnostics and e-health/m-health solutions.

Alongside the new competitions planned for this year, we will establish the Precision Medicine Catapult, a world-leading centre that will help the UK to accelerate innovation in this exciting area.

## Health and care action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Cell Therapy Catapult:</b> providing a world-class centre of expertise in cell therapy to support the rapid commercialisation of cutting-edge technologies with the potential to have a global impact. Scoping the new cell therapy manufacturing centre.	Catapult	Q1-Q4 Up to £10m
<b>Stratification and neurodegenerative diseases:</b> two competitions in the areas of diagnosis, management and stratification, and data and business models to aid stratification.	Collaborative R&D competitions x2	Q1 Up to £7m
<b>Digital health in a connected hospital setting:</b> enabling companies to understand what impact they could have to help deliver more efficient and effective health systems and to connect with providers.	Collaborative R&D competition	Q1 Up to £6m
<b>Dementia:</b> turning research and small-scale pilots into new aesthetically pleasing products and services.	SBRI competition	Q3 Up to £5m
<b>Advancing regenerative medicines and cell therapies:</b> addressing commercial challenges in developing next-generation therapies.	Collaborative R&D competition	Q1 Up to £7.5m
<b>Biomedical Catalyst:</b> enabling early to late-stage innovation for healthcare solutions with a particular focus on SMEs.	Catalyst competition	Q1 and Q3 Up to £30m
<b>Stratified medicine:</b> disease-focused competition under the Stratified Medicine Innovation Platform – scope to be finalised through workshops with the community.	Collaborative R&D competition	Q2 Up to £6m
<b>Stratified Medicine Knowledge Transfer Partnerships:</b> building links between companies and the knowledge base.	Knowledge Transfer Partnerships	Q3 Up to £1m
<b>Healthcare Technologies Launchpad in Wales:</b> supporting the growth of the healthtech cluster in Wales.	Launchpad competition	Q3 Up to £1m
<b>Revolutionising long-term care phase 2:</b> continuing our activity to support new ways for business to develop solutions for long-term care.	Collaborative R&D competition	Q3 Up to £5m
<b>Ambient assisted living call 2015:</b> enabling UK business to exploit EU opportunities in the development and application of assisted living technologies.	EU competition	Q4 Up to £1m
<b>Assisted Living Mission:</b> giving small UK companies the opportunity to understand how products, systems and services for independent living are being developed and successfully commercialised overseas.	Mission	Q4 Up to £100k

Budgets shown refer to funding commitments in the year, which may be spent over several years.



## Challenge-led areas: High value manufacturing

Our high value manufacturing programme aims to grow the contribution of manufacturing to UK GDP by investing in innovation that will maintain or improve competitiveness and increase the commercialisation of new manufacturing technologies. Manufacturing contributes £6.7tr to the global economy, and the UK is in the world's top 10 manufacturers. Manufacturing makes up 10% of UK gross value added and 54% of UK exports, and directly employs more than 2.5 million people.

The UK is scientifically strong in emerging technologies and has the potential to make a global impact, including through manufacture of composite materials, plastic electronics and products derived from industrial biotechnology.

*A landscape for the future of high value manufacturing in the UK*, a study which we commissioned, identified 22 national competencies, which, if effectively developed and/or grown over the coming years, will ensure that the UK is well positioned to grow its manufacturing base significantly.

We incorporated these competencies, grouped under five strategic themes, into our High Value Manufacturing strategy, which forms the framework for our action plans, including those of the High Value Manufacturing Catapult.

### The barriers to innovation

Manufacturing innovation requires new knowledge to generate entirely new products, processes or services, or new technology to improve existing processes. This often involves bringing together more than one novel technology and components of separate supply chains to secure future competitive manufacture and through-life service. Very few enterprises can address these challenges alone.

Manufacturing new products or adopting new processes requires demonstration at commercial scale, which is often expensive and risky.

This so-called 'valley of death' – where many innovations fail – is a significant barrier to manufacturing innovation. Small and medium-sized businesses are important for economic growth, and it can be difficult for them to connect with global players who offer routes to market. We will help to address this challenge.

### Focusing our investment

The five strategic themes where there is strong potential for innovation to make a difference across multiple sectors and generate wealth for the UK are:

- resource efficiency
- manufacturing systems
- integration of new materials with manufacturing technologies
- manufacturing processes
- manufacturing business models.

To tackle the challenges and exploit the opportunities for innovation in these areas, businesses will need to develop within some of the 22 national competencies. Our programmes will set out to support industry in developing these competencies, through feasibility studies, collaborative R&D competitions, and, where appropriate, special interest groups.

## High value manufacturing action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>High Value Manufacturing Catapult:</b> provide a world-class centre of expertise in high-value manufacturing to support the rapid commercialisation of cutting-edge technologies. Initiating the new graphene application centre.	Catapult	Q1–Q4 Up to £30m
<b>Industrial Biotechnology Catalyst:</b> encourage and de-risk the development of industrial biotechnology processes.	Catalyst competition	Q1 and Q3 Up to £15m
<b>Development and applications of advanced coatings:</b> the application of novel coatings that will replace less environmentally friendly products, or enable cheaper or more sustainable materials to be used under the coatings.	Feasibility studies competition	Q1 Up to £2m
<b>Novel mechanical conversion processes:</b> the application of new primary and secondary mechanical conversion technologies and processes.	Collaborative R&D and feasibility studies competitions	Q1 Up to £6m
<b>Manufacturing process industries – North East Launchpad:</b> build on the established cluster to enhance its impact on the process industries in the UK.	Launchpad competition	Q2 Up to £1m
<b>Flexible and adaptive manufacturing:</b> flexibility of production and manufacturing supporting customised and rapidly reconfigurable manufacturing. Adaptive manufacturing including single step, flexible reconfiguration and process	Collaborative R&D competition	Q3 Up to £6m
<b>Smart, hybrid and multiple materials:</b> design, modelling and manufacturing processes of multi-metallic components and high-performance materials.	Collaborative R&D competition	Q3 Up to £5m
<b>Simulation &amp; modelling in materials and manufacturing.</b>	Feasibility studies competition	Q4 Up to £500k plus matched co-funding from DSTL
<b>Industrial Biotechnology ERANET Call 6:</b> encourage and de-risk the development of industrial biotechnology for the production of chemical intermediates, exploiting the strengths of other European players in the process.	EU competition	Q4 Up to £750k
<b>Additive manufacturing:</b> application of additive layer manufacturing techniques or other freeform techniques.	Collaborative R&D competition	Q4 Up to £6m

Budgets shown refer to funding commitments in the year, which may be spent over several years.

## Competence areas: Digital economy

Our digital economy programme addresses the adoption and exploitation of information technologies by businesses. The internet, computing and mobile communications have a transformative effect on how businesses succeed across the economy. By innovating in the UK, and establishing new ways to use this technology in all business sectors, we have the opportunity to position UK companies to grow and to succeed on a global stage.

Software, IT and telecoms services together generated 4.2% of UK gross value added in 2011 and provided 885,000 jobs. We have 107,000 software businesses, and are the world's number two exporter of telecoms services (£5.4bn) and number three in computer services (£7.1bn) and information services (£2bn) (*Source: BIS*).

The world imports the UK's expertise – services dominate our trade balance – and our culture. We are number two in the global export trade in film, television, music, books, news and education.

Our total creative industries exports (£17.3bn) are the highest per-capita in the world. Even though 7.8 million UK adults have never used the internet (half of them for reasons of disability), the UK population are the world's most advanced adopters of online retail and the digital economy.

### The barriers to innovation

The pace of change in information-handling technology creates risks for both businesses and their customers, and companies adopting digital technology may need to fundamentally rethink their business models and supply chains. Whilst the UK internet sector benefits from abundant agile, experimental micro businesses that can help to solve these challenges, growing them to a critical scale requires support not only for their innovative ideas, but also for the companies themselves. And at a human level, the free flow of data can invade privacy and personal security, and unequal access to technology can lead to unequal access to services and commerce.

### Focusing our investment

Our programme aims to help UK companies to experiment and build their confidence in digitally enabled business, developing new technologies and new ways to exploit them, and re-establishing a profitable route to their digitally-empowered customers. We are concentrating on five challenges:

- **digital innovators:** supporting the business journey of those developing new uses for digital technology
- **design:** encouraging development approaches that stem from the needs of the user

- **capability:** helping businesses develop the technical tools and resources they need to innovate
- **marketplace:** creating industry conditions that encourage experimentation and business growth
- **context:** working with others to coordinate business and technology innovation with advances in other areas.

For each of these, we will link digital expertise to the market needs, in one or more sectors where the issue is important. We will therefore frequently target the creative industries, where the impact of digital technologies on value and the user experience continues to be keenly felt.

We will also partner with those working across a much broader sweep of the progressively digitising economy, both in sectors dealing with information assets, such as education or finance, and those grounded in the physical world, such as health, transport, energy or retail, developing digital expertise for use within these sectors and helping to transfer it between them.

## Digital economy action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Connected Digital Economy Catapult:</b> provide a world-class centre of expertise in the digital economy, to support the rapid commercialisation of cutting-edge technologies.	Catapult	Q1–Q4 Up to £10m
<b>Open Data Institute:</b> catalysing the evolution of open data culture to create economic, environmental, and social value.	Funding support	Q1–Q4 Up to £2m
<b>Tech City UK:</b> celebrating and championing London and UK's vibrant tech community.	Funding support	Q1–Q4 Up to £2.5m
<b>IC tomorrow:</b> continuing programme to support digital start-up businesses as they link to challenge partners.	Funding competitions and business support	Q1–Q4 Up to £2.3m
<b>Open data tools:</b> continuing to develop an open toolkit to help clean, structure and store data.	G-cloud procurement	Q1–Q4 Up to £1m
<b>Internet of Things Demonstrator Stage 2:</b> scale-up of outputs from previous projects.	SBRI competition	Q1 Up to £1.6m
<b>Location based services:</b> helping businesses to use location technology to engage with their customers 'here and now'.	Collaborative R&D competition	Q1 Up to £5m
<b>Cross-platform production in digital media:</b> further investment to complement the collaborative R&D projects on visual and audio effects production.	Feasibility studies competition	Q1 Up to £1m
<b>Value from our interactions with digital content:</b> understanding how value in data assets is affected by our relationship to them.	Collaborative R&D competition	Q1 Up to £2.5m
<b>Learning technology – design for adoption:</b> applying design expertise to help accelerate the development and uptake of learning technology.	SBRI competition	Q1 Up to £1m
<b>Internet of Things Launchpad (with Tech City UK):</b> investing in the London and Cambridge SME clusters working on Internet of Things.	Launchpad competition	Q2 Up to £1m
<b>Data applications in commerce:</b> generating value from product and transaction data.	Collaborative R&D competition	Q1 Up to £4m
<b>Lowering the cost of personalisation:</b> finding efficient ways to create individually tailored products and services.	Feasibility studies competition	Q2 Up to £2m
<b>Countering cyber threats:</b> creating systems that are resilient against external security breaches.	Collaborative R&D competition	Q3 Up to £4m
<b>Online professional services:</b> building confidence in the services that we buy online.	Feasibility studies competition	Q4 Up to £1m
<b>Digital Media Launchpad:</b> investing in an emerging cluster of small creative businesses.	Launchpad competition	Q4 Up to £1m

Budgets shown refer to funding commitments in the year, which may be spent over several years.



## Competence areas: Space applications

The UK's space capability is world class. We have advanced manufacturing capabilities, world-leading satellite operators and one of the world's largest satellite broadcasters, as well as a global services sector delivering systems integration and software to support new space applications.

The *UK Space Innovation and Growth Strategy (IGS)* 2010 and 2014 set ambitious targets for the UK to grow its global market share from 6% to 10% by 2030 and to create 100,000 new high-value jobs. The worldwide space market was worth £160bn in 2008 and is forecast to grow to £400bn in 2030.

In the UK, the space sector has grown 9% a year on average over the last decade and continued to deliver similar levels of growth in the last sector review up to 2011. IGS (2010) was updated in 2014 with new actions, most significantly in giving the strategy a clear market focus, and these will be factored into our delivery actions.

The last five years have seen great change take place within the UK space sector, with the creation of the UK Space Agency, the arrival and growth of the first European Space Agency (ESA) facility in the UK, and the establishment in 2013 of the Satellite Applications Catapult at Harwell.

Top-level developments have included an increased funding of space through the ESA, to a total of £1.2bn. Of this, 37% (around £180m) of the 'optional' element (programmes of interest to only some member states which are able to decide on their own level of funding) of this is managed by the Technology Strategy Board on behalf of the UK Space Agency, in the areas of integrated applications, telecommunications (ARTES) and satellite navigation (EGEP).

The UK is the single largest contributor in Europe to telecommunications and integrated applications and the second largest to the ESA navigation programme. These subscriptions are managed independently to this delivery plan under the leadership of the UK Space Agency but the same principles and objectives set out by the Technology Strategy Board are applied.

### The barriers to innovation

The two sectors within the space industry – upstream, such as satellites and supporting infrastructure, and downstream, such as data users, receiver terminal manufacturers and end-use data applications developers – face different barriers.

We aim to help business tackle some of these key barriers to innovation, which include:

- limited awareness of the value and efficiency of using space data
- perception of risk around feasibility and robustness of new space-based solutions
- long lead times for the provision of new spacecraft components and services.

### Focusing our investment

Our space programme aims to support innovation in new applications using satellite data and space-based satellite systems. In 2013, we launched the Satellite Applications Catapult, which will give UK industry the end-to-end infrastructure needed to link innovative ideas from existing space sector players with new collaborators from outside the sector. One of its primary challenges will be to identify which markets offer the greatest potential for UK companies, building on the market analysis carried out under IGS 2010 and 2014.

Our space programme has six key areas of activity:

- R&D and innovation programmes in conjunction with the UK Space Agency for both national and ESA programmes
- the Satellite Applications Catapult
- investment in open innovation to accelerate commercialisation of R&D, guided by the National Space Technology Strategy and roadmaps
- promotion of business opportunities for the UK space industry within other growth sectors, focusing on satellite-based applications and services
- technology demonstration opportunities both in-orbit and terrestrially for new applications, services, components, systems, and instruments
- formation of a 'space' community as part of the Knowledge Transfer Network to succeed the successful Space Special Interest Group and represent the interests of SMEs and non-space players and to facilitate the delivery of the *National Space Technology Strategy* and roadmaps.

## Space applications action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Satellite Applications Catapult:</b> helping UK business develop new satellite-based products and services and to stimulate growth across the UK economy.	Catapult	Q1–Q4 Up to £10m
<b>In-orbit validation:</b> demonstrate innovative satellite payloads and services by developing the TechDemoSat model into a long-term regular programme in partnership with the UK Space Agency and the Satellite Applications Catapult.	Procurement	Q1–Q4 Up to £3m (with additional co-funding)
<b>Entry to space sector – Harwell Launchpad 2:</b> attract new players and start-ups to the space sector and foster cluster activity around Harwell and associated centres of excellence.	Launchpad	Q2 Up to £1m
<b>Space foundations:</b> a joint competition with the UK Space Agency to deliver flagship activities under the National Space Technology Programme.	Collaborative R&D competition	Q3 Up to £2m (with additional co-funding)
<b>Solutions from space:</b> work with other Technology Strategy Board thematic areas to utilise satellite applications and services in new markets and address identified government needs.	Competition format to be decided	Q1–Q4 Up to £4m

Budgets shown refer to funding commitments in the year, which may be spent over several years.

## Competence areas: Resource efficiency

The driver for this programme is a major societal challenge: how to provide a high standard of living for a global population of more than nine billion by 2050 with the resources of a single planet. Global resource extraction and use has grown substantially over the last century, driven by both an increasing population and a growing middle class. At the same time, the availability and accessibility of a broad set of resources – minerals and metals, biomass, food and water – is subject to increasing constraints and increasing environmental impact associated with extraction.

This has resulted in price inflation/volatility of resources and in some cases substantially constrained or even interrupted supply, often due to geopolitical issues. The UK economy is still predominantly linear in terms of its use of resources. Meeting this societal challenge will require a marked increase in the circularity with which we use, reuse, repair and recycle resources of all kinds. The nature of the innovations required will span not only new design approaches, materials and end-of-life technologies and business models but will also require approaches operating at a systems level across multiple value chains.

Resource efficiency measures could add \$2.9tr to the global economy by 2030, with returns on investment of over 10%; across the European Union, the opportunity is £220bn-400bn a year. We estimate the UK market opportunity to be in the range £50bn-75bn a year.

### The barriers to innovation

The barriers to innovation in resource efficiency are:

- weak information flow along supply chains
- lack of understanding and exploitation of life-cycle thinking
- lack of visibility of projected resource crunches; especially for smaller players
- lack of systems and established business models to get 'stuff' (products, components and materials) back for manufacturers and retailers
- poor understanding of the importance of system-level thinking and the interrelation of different resource types.

### Focusing our investment

More circular business model approaches include: repair, reuse, remanufacture, recycle, reduce and replace. We seek to support innovation by businesses to more rapidly adopt solutions based on these approaches that deliver benefits right along supply chains. All our programmes promote these strategies and ensure that life-cycle thinking is at the heart of projects.

Collaboration along existing and new supply chains is vital. Our plan focuses on promoting the design-led and system-level changes necessary to deliver markedly-increased circularity in the use of resources to deliver customer benefits.

## Resource efficiency action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Industrial symbiosis expertise:</b> enabling companies to explore the potential for sharing resources between manufacturing companies, and using co-products from one as feedstocks for another.	Knowledge Transfer Partnerships	Q1 Up to £500k
<b>Increasing value from waste:</b> developing new supply chains that support a more circular economy.	Collaborative R&D competition	Q3 Up to £4m
<b>Clean and Cool Mission 2014 to the US:</b> giving small UK companies the opportunity to understand how clean technology is being developed and commercialised overseas, and find investment and partnerships.	Mission	Q3 Up to £250k
<b>Circular economy systems:</b> exploring business models and supply chains for the circular economy.	Feasibility studies competition	Q4 Up to £1m

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## Enabling technologies

Our enabling technologies programme runs in parallel with our challenge-led activities because we recognise that technological developments can inspire innovation across a range of market sectors, generating wealth for the UK and meeting societal challenges.

We focus on four large and multi-disciplinary areas:

- advanced materials underpin many sectors including manufacturing, construction, cleantech and transport. The interdependency of advanced materials and high value manufacturing in particular offers a large opportunity for UK innovation and growth. Businesses that produce, process, fabricate and recycle materials form a critical element in high value manufacturing. They have an annual turnover of around £197bn and contribute £53bn to the economy
- biosciences are vital to develop the integral products and processes in our lives, from the food we eat to our medical care. Between them, the UK biosciences sectors of pharmaceuticals and industrial biotechnology represent over 13,000 companies, generate over £134bn in turnover and contribute £41bn to the economy
- electronics, sensors and photonics underpin many industrial sectors. The UK's electronics sector generates approximately £29bn a year in revenues, contributing over £12bn to GVA and employing an estimated 850,000 people in the UK
- information and communication technology enables process, product and service innovation across all sectors, leading to increased competitiveness and sustainability. The UK ICT sector comprises more than

116,000 companies with revenues of more than £137bn and contributes £66bn to the UK economy. Our programme seeks to stimulate innovation in software-intensive technologies, processes and systems.

### The barriers to innovation

Private investors find it difficult to invest in higher-risk, early-stage innovation across the four enabling technology areas, making it hard for innovators to take their initial ideas to a level of maturity that will attract later rounds of investment or the engagement of potential users.

Particular barriers are:

- **advanced materials:** uncertainties in availability of energy and raw materials, and competition from low-cost manufacturing overseas
- **biosciences:** advancing a novel product or process often involves long and expensive development requiring high-value capital equipment. The route to exploitation can also be complicated by regulation. Transformative technologies are often overlooked as investments as they are perceived as complex and inaccessible. There is a lack of cross-disciplinary working
- **electronics, sensors and photonics:** the cost of product development and manufacturing can be prohibitive and there is a fragmented supply chain dominated by innovative SMEs with some larger systems integrators and manufacturers who are more risk-averse

- **information and communication technology:** low barriers to entry into software development and lack of engagement with users throughout the process often mean that software is not dependable or sympathetic to the needs, preferences and values of the user.

### Focusing our investment

One of the mainstays of our activity has been our 'technology-inspired innovation' competitions, open to businesses working on these enabling technologies. We will continue to run these competitions in 2014-15 and also invest in activities focused on identified technology challenges:

- advanced materials: materials for aggressive environments
- biosciences: the integration of 'omics' technologies and technologies for the agri-food sector
- electronics, sensors and photonics: robotics and autonomous systems, electronics systems and intelligent sensor systems
- information and communication technology: user experience, and software quality and testing.



## Enabling technologies action plan 2014-15

CHALLENGE: ACROSS ALL ENABLING TECHNOLOGIES	ACTION	TIMING & BUDGET
<b>Technology-inspired innovation:</b> encouraging small and micro businesses to collaborate with new business or science partners to develop technological innovations.	Collaborative feasibility studies competition	Q1 Up to £2m Q4 Up to £3m
<b>Technology-inspired innovation:</b> enabling small and micro businesses to demonstrate the feasibility of innovative underpinning technologies.	Feasibility studies competition	Q3 Up to £2m
CHALLENGE: ADVANCED MATERIALS		
<b>Materials for aggressive environments:</b> stimulating the development of new materials concepts to enable operation in particularly harsh environmental conditions (in terms of temperature, corrosion, abrasion, Ph, impact, load, etc).	Collaborative feasibility studies competition	Q4 £2m
CHALLENGE: BIOSCIENCES		
<b>Integrated 'omics':</b> stimulating innovation and demonstrating convergence of 'omics' technologies.	Feasibility studies and collaborative R&D competition	Q3 Up to £2m with significant additional co-funding
CHALLENGE: ELECTRONICS, SENSORS AND PHOTONICS		
<b>Sensor systems (SAPIENT):</b> designing and integrating technologies to develop sensor systems with intelligence and optimised control.	SBRI Competition Phase 2	Q1 Up to £1m
<b>Electronic components and systems:</b> joint technology initiative focused on micro/nano electronics, smart integrated systems and embedded systems.	EU competition	Q1 Up to £3m
<b>Robotics and autonomous systems:</b> stimulating innovation to accelerate the development of novel robotics and autonomous systems concepts towards technology demonstration and commercialisation in multiple sectors.	Collaborative R&D competition	Q3 Up to £2m with significant additional co-funding
CHALLENGE: INFORMATION AND COMMUNICATION TECHNOLOGY		
<b>Robotics and Autonomous Systems Mission:</b> giving small, high-growth-potential UK companies the opportunity to deepen their understanding of how robotics and autonomous systems technology is being developed and successfully commercialised in the US.	Mission	Q1 Up to £100k
<b>Robotics and autonomous systems:</b> building an integrated community on _connect and developing a robotics and autonomous systems vision for the UK through cross-sector consultation to stimulate greater innovation and collaboration.	KTN community	Q1–Q4 Up to £200k
<b>E-Infrastructure:</b> building a community on _connect to raise awareness in UK businesses of the e-infrastructure resources and expertise available and highlighting opportunities for innovation.	KTN community	Q1–Q4 Up to £100k
<b>User experience:</b> stimulating development and demonstration of new ways for people to interact with and experience ICT systems such as wearables and immersive approaches.	Feasibility studies competition. Knowledge Transfer Partnerships	Q4 Up to £1.5m
<b>Beyond current software testing:</b> stimulating development of new ways to test and validate software components and systems to enhance software quality and improve software engineering.	Feasibility studies competition	Q4 Up to £500k

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# Emerging technologies and industries

An emerging technology is one that has only recently emerged, or is still emerging, from the science base.

It allows something to be done that was not previously possible or was possible only in theory. It creates a totally new value proposition, and consequently has the potential to disrupt existing markets and create new ones.

This programme identifies high-potential technologies just emerging from the science base and helps accelerate their commercialisation through the early engagement of business.

Our work in this area links to and complements the investment being made by the research councils, and in areas such as the eight great technology areas the Government has identified that have the potential to propel future growth in the UK.

## The barriers to innovation

The barriers to innovation are:

- it is difficult for companies to see how they can benefit from technologies when they are completely new, and potentially disruptive – and for academics to find the best routes to market
- the potential value of a disruptive technology must be judged at individual business level as well as at sector level and this rarely happens of its own accord
- getting investment for these riskier, early-stage technologies can be hard
- it is not easy to generate the critical mass needed to develop new industries, which requires many parties working together with easy access to expertise and facilities.

## Focusing our investment

Given the uncertain nature of commercial success in early-stage technologies, we take a portfolio-based approach to the emerging technologies and industries programme. We have identified seven high-potential emerging technology areas.

These are:

- synthetic biology
- energy-efficient computing
- energy harvesting
- non-animal technologies
- emerging imaging technologies
- graphene
- quantum technologies.

We will be investing in these with partners such as the research councils, the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs), the Defence Science and Technology Laboratory and business. We will be publishing our updated *Emerging Technologies and Industries Strategy* (2014-18) and will begin implementing it immediately.

## Emerging technologies and industries action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Understanding and exploring early the commercial potential of disruptive technologies:</b> support the Knowledge Transfer Network to build communities of practice in identified emerging technology areas.	Knowledge Transfer Network communities	Q1–Q4 Up to £700k
<b>Graphene:</b> exploring the potential of graphene to yield new products that could disrupt markets, including stimulating the development of a robust and competitive supply base.	Feasibility studies competition	Q1 Up to £1.5m
<b>Energy harvesting:</b> developing energy harvesting systems designed to perform in usable, reliable and robust ways.	Collaborative R&D competition	Q1 Up to £2.5m
<b>Energy efficient computing:</b> realising the value of disruptive technology through larger scale investment.	Collaborative R&D competition	Q2 Up to £3.5m
<b>Quantum technologies:</b> exploring the potential of disruptive technology through feasibility studies.	Feasibility studies competition	Q2 Up to £2m
<b>Investing in capability:</b> technology does not innovate, it is people who innovate. We will explore how best to support high-calibre innovators.	Type of support to be determined following consultation	Q3–Q4 Up to £200k
<b>Non-animal technologies:</b> realising the value of disruptive technologies through larger scale investments.	Collaborative R&D competition	Q3 Up to £4m
<b>Non-animal technologies IKC:</b> work with NC3Rs and the research councils to help create early-stage critical mass in non-animal technologies (NAT), including exploring the potential of a new NAT innovation and knowledge centre.	Innovation and knowledge centre	Q3–Q4 Up to £2.5m

Budgets shown refer to funding commitments in the year, which may be spent over several years.

## Other opportunity areas

Our thematic priorities focus on those areas where Technology Strategy Board programmes can add most value to UK innovation. But there are other sectors where the UK capacity is strong and where we are able to help and encourage business innovation.

These include the creative industries and learning technologies.

### Creative industries and design

In 2013 we published an updated strategy for innovation in the creative industries. In 2014-15 we will continue to implement the strategy and offer support to businesses in the sector. The exciting digital opportunities for the creative industries will continue to be taken forward through our digital economy programme.

More broadly across the organisation, we will increase our support for the early use of design across our programmes, through the use of Innovation Vouchers, the Design Option and the work of the Design Special Interest Group.

The aim is to counter the tendency to consider the usability and desirability aspects of design only towards the end of R&D projects, and avoid revisiting earlier decisions that can result in increased time to market, more cost, and less commercial success.

## Other opportunity areas action plan 2014-15

CHALLENGE	ACTION	TIMING & BUDGET
<b>Connecting design and technology communities:</b> ensure that design thinking is incorporated early in the project life-cycle to improve commercial outcomes by continuing to support the Design KTN community. Evaluate the success of the Design Option pilots, and develop follow-on activities.	KTN community	Ongoing Up to £150k
<b>Learning technologies communities:</b> launch (with digital economy team) a new design studies competition to bring design expertise to bear to help accelerate the development and uptake of learning technologies.	SBRI Competition	Q1

Budgets shown refer to funding commitments in the year, which may be spent over several years.





“We feel that the Technology Strategy Board has been, and will be, our long-term partner and ally in the fight against dementia.”

Dr Kate McLeish, vice president of technology, IXICO  
Read IXICO's story at [www.innovateuk.org/success-stories](http://www.innovateuk.org/success-stories)

We will roll out the Agri-tech and Industrial Biotechnology Catalysts further in 2014-15 and are launching the

**Energy Catalyst**

IXICO was one of the first tranche of companies to benefit from the award-winning Biomedical Catalyst and is conducting a trial with partners of a dementia diagnosis system. Last year saw the launch of the

Agri-tech and Industrial Biotechnology Catalysts.

# How we operate: Continuously improving our capability

To deliver our programmes as efficiently and effectively as possible, and to best meet the needs of our customers, we need to be a highly capable organisation.

We will continue to develop our people resources and business processes to be fast, flexible, and focused on the needs of business, and our benchmarks and impact measures to ensure that we remain effective and deliver value for money.

During 2014-15 we will work with our sponsor department BIS on the implementation of the recommendations of the triennial review of the Technology Strategy Board, with a focus on finances and communications.

## Our values

We rely on our people to achieve our goals. Having clearly articulated values is important for trust, clarity of purpose and delivery. We identified five values as core to our evolving organisation and we will continue to ensure these are embedded over the coming year through an increased focus on internal communication and engagement. Those values are:

- solution-focused
- passionate about innovation
- curious and creative
- one dynamic team
- committed to helping one another.

## People and resource planning

With an ambitious plan and new responsibilities, we must make sure we are adequately resourced and ready to support our people.

In order to deliver our programme from 2014-15 onwards – which includes many new challenges set by government – we aim to increase our staff numbers from the current level of just over 200 to approximately 300.

This year will be a key one in terms of our people. We will see some structural change within our executive management team and will be focusing on how we grow and develop the distinctive leadership capabilities required to deliver our strategic objectives.

This will include developing and supporting people managers who are skilled and capable leaders of change. We will also continue to focus on attracting, retaining and renewing excellence in the identified areas of skills and knowledge we need to deliver against our plans.

Establishing the right culture for our staff is an ongoing priority. As our team continues to grow, we will underpin the existing culture which safeguards staff wellbeing; we will build on our peoples' strong motivation and understanding of how they contribute to our objectives; we will ensure employees have a voice in the organisation's development; and

we will continue to stimulate creativity and develop strong, mutually supportive teamwork to ensure we achieve our goals.

Together with the work we are doing on creating our brand story externally, we will be focused on ensuring our own staff understand and are motivated to telling our story in a positive and energising way, thus becoming our best ambassadors.

## Process improvement, management information and IT

We have grown strongly since we were established in 2007. We require a more robust approach to how we manage our processes to ensure capability, scalability and performance improvement.

We will enhance our business processes through the development of a framework which will improve how we support businesses to effectively and efficiently meet our customers' needs. For example, we have brought the administration of most of our grants into one system and are consolidating all our support to improve processes and reporting. This work includes having an integrated online application and grant payment process.

We are increasing access to our project information, which is now available through our website. We are also supplying data to the Gateway to Research portal led by the research councils, so that information about publicly funded science, R&D and innovation projects is all in one place.



We will simplify and enhance our IT system to make it easier for customers and staff to access and use. In addition, we will work to unify our databases to improve our management information systems.

## Integrating customer support

The changed innovation landscape and our greater focus on SMEs have resulted in us working more and more with small and young companies, including those that may have never applied for public funding before. To better support the businesses and organisations contacting us, we will improve how we manage customer queries, complaint tracking and support and provide an integrated 'one-stop' service for customers and staff.

### Targets

- we will enhance our business processes through taking a customer-centric approach to our end-to-end processes and performance management and will build organisational capability in improvement methodology, driving improvements through the organisation to better meet the needs of our customers
- we will work with our sponsor department BIS on the implementation of the recommendations of the triennial review of the Technology Strategy Board, with a focus on finance and communications
- we will investigate and evaluate means to improve our monitoring of supported companies to ensure that our business processes support companies' development during engagement with us

- we will simplify and enhance our IT system and improve our management information systems to make it easier for customers and staff to access and use in order to extract maximum value and we will ensure it is scalable
- to better support the businesses and organisations contacting us, we will improve how we manage customer queries, complaint tracking and support and provide an integrated 'one-stop' service for customers and staff.

## Impact and evaluation

We are committed to improving our understanding of the impact of our programmes. Robust evaluation will help us to improve delivery and impact and, combined with more rigorous analysis of opportunities, will help steer future investments.

In October 2013 we established a dedicated economics and evidence function to take forward a complete plan of impact analysis. In 2014-15 we will deliver a process and impact evaluation of SBRI, and commence further evaluations across a number of key areas, including:

- Smart
- Low Impact Buildings Innovation Platform
- Biomedical Catalyst
- Innovation Vouchers.

We will investigate means to conduct a more holistic evaluation of the organisation. We will complement this with portfolio analysis across our range of programmes and customers. Together these will provide insight as to our impact and effectiveness now, and help to inform decisions about where we are going.

To provide more timely insight on impact, we will investigate ways to improve our monitoring of supported companies. This will enable us to track companies' development during engagement with us, as well as seeing how they develop beyond the life of the project.

### Targets

- explore means of conducting portfolio analysis of our support for innovation, to enhance investment decisions and ensure our support is targeted in the most effective way
- commence comprehensive impact evaluations covering Smart; the Low Impact Buildings Innovation Platform; Innovation Vouchers, and Biomedical Catalyst, and deliver the evaluation of SBRI
- explore ways to improve our monitoring of supported companies, both during engagement with the Technology Strategy Board and beyond
- track and evaluate impact such as the 'conversion' of the companies we refer to GrowthAccelerator for support and the amount of external funding raised following showcasing of activities
- engage with and seek views from our stakeholders to ensure we are providing support relevant to their needs.

# Our tools, from A to Z

Our goal is to accelerate economic growth by stimulating and supporting business-led innovation. We help business with a range of activities and programmes, each focused on helping to solve specific innovation challenges.

We support businesses of all sizes and work with a wide range of partners in the public and private sectors to help make the UK's innovation system work more effectively to support future economic growth.

Most of our support is offered on a competitive basis, and we are looking to help the best ideas with the most economic potential.

The main ways we support business are outlined in this section.



Provide funding and a more co-ordinated approach from early-stage research to near commercialisation to innovative businesses and researchers working in the priority areas of healthcare, agriculture, industrial biotechnology and energy, with the aim of quickly turning excellent UK research into commercial products.



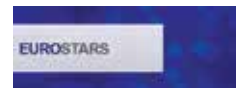
A network of world-leading technology and innovation centres designed to advance innovation in specific fields such as high value manufacturing and satellite applications. Catapults enable the very best of UK businesses, scientists and engineers to work together with access to leading-edge facilities to transform ideas into commercially viable products and services.



Provides funding for businesses, universities and research and technology organisations to work collaboratively on innovative projects in strategically important areas to tackle specific technical or societal challenges.



We help the most entrepreneurial and innovative UK companies expand their horizons by introducing them to potential collaborators, suppliers, customers and investors overseas, such as in the US, India and Brazil. We work in partnership with UKTI, and we invite mainly early-stage UK businesses to compete for places on missions to countries that are particularly strong in innovation and enterprise.



Grant funding to help UK high-tech small and medium-sized businesses to undertake R&D projects and develop partnerships with similar companies and knowledge and supply chain partners elsewhere in Europe. Eurostars enables companies to develop their networks and to build up the knowledge to participate in larger EU programmes such as Horizon 2020.



Businesses in need of support to test an innovative idea and explore its commercial potential can compete for funding towards their costs. Funding is available to all sizes of business and can be awarded to both individual companies and consortia. Successful projects are then better prepared to enter larger programmes to develop the idea.



Innovation and knowledge centres offer a shared space and entrepreneurial environment in which researchers from academia and business can work side-by-side on commercial applications of emerging technologies.



Innovation Vouchers provide small amounts of funding to enable innovative small and medium-sized businesses to work with experts they have not worked with before and gain knowledge that could help their business to grow. The experts can be from academia and research and technology organisations and from the fields of design and intellectual property.



The network supports business innovation by enabling people to share knowledge, ideas and opportunities within and between specific sectors and communities.

The Technology Strategy Board's online community site, **\_connect**, can be accessed at <https://ktn.innovateuk.org>



Knowledge Transfer Partnerships match businesses with UK universities, colleges, research and technology organisations and a recent graduate in order to deliver a challenging innovation project and build sustainable capacity and capability in the businesses leading to growth.



Launchpads are aimed at ambitious early-stage small and medium-sized businesses working in high-tech geographic clusters. They provide funding and a programme of business support to help the business develop an innovative idea into a commercial prospect and potentially attract additional private investment.



The SBRI programme (Small Business Research Initiative) helps businesses to develop an innovative product or service through a contract for up to £1m from a public sector organisation needing a solution to a specific challenge. The business gets funding to develop its ideas and the guidance of a lead customer and the public sector gets more innovative ways of meeting its needs.



Awards grants to individual pre-start-ups, start-ups, micro businesses and small and medium-sized businesses to enable them to assess potential markets and invest in R&D and innovation. Three types of funding support are available: proof of market, proof of concept and demonstration of prototype. Smart is designed to address the funding gap experienced by many small and early-stage businesses.

## Other ways we provide support

In addition to the specific activities already mentioned, we also deliver support through:

**Innovation platforms:** these bring business, academia and government together to focus on a specific challenge, such as vehicle emissions or affordable healthcare, and include the development of technology roadmaps; consideration of standards, regulations, and procurement; and appropriate forms of funding support

**Events:** these include InnovateUK, our major annual innovation conference and exhibition delivered jointly with UKTI; networking days designed to help businesses interested in applying to funding competitions to find collaborators and partners; and events that help the projects we support to meet with the investment community. We also support a range of third-party innovation events with similar aims

**EU and international:** support for businesses to access EU R&D and innovation programmes such as Horizon 2020. This includes National Contact Points, experts who can advise businesses on how best to apply to specific programmes and the Horizon 2020 UK website [www.horizon2020UK.org](http://www.horizon2020UK.org). We are developing more international programmes to enable businesses to internationalise and to access global markets, including with the emerging markets of India and China where there is significant potential.







# Technology Strategy Board

Driving Innovation

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*The Technology Strategy Board is the UK's innovation agency.*

*We accelerate UK economic growth by stimulating and supporting business-led innovation.*

*We are a business-led executive non-departmental public body, sponsored and funded by the Department for Business, Innovation and Skills.*