

**UPDATE
DECEMBER 2011**

The technology and innovation centres in this publication are now called Catapults

Closing the gap between concept and commercialisation



Closing the gap between concept and commercialisation

The Technology Strategy Board is creating a new network of world-leading technology and innovation centres – a major new investment in the UK's innovation landscape.

To compete successfully in tomorrow's global knowledge economy, innovation is vital. The new network of centres is a transformational long-term strategic investment by the UK Government to help generate economic growth by filling a critical gap in the UK's national innovation landscape. It aims to accelerate business innovation by building a bridge between our world-leading research base and the companies, large and small, which are ambitious for growth in technology-enabled markets. This is a fast-paced initiative with long-term benefit. Focusing on a small number of areas, it will harness the UK's strengths, build capacity and generate the critical mass needed to compete effectively in global value chains and high growth markets.

As the UK's national innovation agency, the Technology Strategy Board will set up, oversee and co-ordinate the network of centres as part of the wider UK innovation landscape. Following the announcement of the programme in Autumn 2010, this document sets out our vision, strategy and plan for the centres.

The technology and innovation centres will create a new framework for long-term investment and joint working between business and the UK research base, complementing the other programmes and resources available to stimulate innovation. We aim to transform the resource available to accelerate the translation of research

into profitable products and services, and expect UK businesses of all sizes to use the centres to find new opportunities to accelerate – and reduce the risk of – product and service development.

There was a strong and positive response from business and others to the prospectus we issued in January and we are moving ahead rapidly with the technology and innovation centres programme. Two centres are already in development and this document announces a third, in offshore renewable energy – as well as identifying the areas which hold the most potential for further centres in the short term. We will be discussing these with business and research communities in the coming months and will make proposals for a further three centres following this input.

We recognise that many successful businesses are working in areas outside the priorities we have identified for the new centres, and there are many other ways in which support – from the Technology Strategy Board and others – works to accelerate innovation. Our strategy document, *Concept to Commercialisation*, explains how we will continue to work with business over the next four years to accelerate business innovation across a wide range of areas.

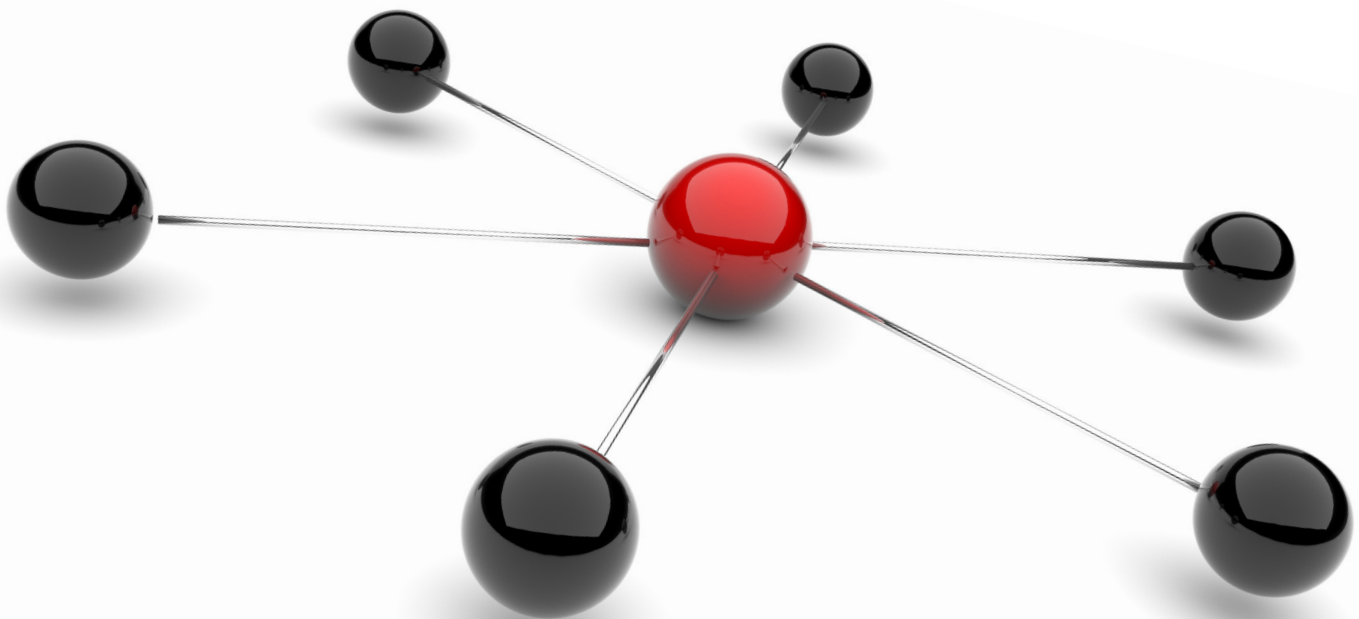
This programme has huge potential. Together with business, research and academia we are creating a vital resource which will help to drive economic growth by closing the gap between concept and commercialisation and enhancing innovation in specific technology areas for years to come.

This document explains how.

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The vision

The technology and innovation centres programme represents a long-term strategic investment to create a transforming innovation resource, enabling the UK to address market needs in key areas and compete in the global markets of tomorrow – generating growth and wealth for the UK.



The new network of technology and innovation centres will stimulate innovation, accelerate growth and anchor high value development activity in the UK. It will make world-leading research and technologies available in a way that UK businesses can engage with, in a professional and entrepreneurial environment. Using these technologies and resources, business will be able to develop new products and services more rapidly and effectively.

The network will build on the UK's outstanding research capability, both academic and business, and provide an accelerated path for technologies to move from concept towards commercialisation.

The network of centres is one part of the Government's broader agenda to stimulate innovation and growth. The Technology Strategy Board's 2011-2015 strategic plan, **Concept to Commercialisation** features technology and innovation centres as a key element but also highlights the many other approaches and programmes in place and planned, working with partners to accelerate and support business innovation in different ways.

Technology and innovation centres will provide access to the best technical expertise, infrastructure, skills and equipment – resources which companies, particularly small ones, can seldom afford alone. By providing a national focus for joint work between businesses and the research base, individual centres will create a critical mass of activity which will benefit the entire sectors in which they operate, and beyond.

The centres will attract work and engagement from a wide cross-section of industry ranging from multinationals to small businesses, and will have the reputation to work closely with the best universities and other technology organisations in the UK and internationally. They will also act as connectors, sharing expertise between centres and across research institutions.

They will provide an innovative and entrepreneurial environment, enabling the development of new value chains and facilitating a variety of routes to the commercialisation of new products, processes and services. They will have international reach, connecting with other countries' centres of business and research excellence, and building an international reputation which will also help to attract inward investment.

The programme to establish these centres will transform the resource available for innovative businesses in the long term, establish world leading capabilities for the UK and achieve global impact.

'We will invest over £200 million in technology and innovation centres over the next four years. These centres will be great for research, great for business – and they're going to put Britain back at the top table for innovation.'

Prime Minister David Cameron, 22 October 2010

Developing the concept

The initiative to create a new UK network of technology and innovation centres, as a long-term investment in innovation and future growth, has been taking firm shape since Autumn 2010.

Many have contributed and continue to contribute to this thinking – leading entrepreneurs, government departments, parliamentary committees and the wider business and research communities who will be instrumental in, and will benefit from, the centres in future.



In March 2010, the entrepreneur Hermann Hauser produced an influential report, *The Current and Future Role of Technology & Innovation Centres in the UK*, which identified best practice from around the world and made a robust case for long-term UK investment in a network of technology and innovation centres which would 'deliver a step change in the UK's ability to commercialise its research'. The rationale for establishing such centres was further reinforced by Sir James Dyson in his 2010 report *Ingenious Britain*.

In Autumn 2010 the Government announced that it would invest over £200m in a network of technology and innovation centres over the four-year spending review period, and that the Technology Strategy Board would be the agency responsible for creating and overseeing the new facilities.

In January 2011 the Technology Strategy Board published a **prospectus**¹ which proposed key principles for the new network – what the centres should do, the criteria for choosing their areas of work, how they should be run and the process for their development.

The new plans for physical centres which would focus innovation and pre-commercial development caught the imagination of the UK's researchers and businesses. The prospectus invited views on the areas for future technology and innovation centres, and on the proposed management and governance arrangements. Over 500 overwhelmingly positive responses were received, welcoming the proposals and suggesting a wide range of areas for future investment². This input from the research and business community has been invaluable in complementing our own experts' work to define the strategy for developing the centres programme.

In early 2011 the House of Commons Science and Technology Committee conducted an enquiry into the prospects for technology and innovation centres, seeking its evidence from many quarters. The resulting report also strongly supported the initiative and the thrust of the proposals in the Technology Strategy Board's prospectus, and made some practical recommendations about how the programme should be taken forward which have made a valuable contribution to the development of our plans.

As the programme develops, the continued involvement of research institutions, business, government and other partners will be vital, both in establishing the centres and in working with them, to ensure that this major addition to the innovation infrastructure of the UK will achieve its purpose.

To find out how to contribute to the development of the technology and innovation centres programme, see *Getting involved* on page 21.

¹ Technology and innovation centres; a prospectus, Technology Strategy Board January 2011, www.innovateuk.org

² A summary of these responses will be available on our website at www.innovateuk.org

The strategic plan

The investment of over £200m over the four years from 2011 to 2015 will enable the establishment of six centres in key areas.

Working with business, we have developed a strategy for the creation of the new network.



Enhancing the innovation landscape

The new centres will be an important new element in the UK's innovation infrastructure and it is vital that they complement and enhance the existing structures and resources.

We will ensure that they reach out to and work effectively with existing publicly funded bodies such as the research councils, universities and national measurement institutes, and with independent research and technology organisations. The centres will work closely with the other elements of the Technology Strategy Board's innovation investment programme, as well as with EU research and innovation support.

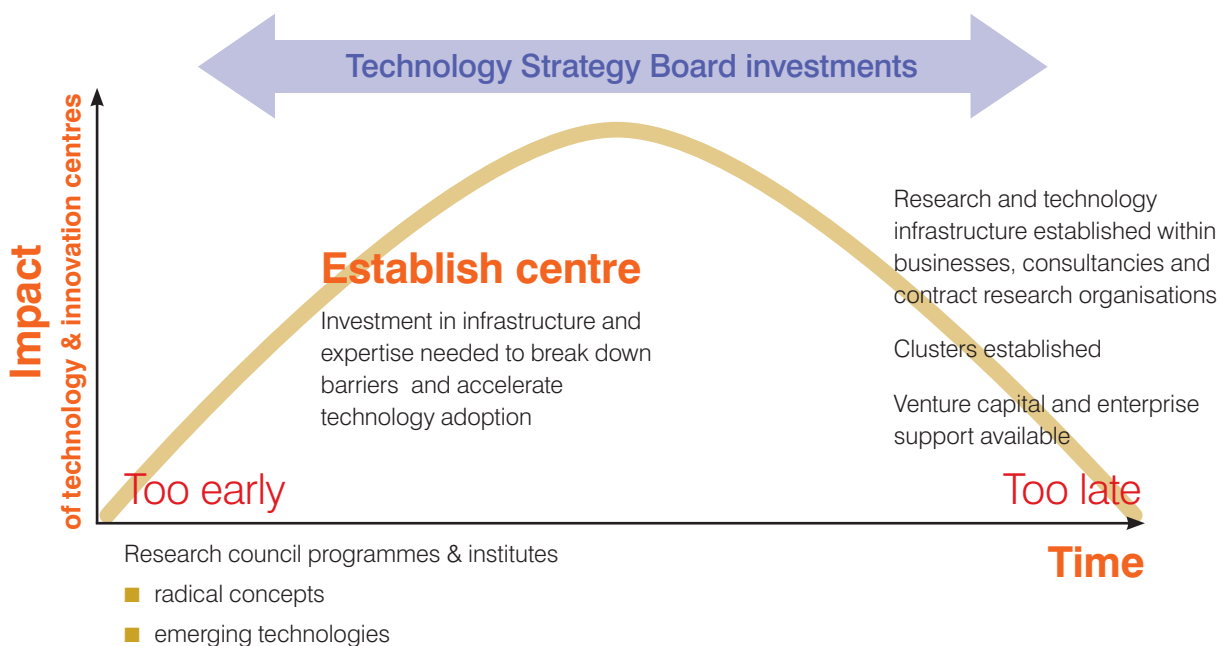
Across the UK there are many examples of different geographical groupings and physical clusters of companies and research bodies which have an important role to play in innovation. As we examine where and in what technology areas to establish a centre, we need to make choices that will have the most potential economic impact and be of most benefit to high-growth innovative businesses.

The new centres will occupy a distinctive territory. While there may be small clusters of businesses with bright ideas in a particular area, it may be too early in terms of technological development to establish a centre in that area. Equally, to justify a technology and innovation centre, a sector or technology area even if well developed must still demonstrate the potential for substantial growth – and for a physical centre to make a powerful difference to the pace of innovation.

To have the right impact centres must be timely – working in the space between research and the stage where the technology is part of specific business plans and, for example, venture capital is available. They must work in the space between concept and commercialisation.

Technologies evolve through different phases and need different approaches to speed them along – from connecting communities around embryonic ideas, through to demonstrator projects to encourage wider take-up. There are often very high barriers to the adoption of a technology; for example the need for long-term investment in capital facilities and technical expertise may be well beyond the funding ability and appetite for risk of businesses, especially SMEs. In such cases, and at the right time, a technology and innovation centre will provide a powerful resource to help businesses develop new products and services based on the innovative technologies made available by the centres.

Timeliness and impact



These centres form one part of the Technology Strategy Board's varied programme of long-term support for innovation in the UK. They will feature in the work of relevant **innovation platforms**, which focus on helping business to address major challenges through innovation, and work closely with the **Knowledge Transfer Networks**. They will complement and work with existing research and development programmes, **SBRI** (the Small Business Research Initiative), demonstrator projects and **Knowledge Transfer Partnerships** which generate business and academic collaborations.

As a long-term component of the UK innovation infrastructure, the new centres will need to evolve into complementary areas as the technologies mature and the needs of business customers shift.

Criteria for establishing centres

An essential part of the strategy to establish the new network is the adoption of the right criteria for assessing and prioritising options for the focus of future technology and innovation centres.

We have adopted five specific criteria to guide these decisions:

- Are the potential global markets which could be accessed through the centre predicted to be worth billions of pounds per annum?
- Does the UK have world-leading research capability in the area?
- Does UK business have the ability to exploit the technology and make use of increased investment to capture a significant share of the value chain and embed the activity in the UK?
- Can a proposed centre in this area enable the UK to attract and anchor the knowledge-intensive activities of globally mobile companies and secure sustainable wealth creation for the UK?
- Is a proposed centre closely aligned with, and essential to achieve, national strategic priorities?

These criteria form the assessment framework for the many possible focus areas for these centres. Using our own expertise and in consultation with business and research communities, we examine what difference the establishment of a centre in an area would be expected to make, including whether alternative methods of support would deliver results more effectively, and whether it is timely to set one up. We also look at whether there is a UK business community ready now to benefit from the work of a centre.

We will only invest in a technology and innovation centre when the area is ripe for such an investment and when this is the most effective mechanism.

The *Implementing the plan* section of this document outlines the initial priority list of potential candidate areas for technology and innovation centres, following our assessment.

Technology and innovation centres are just one element of our long-term support for innovation across many critical areas in the UK. Areas where centres are not the appropriate or timely solution may still be a key target for innovation support through other programmes and mechanisms.

For more information on the Technology Strategy Board's wider approach to innovation please see the 2011-2015 strategic plan, **Concept to Commercialisation**, at www.innovateuk.org

Funding, operation and management

The prospectus for technology and innovation centres set out specific proposals for their operation and management. The comments received endorsed the proposed model and so our strategy will adopt these main features.

Roles

A technology and innovation centre will provide a dynamic environment in which multi-disciplinary teams from a diverse range of backgrounds can work together.

The role of a centre will be to:

- enhance businesses access to leading-edge technology and expertise
- reach into the research base for world-leading science and engineering
- undertake collaborative applied research projects with business
- undertake contract research for business
- be strongly business-focused with a highly professional delivery ethos
- create a critical mass of activity between business and research institutions
- provide skills development at all levels.

Structure

Each centre must be nationally inclusive and create strong links to existing expertise and capital assets. A centre will ideally be based on one location, building a unique capability in a single physical facility to maintain focus and critical mass. However, in some circumstances a multi-site centre may be appropriate – for example where there is a clear rationale for this in providing links to research capability or to customers.

Funding and operation

Centres will gain their funds from a mix of core Technology Strategy Board investment, and competitively won business and public sector funding. The typical funding model, which may vary through the life of the centre, can be expressed in simplified terms one-third, one-third, one-third. This means that when fully established the centres would generate their funding roughly equally from three sources:

- business-funded R&D contracts, won competitively
- collaborative applied R&D projects, funded jointly by the public and private sectors, also won competitively
- core public funding for long-term investment in infrastructure, expertise and skills development.

Core funding for each centre is expected to be at least £5m to £10m a year – corresponding to an annual turnover of around £20m-30m. Each centre, once established, will need to attract around £10m to £15m per annum from business to be viable. Centres may need substantial capital investment or equipment in order to provide access for business to the best technical expertise, infrastructure and skills that would otherwise be outside the reach of individual companies. They will need to be run with a commercial mindset but with any surplus being reinvested into the centre itself.

The Technology Strategy Board will provide each centre with core funding under an agreement with the organisation or body running the centre. The agreement will:

- provide sustainable long-term funding generally for a minimum of five years, with an expectation of continuing for at least 10 years, subject to continuing satisfactory performance and the future funding environment. This will need to be complemented by long-term business support
- define the governance arrangements, remit and bounds for the centre
- specify quarterly reporting requirements against agreed metrics and performance measures and an annual performance review
- specify aspects such as financial liabilities, step-in rights if appropriate, and equipment ownership

- encourage the centres to link with, and draw on the outputs of, the research base and other centres
- define the membership agreement for the network of centres covering branding, networking communications, publicity, environmental sustainability and other common aspects
- outline the principles for intellectual property management
- require annual plans to be submitted and approved.

More detailed information on all these topics will be made available to those organisations involved in establishing centres in particular areas.

Governance and management

A technology and innovation centre will be an independent entity, constituted on a 'not-for-profit' basis separately from any host organisation or other major partners. Each centre will be required to establish a business-led Governance Board, composed of business users and experts in the technology to steer the work of the centre and oversee its programme of activity.

Centres should have operational autonomy within their agreed parameters and objectives, allowing them to adapt to the changing needs of their customers and the business base. Individual centres will be responsible for business planning and delivery of their objectives within the core framework. They will also be responsible for assets and liabilities, ownership and management of facilities, equipment and intellectual property.

The performance, culture and feel of any organisation inevitably comes down to a few key individuals, such as the CEO, Chair of the Board and other senior staff, who must have the right blend of enthusiastic entrepreneurial spirit, industrial experience and knowledge of the academic base. To ensure the centres are run by highly capable, connected and competent individuals, we will work with each centre to create an appropriate framework for the appointment of these key people.

This new programme requires relatively light-touch but effective central management to ensure that the network of centres achieves its objectives. This will include identifying a range of appropriate measures to track the success of the centres over time. To ensure this the Technology Strategy Board will:

- Establish a specific directorate within the Technology Strategy Board, headed by a new Executive Director, to handle its internal management responsibilities for setting up and overseeing the technology and innovation centres.
- Establish an oversight committee to advise on the establishment and running of the network. The committee will act in an advisory capacity to both the Technology Strategy Board and the technology and innovation centres. Its main responsibilities will be:
 - to advise the Technology Strategy Board on the strategic direction for the centres and the establishment and operation of the network
 - to ensure robust links between the centres and the wider innovation system
 - to advise on future investment decisions and continuity of funding
 - to work with the Technology Strategy Board on the appropriate success measures
 - to review progress being made, including reviewing the business and operational plans and performance of individual centres and reporting on the performance of the network as a whole
 - to champion the brand.

The oversight committee will consist of individuals with senior level experience from across industry, the research base including the research councils, the Department for Business, Innovation and Skills, and the Technology Strategy Board. It will collect additional input from other government departments, UK Trade & Investment and learned bodies. It should be chaired by a senior industrialist.

We propose to invite members on a personal basis, rather than representing corporate interests, and despite the broad range of interests to be represented would target no more than 6-8 members. Further announcements will be made shortly.

Brand and identity

Overall, the identity of the technology and innovation centres must be synonymous with excellence.

The new network will have a clear and strong corporate identity which will support this reputation and contribute to the positive role they are expected to play in future UK economic growth. Although operating in different areas the centres share a common vision; it will be important for each centre to present itself as part of this powerful network for innovation.

Developing an identity which will achieve this over time requires expert work on the title of the network, how it reflects the values and aspirations, how the naming will work in practice, and how it will be visually represented. Views from the community are being taken into account in this development work, which is currently under way and will be completed in the summer of 2011.

Intellectual property

Each centre will have a professional, planned approach to the management of intellectual property rights. The detailed approach will vary for each technology area and sector but it must encourage collaborative working. The arrangements should be flexible enough to be tailored to the different circumstances of partners and business users, large and small, and need to protect existing intellectual property contributed to projects by both the centre and its customers.

Centres will need to adopt a transparent and open model to draw in underpinning intellectual property from research, and ensure that new intellectual property created within projects can be protected and exploited successfully to the benefit of the centre, its customers or both depending on the circumstances.

The Technology Strategy Board will not, in general, seek to take ownership of intellectual property created in centres.

Implementing the plan

We have confirmed and announced three areas in which centres will be established, and identified 10 further areas which have the strongest potential for future centres.

We will be discussing these with the business and research communities in the coming months and will bring forward proposals for a further three centres in the light of this input.



The process of establishing the network of technology and innovation centres began in early 2011. To implement the strategy we have developed a process which consists of five key stages:

- we screen technology areas which may have potential for a centre, using the technology and innovation centre criteria to identify the strongest candidates
- we hold in-depth discussions with the business and academic community to assess the case for a centre in that area
- we run a two-stage process to select the parties to run the centre and identify key partners
- we develop the strategic framework and business plan for the specific centre in conjunction with selected hosts
- we then open the centre for business.

Initial areas for technology and innovation centres

High value manufacturing

The first confirmed technology and innovation centre is in high value manufacturing. Seven partners, with expertise in different areas of this field, will work together to form the new centre. The partners are the Advanced Forming Research Centre (based in University of Strathclyde), the Advanced Manufacturing Research Centre (based in the University of Sheffield), the Centre for Process Innovation (located in Wilton and Sedgefield), the Manufacturing Technology Centre (sponsored by the universities of Birmingham, Loughborough and Nottingham, and TWI Ltd), the National Composites Centre (based in the University of Bristol), the Nuclear Advanced Manufacturing Research Centre (sponsored by the universities of Manchester and Sheffield) and the Warwick Manufacturing Group (based in the University of Warwick). These operations will bring together a considerable asset base of leading edge equipment and highly skilled personnel.

The new centre will provide integrated capability and embrace all forms of manufacture using metals and composites, in addition to process manufacturing technologies and bio-processing. It will draw on excellent university research to accelerate the commercialisation of new and emerging manufacturing technologies with new and existing portfolios of partner companies.

During the initial phase to October 2011, the partners will work to:

- develop a strategic framework of markets, industries and technologies which will guide the direction of the centre. This work will be conducted in conjunction with the Institute for Manufacturing, University of Cambridge
- establish the company limited by guarantee which will operate the centre and the legal framework within which the individual partners will operate
- put in place the supporting legal agreements
- start recruitment of key personnel
- agree a business plan and establish the grant funding mechanism.

The centre in high value manufacturing is expected to be operating by October 2011.

Cell therapy

The second technology and innovation centre to be established will focus on cell therapies and advanced therapeutics. It will help support the development and commercialisation of these medicinal products as well as the underpinning technologies that address the challenges of manufacturing, quality control, safety and efficacy of these products.

Cell therapies can be described as the use of living cells as, or incorporated into, a medicinal product. These therapies can have numerous uses, such as:

- enabling regeneration of cells tissues or organs (regenerative medicine)
- using cells as delivery mechanisms for therapies (eg, gene therapy)
- modulating the immune system to approaches to treat infections and cancers.

Cell therapies have already provided significant medical advances in areas such as skin regeneration for burns patients and wound repair and cancer treatment vaccines for prostate cancer. Such treatments have the potential to go much further, with next-generation products offering cures or treatments with long-term benefits.

The number of UK companies developing cell therapies has been growing, and the UK is a world leader in this area with a strong academic science base and a supportive clinical and regulatory environment. Good progress has been made in recent years including over £200m in public investment in basic and translational stem cell science since 2003, and the launch of the Technology Strategy Board's regenerative medicine programme in 2009.

The company landscape is dominated by small and medium-sized enterprises and they face the challenges inherent in working with emerging technologies, including technological, regulatory and strategic uncertainties. Developing cell therapies requires interdisciplinary approaches covering several areas including developmental and stem cell biology, gene therapy, cellular therapeutics, nanoscience, biomaterials, bioengineering and chemical biology as well as working with clinicians delivering treatments to patients. For companies, access to enabling infrastructure and expertise that address their challenges will play a significant role in speeding up development and accelerating routes to market.

The cell therapy technology and innovation centre is expected to be a single, autonomous entity, nationally inclusive and independent of higher education institutions. The process to select a body or organisation to lead this centre began in May 2011. Further information can be found on the Technology Strategy Board website at www.innovateuk.org

Offshore renewable energy

The third centre will be in the area of offshore renewable energy.

Renewable energy generation and supply is now a major component of global energy and economic policies. The UK has abundant resources of wind, wave and tides and is focusing on offshore renewables as a major part of its future energy mix.

The UK also has world-leading expertise in offshore engineering and understanding of our seabed and marine environment. This has given us a worldwide reputation in offshore facilities and makes the UK an excellent base for offshore research.

The technology and innovation centre in offshore renewable energy will therefore focus on technologies for offshore wind, wave and tidal power.

Innovation has the potential to make a particularly rapid impact in offshore wind, and the centre is likely to cover the range of technologies involved in offshore wind power development – not only by transferring knowledge from the established offshore engineering industry but also in the development of turbines and blades, where links can be made with the UK's lead in aerospace and control systems. The UK is in a strong position to take advantage of inward investment opportunities and establish a UK supply chain for offshore wind.

Marine power – wave and tidal – is a less mature field but will also be a key focus of the centre, using as it does many of the same offshore engineering capabilities. Over time, the expertise of the centre could also be applied to other areas of offshore energy technology as they develop.

We will be seeking expressions of interest in participating in this centre in the summer of 2011.

Other candidate areas

A key stage in the development of the technology and innovation centres programme has been identifying the areas which are priority candidates for the establishment of a centre – those where there is most potential for a centre to have a catalytic effect in stimulating future economic growth.

The analysis that we have undertaken has drawn extensively on the responses to the prospectus published in January 2011, and has indicated that there are a number of such promising areas, beyond the initial three where the decision to establish a centre has already been taken. However, more work is needed with the business and academic communities to assess the contribution that potential centres in these areas might make and exactly what their focus might be.

The further priority areas that we are exploring as potential candidates for a centre, are:

- complex systems
- digital media/creative industries
- future cities
- future internet systems
- photonics
- resource efficiency
- sensor systems
- smart grids and distribution
- space
- transport systems and integration.

All these areas have high potential for UK innovation and growth, but our task is to identify those where a technology and innovation centre is the right solution at the right time.

The funding and resources for the centres programme are finite, enabling the establishment of six centres in total in this first phase. So it is from these priority areas that we will take forward proposals for a further three centres, after discussion with the relevant business and research communities.

Technology areas not covered within these 10 priorities will still be the subject of continued dialogue and, where relevant, a range of options will be considered as part of our ongoing programme of work to support business-led technology innovation in areas which present the greatest opportunity for future growth. However, these 10 areas remain our focus for technology and innovation centres in the short term.

The following pages outline the rationale for selecting each of the 10 immediate priority areas.

Complex systems

A complex systems technology and innovation centre could focus on developing theoretically well-founded yet practical approaches to the engineering of reliable, secure and trustworthy complex systems on which modern society relies. Such systems include elements of global financial markets, large parts of critical national infrastructure and the internet. Current approaches to software engineering do not scale to the complexity we see in software-intensive systems and cannot take into account their emergent properties and the behaviour of users.

The centre could help UK software businesses and those which rely on software performance to capitalise on the latest approaches, tools, languages and training, based critically on learning at an industry level and to adopt emerging leaps in practice at an early stage.

The 10 candidate areas:

- complex systems
- digital media/creative industries
- future cities
- future internet systems
- photonics
- resource efficiency
- sensor systems
- smart grids and distribution
- space
- transport systems and integration.

Digital media/creative industries

A centre in this area could focus on the new media and new technologies which will ensure that the UK's historical strength in creative and media industries continues in new global markets. Its aim could be to enable the UK to take an inter-disciplinary lead on the development of new multi-platform technologies, build new skills in entrepreneurialism, in intellectual property husbandry and in digital creative design. It could also address the relevant legal, intellectual property and regulatory factors in order to anchor important parts of the new value chain in the UK. It could address the development and monetisation of digital services, such as those based on media content, advertising and social media, and the data derived from the use of such services.

It could help UK businesses in the creative and media sectors to become earlier adopters of digital technologies and be among the first to grapple with and lucratively resolve the innovation, implementation and scale issues that arise. The centre would also aim to propagate this learning across a broad range of other sectors such as transport, energy and healthcare and in the process create new value chains.

Future cities

Future cities is an area which is generating significant global interest, but to date there has been little in the way of R&D and innovation which has taken a practical approach to solving some very complex issues. A future cities technology and innovation centre could work on integrated solutions to enable cities to continue to be the engines of future sustainable growth. It could cover a wide range of technologies including energy generation and supply, construction, food supply, transport, healthcare, water and waste, digital services, financial services and manufacturing.

A centre in this area could help bring communities together, breaking down some of the barriers between the different areas of expertise, creating linkages between different supply chains, and creating a shared vision of the commercial opportunities and the benefits of integrating city systems. There are opportunities to build on and integrate elements of the programmes we have already supported and to develop further activities to create a lead for the UK in this area.

Future internet systems

A centre in this area could focus on the continued evolution of the internet into a key engine of our future economy and society, including its extension into a world of connected objects, and the management and harnessing of the ever increasing volumes of data. It would enable new, richer and potentially disruptive services which will become widely embedded across the way we do business, live, and interact.

It could help UK businesses benefit from developing, exporting and adopting a diverse range of internet technologies, including new network components and infrastructure, disruptive, low-cost, low-power sensors, data transport, storage, security, search and discovery techniques and the generation of knowledge from diverse data sources and the integration and management of complex, interconnected systems. It could also help businesses create new business value chains for data-rich services, and service delivery, including those based on public services and using public data.

Photonics

A potential centre would be expected to focus on key enabling photonics technologies that underpin a wide range of application areas including IT, telecommunications, defence, automotive, energy, life sciences, industrial and consumer. The centre's activity could include materials, devices, packaging, lighting, lasers, optics, imaging, solar energy, measurement, biophotonics and displays.

It could provide access for UK businesses to world class photonics technical expertise, infrastructure, skills, and equipment that individual companies, particularly SMEs, could not afford. It could also act as a hub for the photonics industry, and help UK businesses, whether working directly in the photonics industry or not, to work together to create new photonics-based solutions quickly and efficiently.

Resource efficiency

A centre in this field would need to be focused on a specified area within the very wide range of possibilities under the resource efficiency heading. One possibility would be focusing on at risk strategic materials; such as the rare earth and platinum group metals that are essential to high tech industry. Other potential areas of focus could include; design and manufacture for minimum resource requirements, reuse and recycling, and new disassembly, recycling and concentration techniques for dispersed, low concentration waste containing valuable materials.

The first phase of development of the concept of a resource efficiency centre would be to work with stakeholders to define the area(s) of focus that would be of greatest benefit to the UK economy.

Sensor systems

A sensor systems technology and innovation centre could cover four aspects: materials, devices, control systems for various sensor types, and sensor networks. It would build on the large investment in the area by the Engineering and Physical Sciences Research Council and contribute to addressing a number of the Technology Strategy Board's challenge areas – including healthcare, detection and identification of infectious agents and energy – and complementing existing innovation platforms. It could act as a hub for the sensors industry and also help UK businesses in a wide range of sectors – whether working directly in the sensors industry or not – to access technical expertise, infrastructure, skills, and equipment which would otherwise be out of their reach. It could help UK businesses and the research base work together to create new sensor-based solutions quickly and efficiently.

From these 10 priority candidate areas we will take forward proposals for a further three centres, after discussion with the relevant business and research communities. Join the discussions on **_connect**

Smart grids and distribution

A centre in this area could provide a focus for integrating UK research, development and demonstration in the area of energy generation, distribution and demand (including integration of electric vehicles and heat pumps etc). It would seek to take advantage of major new opportunities for distributed energy generation and end-user demand management. It would potentially cover digital technologies, information management, grid control, effective transmission and energy storage solutions, and the relevant underpinning technologies such as sensors.

It could help UK business in both the supply and energy using sectors to produce new 'smart grid' solutions and demonstrators whilst also assisting the development of the necessary standards, legal and regulatory frameworks.

Space

A technology and innovation centre focused on space could cover a wide range of technologies used in the space industry – from the development of satellites through to the delivery of everyday services derived from space applications.

It could help UK businesses develop new spacecraft systems and payloads (such as propulsion, power sources and processors), new applications of space data (including climate data services, and applications integrating earth observation and satellite navigation). It might also provide technology demonstration opportunities to address the high costs of testing technologies and services from space.

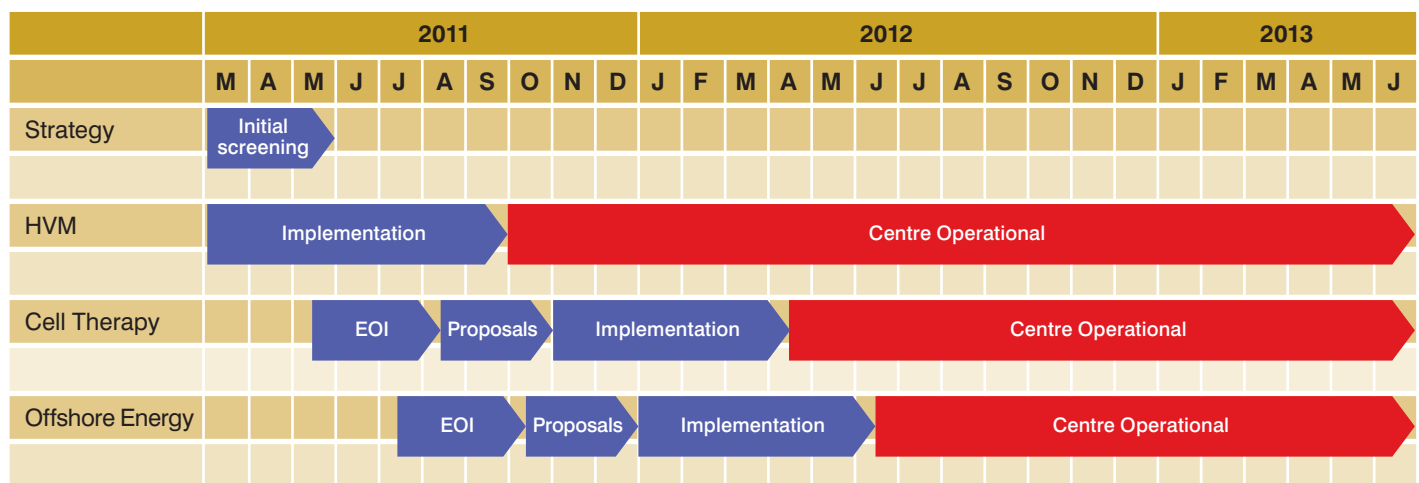
Transport systems and integration

The scope of a transport systems and integration centre would be expected to cover modeling of transport systems and vehicles/people/goods within the system, as well as the physical testing of novel approaches to integration of the transport system.

It could help UK businesses involved in all parts of the transport supply chain: infrastructure, digital service providers, equipment suppliers, content suppliers, vehicle manufactures, public bodies, freight and public transport operators, research bodies, to work together to create new solutions to moving people and goods quickly, efficiently and cheaply.

Next steps

Schedule for establishing the first three confirmed technology and innovation centres



EOI: Expressions of interest HVM: High Value Manufacturing

A more detailed implementation plan for the next three centres in this phase will be developed once the areas have been confirmed. We intend all to be fully operational by 2013.

Getting involved

There is huge potential in this new network of sector-focused technology and innovation centres. But to achieve this potential will need the wide participation of business, research and academia – who themselves will both deliver and benefit from the advances that the centres will achieve.

The Technology Strategy Board will be continue to engage with the relevant business and academic communities to explore in more detail what a technology and innovation centre could achieve in each area, and the extent of business commitment and engagement to working with and funding specific centres.

To join in these discussions please visit the Technology Strategy Board website at www.innovateuk.org and the **_connect** collaboration and networking platform at <https://ktn.innovateuk.org>

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