



Together transforming
research into innovation

The Technology Strategy Board, since its establishment as a standalone organisation in 2007, has been working in close partnership with the Research Councils. To meet the challenges ahead, the UK needs to translate excellent research into innovative products and services. To this end the Research Councils agreed to invest at least £120m in complementary activities with the Technology Strategy Board, between April 2008 and March 2011. This review outlines how our partnership is working, and the resulting benefits for research and business.

Working in partnership

The UK has a world-leading research base generating the knowledge that will help create future products and services. The UK also has many innovative businesses with the capability to exploit that knowledge.

The aim of our collaboration is to see increased economic benefit for the UK, by helping to accelerate the translation of research excellence into new and improved products and services. Together we create opportunities to maximise the economic impact of the research base and ensure that UK businesses are at the forefront of the global marketplace.

We have already jointly invested more than £200m in collaborative programmes. Our ultimate aim is to see increased economic benefit for the UK.

A strong and vibrant research base is essential as a source of innovation and to provide the underpinning capabilities that UK businesses require to remain competitive in a global market.

Iain Gray, Chief Executive, Technology Strategy Board

Moving forward, with increasing pressures on public spending, we will continue to strengthen the links with the Technology Strategy Board to maximise the benefits of the investments that we make in research.

Alan Thorpe, Chairman, RCUK Executive group

How we work together

Our collaboration takes many different forms. The Technology Strategy Board and one or more of the Research Councils might together fund a joint activity; we might fund distinct but complementary activities that have the same overall objectives; or our collaboration might be strategic – for example, influencing each other's strategy or sharing best practice.

Ways in which we collaborate include:

- establishing collaborative research programmes
- encouraging the sharing of knowledge between the research base and industry – through people, networks, seminars and other events
- developing UK expertise and capacity in innovation research
- supporting rapid commercialisation of emerging technologies
- promoting business access to UK research facilities.

Our achievements so far

Between April 2008 and February 2010 we jointly committed more than £200m in collaborative programmes, with a further £100m investment expected from business. The activities we have jointly funded so far include:

- more than 100 collaborative R&D projects
- more than 250 knowledge transfer partnerships
- two innovation and knowledge centres; two more will be announced in 2011
- the UK Innovation Research Centre and seven connected research projects and exploratory projects.

Since April 2008 the level of our collaboration has increased considerably:

- RCUK funding in activities aligned with the Technology Strategy Board strategy has more than doubled, and is expected to triple by the end of March 2011.
- Strong and effective working relationships have been established between the Technology Strategy Board and all seven of the Research Councils.
- We have initiated many new partnerships between industry, academia and government organisations.
- We have made significant progress in developing joint activities in areas that address challenges in society.
- We have developed innovative approaches to working with high-value sectors of the UK economy, such as creative industries and financial services.

The rest of this report looks at some case studies of our collaboration so far.

Joint action in practice

We collaborate in various ways across a range of priority areas. The following case studies show how, together, we are making a difference.

Developing new strategic priorities

RCUK is playing an increasingly important role in helping the Technology Strategy Board develop strategies in new areas, and the Technology Strategy Board is working with RCUK to help ensure that their strategies are better informed by industry's needs and challenges.

Tackling today's challenges

As a result of our increased collaboration we are funding more activities that meet particular challenges in society.

Two or more Research Councils now work with the Technology Strategy Board on each innovation platform. These platforms target specific societal challenges where the UK Government is taking action to tackle the problem.

A robust case for joint investment

The Technology Strategy Board is running a major programme in regenerative medicine, in partnership with the Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC) and the Medical Research Council (MRC).

Regenerative medicine has already provided significant medical advances such as skin regeneration for burns patients, and it has the potential to go much further.

The Technology Strategy Board is investing £18m in the programme, and the three Research Councils are together providing an additional £3.5m.

So far the programme has funded commercial feasibility projects to explore the viability of developing therapeutic candidates (that can replace or regenerate human cells, tissues or organs) into regenerative medicine products.

£2.1m is also being invested in three major collaborative R&D projects to explore the



regenerative medicine value chain, and to develop business models that will enable businesses to best capture that value. The Economic and Social Research Council (ESRC) and the Scottish Government are contributing £148k and £195k respectively to this area.

In March 2010 two more competitions were launched – 'Developing therapeutics' and 'Tools and technologies' – with total investment of around £6m. These will feed into longer-term product development competitions planned for 2011.

The regenerative medicine programme will help UK businesses benefit from our strong science base

Food security: a global issue



The Sustainable Agriculture and Food Innovation Platform is a major initiative by the Technology Strategy Board, BBSRC and the Department for the Environment, Food and Rural Affairs (Defra) to stimulate the development of new technologies that will increase food productivity, while decreasing the environmental impact of the food and farming industries.

Over the next five years up to £75m will be invested in innovative R&D in areas such as crop productivity, sustainable livestock production, waste reduction and management, and greenhouse gas reduction.

The first competition for funding is investing £13m in collaborative R&D to develop crop protection technologies, products and services that enable sustainable agricultural production and comply with EU regulations.

We are supporting innovation to boost food production and protect the environment

Strengthening the innovation system

We are working to make connections between different sources of funding, to ensure that investment from the public sector is more efficient and that we are not duplicating our efforts or leaving gaps.

Tailoring our activities

We aim to find the best way to support innovation in each priority area. We now employ a broader, more open definition of innovation that encompasses ideas and approaches from a broad range of research disciplines and business sectors.

Low carbon vehicles



EPSRC is funding university research as part of a programme to provide joined-up support for the UK's low carbon vehicle activity – from strategic academic research, through collaborative R&D, to the production of demonstration vehicles.

The Integrated Delivery Programme (IDP) is a £250m investment programme led by the Technology Strategy Board and jointly funded by Government and business.

The EPSRC's university-based research projects are forming an important part of the IDP and it will be investing £7m

in small-scale, short-term feasibility projects exploring future technologies that might contribute to the reduction of carbon dioxide emissions from the UK vehicle market.

The feasibility projects will be incorporated into the IDP portfolio, and successful projects will have an opportunity to secure follow-on funding through IDP competitions for collaborative R&D.

The IDP is showing academia and industry that the UK Government is a serious provider of funding all the way through the R&D process. The technical director of Ricardo, which is represented on the IDP's advisory panel alongside other key players in the automotive sector, says the IDP is a 'major leap forward'.

We are providing a chain of support, from academic research through to demonstration vehicles

Shorter projects for the creative industries

Micro enterprises and SMEs are significant innovators in the creative industries; however, they face challenges in finding the time and resources to explore and develop new ideas. Recognising this, the Technology Strategy Board introduced funding for fast-track projects and feasibility studies in this sector.

Fast-track projects and feasibility studies are small, short awards with a light-touch application and assessment process.

RCUK, especially the Arts and Humanities Research Council (AHRC), worked closely with the



Technology Strategy Board to shape these activities, drawing on their experience of developing innovative knowledge transfer models.

We look for the most appropriate ways to support innovation

Investigating next-generation sensory theatres

A feasibility project funded by the Technology Strategy Board and AHRC has led to the development of a sensory theatre for children with special needs.

BigDog Interactive Ltd, in partnership with the Illustrious Company and Nick Bryan-Kinns from the Interaction Media and Communication group at Queen Mary, University of London, secured £20k funding for their project.

The project enabled the partners to develop and install a sensory theatre at the Three Ways School in Bath. BigDog Interactive intends to continue the project with the school and to investigate whether online distribution might lead to a new business model so that this type of sensory theatre can be provided to special needs schools at no cost.



BigDog

Sharing expertise

An important part of our work together involves sharing expertise and good practice. This has helped us to develop new types of collaborative activities that enable industry and academia to initiate

new links and strengthen ongoing relationships, catalysing innovation within the business community.

Supporting emerging technologies

By focusing on emerging technologies we can speed up their commercial exploitation and help turn them into the growth sectors of tomorrow for UK business.

Sandpits: a new way to encourage innovation



The Technology Strategy Board has added 'sandpits' to the range of activities it employs.

The sandpit brings together a diverse group of individuals with a mix of skills to explore innovative solutions to real-world problems. People are taken away from everyday distractions, and any preconceptions are challenged. The desired outcome is ambitious, innovative research without boundaries, and the development of new and sustainable relationships between participants.

Ensuring privacy and consent

Working with EPSRC and ESRC, the Technology Strategy Board used a sandpit within the Network Security Innovation Platform to explore ensuring privacy and consent in identity management infrastructures.

The sandpit was first developed by EPSRC

The sandpit uncovered truly innovative solutions which resulted in three projects receiving a total of £5.5m.

- **Encore** – aims to provide more rigorous ways for individuals to give and revoke consent for the use of personal data.
- **VOME** – is exploring end users' ideas about privacy and consent, to gain a clearer understanding of the hardware and software needed to meet their expectations.
- **Privacy value networks (pvnets)** – will generate a detailed understanding of individuals' and organisations' conceptions of privacy and identity in different contexts and timeframes.

A new innovation centre: fighting cyber crime

EPSRC and the Technology Strategy Board are co-funding the Centre for Secure Information Technologies (CSIT), which promotes innovation in the emerging field of secure IT.

Innovation and knowledge centres are centres of excellence with five years' funding to accelerate and promote the business opportunities of an emerging field of research and technology. The key feature is a shared space and entrepreneurial environment in which researchers, potential customers and skilled professionals can work side by side. These centres are supported by EPSRC, BBSRC and the Technology Strategy Board.

CSIT will pioneer the concept of 'converged security' – the use of IT systems to improve people's physical security while protecting the systems themselves to ensure they can't be hacked.

Innovation and knowledge centres give dedicated teams the resources to explore and promote emerging technologies

Promoting knowledge sharing

The sharing and translation of knowledge is vital if UK business is to draw effectively on the excellence of the research base. We have jointly developed new ways to maximise the exchange of ideas, know-how and people. As we move forward we will look to create greater links between the different types of activities.

Knowledge transfer networks (KTNs) are run by the Technology Strategy Board and draw members from across industry, academia and Government. They put companies and innovators in contact with the knowledge and funding they need to bring new products and processes to market.

Supporting the Financial Services KTN

The Research Councils collaborated closely in the development of the Financial Services KTN. Investment from the Technology Strategy Board, ESRC and the Natural Environment Research Council (NERC) will total almost £3m over three years.

The KTN will help businesses to innovate in the financial services sector by providing them with networking and partnering opportunities and up-to-date information about markets and technologies.

The ESRC research community will provide expertise in areas such as understanding behaviours in the sector, and consumers' needs. Science from NERC in the area of environmental risk management will be relevant to the reinsurance industry.

RCUK supports KTN special interest groups

RCUK has initiated several new KTN special interest groups and is involved with many others.

The Science and Technology Facilities Council (STFC), NERC and BBSRC support the Research Instrumentation Special Interest Group within the Sensors and Instrumentation KTN.

The market for instruments is substantial and the group aims to help UK firms capture a larger share.

It has around 3,500 individual members, some 80% of whom are from industry. Since its establishment, it has leveraged around £70m in innovation-related funding for an outlay of £0.75m.

KTNs manage research and technology clubs

Three BBSRC-led research and technology clubs are managed through the KTN network. These clubs establish a stream of funding to support academic research and encourage closer links between academia and industry.

The Bioprocessing Research Industry Club (BRIC) is a research and technology club managed by the HealthTech and Medicines KTN.

BRIC addresses the challenges for industry of manufacturing complex biopharmaceuticals. Because innovative research in bioprocessing can involve substantial multidisciplinary work, BRIC brings together the skills from different scientists and institutions to better meet the needs of business.

In one project supported by BRIC, scientists at University College London are developing new microfluidic tools to rapidly analyse the stability and integrity of proteins in bioprocesses. This research has already led to two patent applications for analytical devices.

Avecia Biologics, an industry member of BRIC, says the club has delivered successfully in three areas: 'It has funded pre-competitive research in universities relevant to the firm's interests, it has attracted new blood in the academic community to work on

bioprocessing related research, and it has helped develop a dynamic, multidisciplinary network.'

Allocating Industrial CASE awards through the KTNs

RCUK funds knowledge sharing through collaborative training schemes such as Industrial CASE. This scheme funds PhD studentships on projects between industrial and academic partners.

KTNs add value by widening the network of companies, particularly SMEs, that can benefit from Industrial CASE projects.

EPSRC has funded a project, through the Chemistry Innovation KTN, between NiTech Solutions Ltd and Heriot-Watt University.

The project aims to test if NiTech's innovative process for manufacturing pharmaceuticals is robust and minimises cross-contamination. Production costs are expected to be lower and the environmental impact reduced compared with traditional mixing methods.

'The ICASE award provides a very good vehicle to solve real industrial problems,' said Prof Xiong-Wei Ni, NiTech's technical director. 'The involvement of the Chemistry Innovation KTN has added value to the project both in terms of networks and also the range of meetings and presentations to which students are invited.'

Looking ahead

Since the Technology Strategy Board was established in July 2007 there has been a major change in its partnership with RCUK.

Many of our collaborative activities are still at an early stage and have not yet begun to deliver in terms of hard economic measures. However, feedback from the partnerships and relationships that have been built between academia and business are clear indicators of the value of our collaboration and of future success.

Through our collaboration to date we have:

- unlocked opportunities for wealth creation by linking businesses with the research base
- promoted new and ongoing collaborations between business and academia
- attracted new business sectors and academic communities to work on innovation challenges
- developed innovation capability in the UK.

RCUK has exceeded the £120m target set by the Government to invest in activities that align with the Technology Strategy Board's priorities. Our relationship, however, goes beyond the need to meet a monetary target, and we have developed strong relationships and joint working, and initiated a diverse and innovative range of new collaborative activities. We now have a closer relationship on which to build and deliver collaboration in the future, for the benefit of business and economic growth.

Our future collaboration will centre on strategic joint priorities, building on academic strength and excellence in areas where UK business is, or has the potential to be, world leading. These joint priorities will reflect mutual priorities relating to major opportunities and challenges for the UK, and will specifically cover innovation and commercial exploitation where our agendas complement one another.

Knowledge Transfer Partnerships

Knowledge transfer partnerships (KTPs) are a UK-wide programme funded by the Technology Strategy Board and 19 other organisations including RCUK.

KTPs enable companies to obtain knowledge, technology or skills from a recently qualified expert. Companies embed the knowledge by recruiting an individual to work on a project lasting 10 to 40 weeks or one to three years. Each partnership is part-funded by the Technology Strategy Board or one of the other funding bodies, with the balance coming from the company partner.



STFC funds shorter KTPs

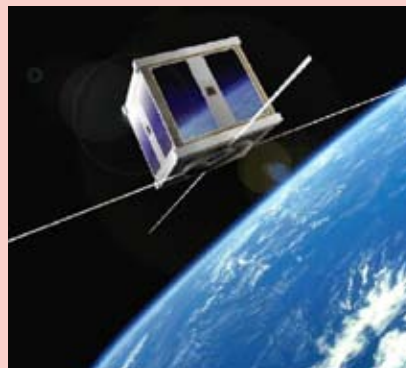
STFC is supporting a shorter KTP between the Energy Efficiency Company (EEC) and Lancaster University's Management School and Environment Centre. Shorter KTPs are appropriate for independent micro organisations and SMEs that have the potential for growth.

The aim of the 40-week partnership is to develop a business plan to provide consultancy advice relating to carbon offsets, trading and verification.

Before EEC can establish the business plan it needs to understand the technical, legislative, political, economic and social considerations surrounding carbon trading, offsetting and verifying – however, the company does not have the expertise to do this. The collaboration with academics from Lancaster University will enable the company to gain the knowledge it needs.

KTPs enable companies to benefit from academic expertise

The CubeSat KTP programme



The Technology Strategy Board and STFC have worked closely on the CubeSat KTP programme, along with the CubeSat Research Network and the Sensors and Instrumentation KTN.

The programme is supporting the development of up to 12 miniature satellites over 12 months. The best projects will be launched to get space accreditation.

A CubeSat is an extremely small satellite that is supplied in a kit. CubeSats offer the potential to introduce new and disruptive technologies into the space market at a fraction of the cost of conventional satellites.

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The **Technology Strategy Board** is all about driving innovation in business.

It stimulates technology-enabled innovation in the areas which offer the greatest scope for boosting UK growth and productivity. It promotes, supports and invests in technology research, development and commercialisation for business benefit. It brings people together to solve problems or make new advances. It also advises Government on how to remove barriers to innovation and accelerate the exploitation of new technologies.

www.innovateuk.org

Research Councils UK (RCUK) is the strategic partnership of the UK's seven Research Councils. The Research Councils jointly invest annually around £3bn in research. Their focus is on excellence with impact and nurturing the highest quality research, as judged by international peer review, providing the UK with a competitive advantage.

The seven UK Research Councils are:

- Arts and Humanities Research Council (AHRC)
- Biotechnology and Biological Sciences Research Council (BBSRC)
- Economic and Social Research Council (ESRC)
- Engineering and Physical Sciences Research Council (EPSRC)
- Medical Research Council (MRC)
- Natural Environment Research Council (NERC)
- Science and Technology Facilities Council (STFC).



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