

R&D IN THE UK

THE WORLD'S CENTRE OF EXCELLENCE



Hit the world running^{UK}

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UK companies, including many of the world's major corporations, enjoy access to world-class science and academia and link into a wide network of smaller enterprises, many of which are also world leaders in their fields. A unique multicultural and entrepreneurial economy, the UK is at the hub of international business, bringing the world to a company's door and helping them to plug directly into the heart of global finance, global creative and professional services, global media and global talent. In short, it is the gateway to the world. You too can be at the heart of this global crossroads. Start by talking to UK Trade & Investment.

UK Trade & Investment is the Government organisation that helps UK-based companies succeed in the global economy. Our range of expert services are tailored to maximizing the international success of individual businesses.

UK Trade & Investment also helps overseas companies bring high quality foreign direct investment, including R&D, to the UK's vibrant economy – acknowledged as Europe's best place from which to succeed in global business.

We provide companies with knowledge, support and advice at all stages of their business decision-making.

UK Trade & Investment offers expertise and contacts through a network of international practitioners throughout the UK and in British Embassies and other diplomatic offices around the world.

For further information please visit www.uktradeinvest.gov.uk or telephone +44 (0)20 7215 8000.

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The world's centre of excellence

The UK is a scientific powerhouse whose technological leadership and innovative thinking have been successfully leveraged by a Government committed to raising investment in innovation to create one of the most effective and dynamic environments for R&D in the world

A long-established and exceptionally strong science base puts the UK in a unique position to attract and serve the world's investors in R&D. At the heart of innovation in the UK are outstanding universities, four of which are in the world's Top 10. Their expertise and engagement with industry are driving global developments and generating thousands of new inventions and patents every year.

Many of these patents are created through collaborations with leading investors in R&D, for example Boeing, Siemens, Toshiba, Rolls-Royce, Nokia, Syngenta, Ford, O2, AstraZeneca, GlaxoSmithKline and Unilever, as well as high-tech SMEs from around the world. A significant number also originate from university spin-out companies, which are a dynamic element of the UK's innovation culture responsible for turnover of £500 million per annum. These spin-outs, such as the globally successful Solexa and Cambridge Display Technology, are also testament to the real-world focus of UK research and its supportive environment for enterprise.

Leading the world

The scientific reputation of the UK has traditionally been symbolised by its 70 Nobel Prize winners and extraordinary track record of scientific discovery – extending from the steam engine to the electrical generator and the molecular structure of DNA to the mapping of the human genome. Today, it is also exhibited in exciting, world-leading advances like DNA fingerprinting technology that is revolutionising forensics, polymer developments that are transforming display technology and pioneering work on mobile communications, medical imaging and renewable energy technologies.

The boldest of such breakthroughs may emerge from the smallest of laboratories but there is no denying the importance

to R&D in the UK of the critical mass and connections of its technology clusters. From 'Silicon Fen', the Cambridge ICT cluster that persuaded Microsoft to set up its first research centre outside the US, to the 'Wireless Corridor' in the west of England encompassing Toshiba and Motorola to the world-leading Midlands-based 'Motorsport Valley', the UK's clusters give companies valuable opportunities to share knowledge, collaborate effectively and transfer technologies.

Investing in innovation

One of the foundation stones of this success is high priority investment in the UK's innovation infrastructure which has seen a doubling of Government funding for science in the last decade to £3.4 billion and the introduction of one of the most open and creative collaborative R&D initiatives in the world administered by the Technology Strategy Board. The Technology Strategy Board (www.innovateuk.org) plays a vital role in the UK Government's objective to increase investment in R&D from 1.9 per cent to 2.5 per cent of GDP by 2014 and has already supported over 700 collaborative R&D projects worth £1 billion.

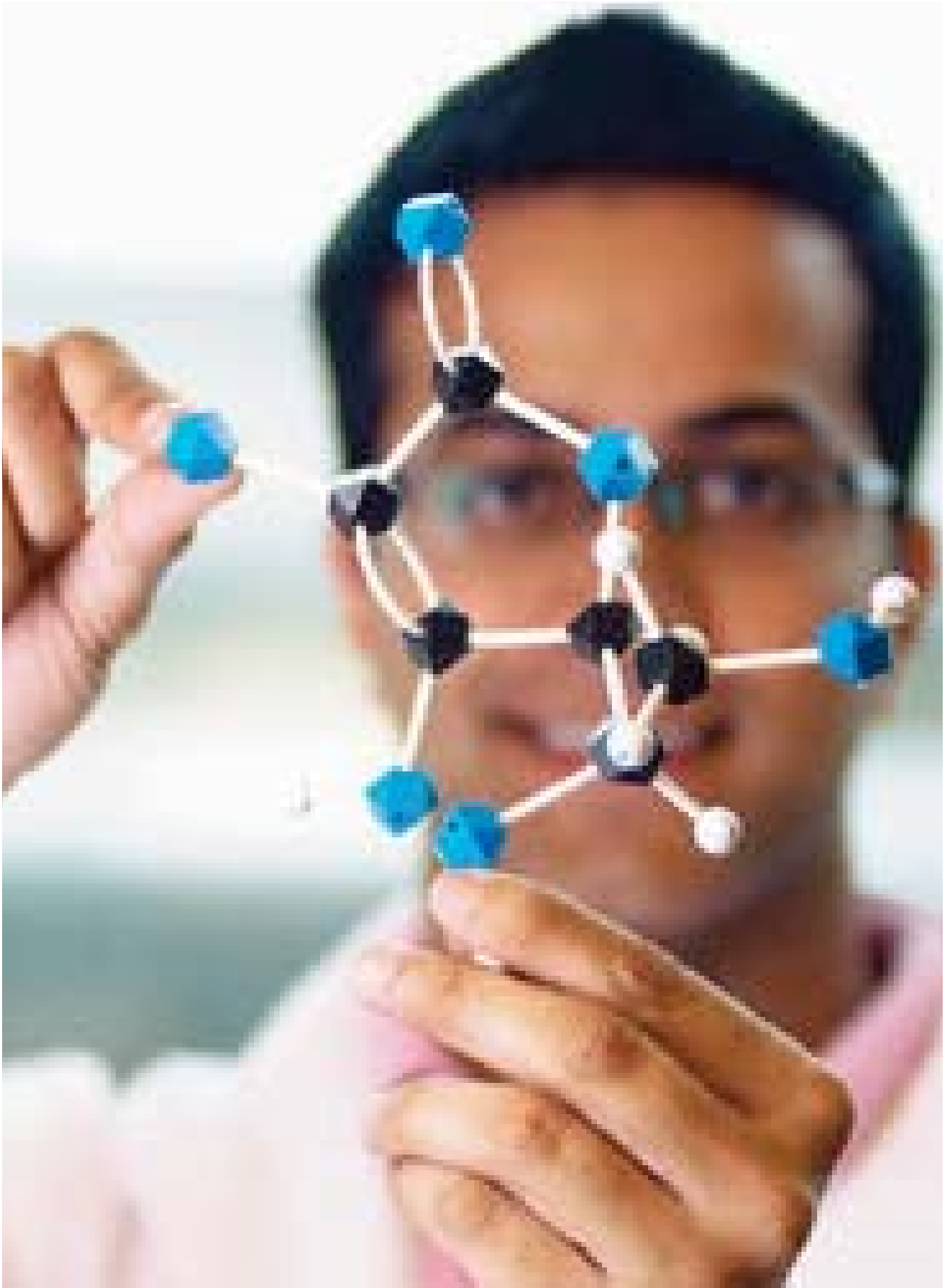
The UK's superb science base combined with the Government's focus and funds are proving a compelling force at both home and abroad. The amount spent by UK industry on R&D doubled to nearly £21 billion in 2006, with R&D in sectors such as software and pharmaceuticals amounting to an unprecedented 70 per cent of overall capital expenditure. The UK's ability to beat average worldwide R&D figures so convincingly owes much to the enthusiasm of the private sector, which generates 66 per cent of total UK R&D spend, the generous funds released by the UK's medical research charities and also to the confidence of foreign-owned companies, which account for around 45 per cent of all business R&D in the UK.

Focusing on the future

In recent years there is no doubt that the UK has consolidated its position as Europe's top R&D location, with investment in leading-edge R&D projects soaring by 62 per cent in 2006. There is every reason to believe that this growth will be sustained. The Government is bringing together all the elements of the UK's richly-integrated R&D infrastructure to make it easier than ever before for organisations to carry out R&D in the UK, such as UK Trade & Investment's R&D Programme which tailors packages of help for targeted overseas companies and UK-based knowledge driven companies. New centres of excellence are also appearing across the UK, ensuring that R&D in the UK stays ahead of the game.

Community and technological challenges are being faced boldly in the UK in many ways. For example, the country has been at the forefront of low carbon developments, creating specialist centres such as the Energy Technologies Institute, which brings together BP, EDF Energy, Rolls-Royce and Shell, as well as national bodies such as the Carbon Trust (www.carbontrust.co.uk), to invest £25 million a year in stimulating and supporting R&D.

New additions to the UK's innovation landscape include the £113 million High-End Computing Terascale Resource (HECToR), one of the world's largest and most advanced supercomputing facilities, invaluable for fundamental research as well as in areas such as climate modelling. Equally, Diamond Light Source, a £300 million synchrotron, is giving researchers the opportunity to design new materials, drugs and electronics. The first industrial organisation to use the synchrotron to help lift its competitive performance was US pharmaceutical company, Vertex.



R&D excellence

A commitment to competitive advantage

The UK Government has established a business-focused approach to innovation. Led by the Technology Strategy Board, which is successfully stimulating bold and beneficial R&D in the UK, that enables even greater numbers of companies to collaborate with research institutes and each other to accelerate the development of technologies that will underpin future products and profits.

The Technology Strategy Board now acts as the UK's innovation champion, providing national leadership, technological guidance and substantial funding for collaborative R&D in new and emerging technologies. With a package of support worth £1 billion over three years from 2008, it will invest in technology and innovation projects that will improve business competitiveness. Sponsored by the Department for Innovation, Universities and Skills (DIUS), it combines and focuses the public resources available across the country and leverages additional funds from industry, enabling R&D to flourish.

However, the Technology Strategy Board is much more than just a funding organisation. It spots opportunities, inspires projects and brings people together to solve problems and make advances through using four key mechanisms: Collaborative Research and Development, Knowledge Transfer Networks, Innovation Platforms and Knowledge Transfer Partnerships.

Since the launch of its Collaborative Research and Development Programme in 2004, the Technology Strategy Board has supported over 700 projects worth more than £1 billion across 40 technology areas. Collaborative R&D has been responsible for the successful development of hundreds of new products, processes and services, such as

a 3D digital display system, a low-cost photovoltaic concentrator, composite construction materials from waste and a sensor system for combustion efficiency optimisation. The programme not only enables larger, experienced R&D collaborators such as Ford, Hewlett Packard, St Gobain, E.On and Doosan Babcock to work with leading UK universities, it also ensures involvement from smaller innovative enterprises like Whitfield Solar, Qudos Technology and Epigem.

Knowledge Transfer Networks (KTNs) are also encouraging a significant rise in business investment in R&D. Providing a way for industrial and academic communities involved in specific fields of technology to develop ideas and interactions, KTNs are broadening and accelerating knowledge transfer into the commercial arena. There are currently around 30,000 members of the 24 KTNs, which range from Aerospace & Defence, Bioscience for Business and Chemistry Innovation to Digital Communications, Industrial Mathematics and Nanotechnology. The full list of KTNs can be found at www.ktnetworks.co.uk.

Innovation Platforms bring business and Government closer together to respond to major challenges facing society through the generation of innovative solutions and the better coordination of associated policy, regulation and procurement. The first two Innovation Platforms to be launched – Assisted Living and Low Impact Buildings – are driving technology developments to meet the increasing demand for independent living among older people in a context of demographic change and to improve the energy efficiency of new and existing buildings. There are currently three more: Intelligent Transport

Systems, Network Security and Low Carbon Vehicles. This 'challenge-led innovation' approach will be a key priority for the Technology Strategy Board and five more Innovation Platforms will be launched over the next three years (www.innovateuk.org/ourstrategy/innovationplatforms.ashx).

Long-established and eminently practical, Knowledge Transfer Partnerships (KTPs) (www.ktponline.org.uk) bring together businesses with an idea for improving their competitiveness or productivity and high-calibre graduates with the knowledge and skills in helping make it happen. Over 1,000 placements a year prove the scheme's ability to help UK firms break into new technologies and new markets. In 2006/07 participating companies created 1,400 new jobs and generated an overall increase in profits of £100 million. Such has been the success of the programme that the Technology Strategy Board plans to double the number of placements within three years.

'The Technology Strategy Board is strongly business focused for a reason. It is business people who are best placed to understand the markets, the opportunities and the strengths that Britain can use to develop and apply new technologies and ways to innovate.'

Rt Hon John Denham MP
Secretary of State for Innovation,
Universities and Skills



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CASE STUDY: IVIEW

Developing an innovative visualisation system for use in sports programmes which allows the viewer at home to see incidents from any perspective.

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‘Technology Strategy Board funding allowed us to bring together partners with the right skills and moreover helped to overcome the often-found gap between research and market-ready products. We have been able to transfer know-how gained in our research department and from an academic partner to an SME that has no research facilities. The company intends to ‘productise’ the research work and in return we are expecting to use the final commercial product for BBC programme making.’

Dr Oliver Grau
Lead Technologist, BBC Research & Innovation and leader of the Technology Strategy Board ‘iview’ project

The UK's R&D infrastructure

A dynamic network of knowledge, resources and support

The highly-developed R&D infrastructure in the UK encompasses every element of the innovation jigsaw, providing organisations with access to comprehensive and coordinated assistance, exceptional expertise and knowledge, and outstanding collaborative and funding opportunities.

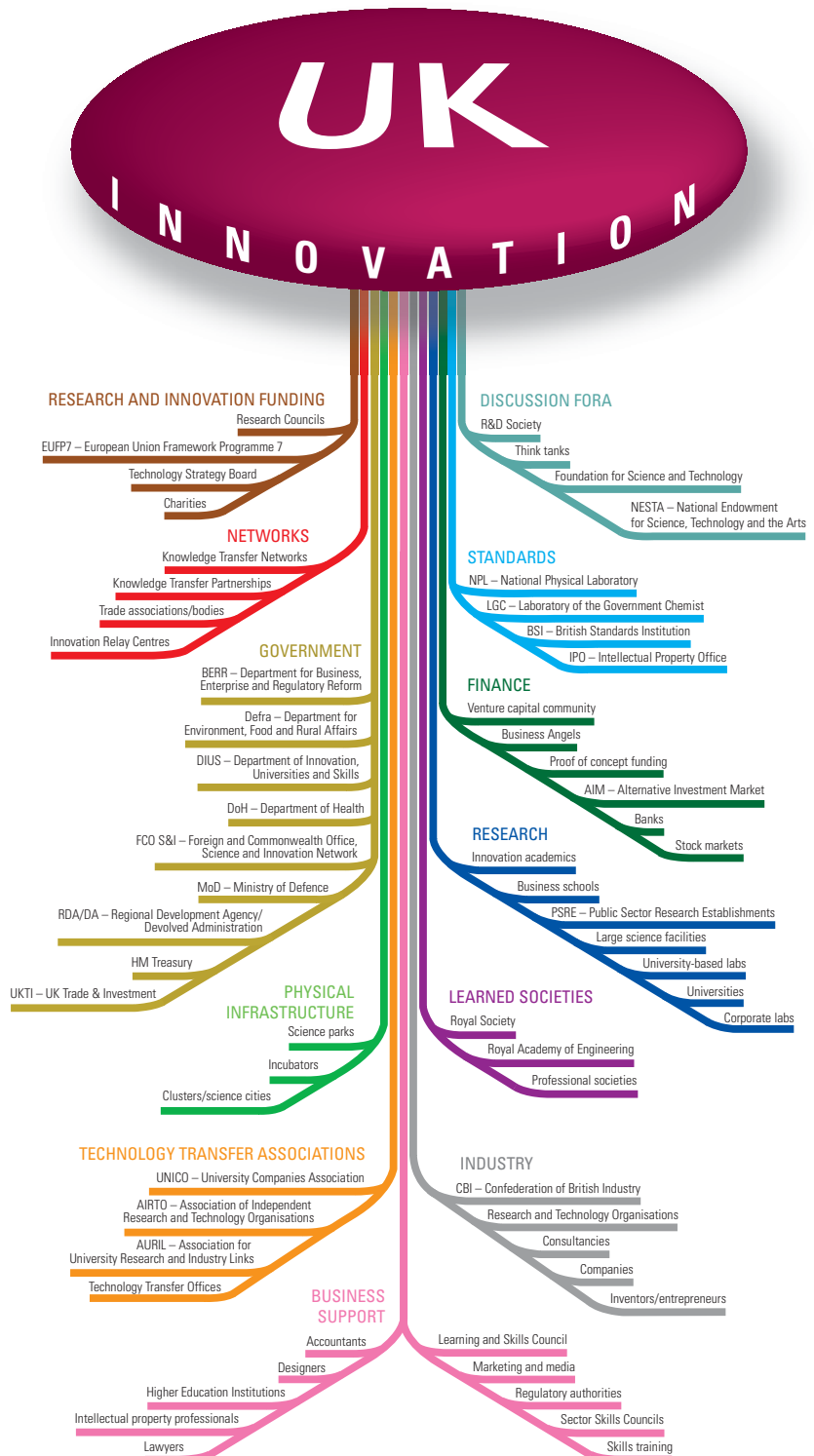
Taking a concept from laboratory breakthrough to business success is a complex endeavour. Bridges have to be built between business and science. Connections have to be made to acquire new knowledge. Facilities, finance and professionals have to be found. Very specific skills levels and standards have to be met. And, more often than not, unforeseen hurdles have to be overcome.

If the innovation story that starts with a promising idea is to reach its rewarding conclusion, help has to be to hand every step of the way. In the UK it is.

Highlighted opposite are just a few components of the UK's integrated support network for R&D – and on the following pages are some examples of what it enables companies to achieve.

'London was a tempting prospect because we needed to get some significant capital and an early Initial Public Offering would be much easier to arrange for a UK company. Instead of taking two years to get the investment we needed, we managed to raise £4.5 million in six months.'

Mike Peters
Safeguard Biosystems



The UK accounts for 75 per cent of the European private equity and venture capital market

Universities in the UK produce a far higher number of spin-outs than their US counterparts per £1 million of research, with around 190 added to the number in a typical year

The seven Research Councils (www.rcuk.ac.uk) are the UK's biggest public funders of cutting-edge research, spending around £2.8 billion every year to support strategic, basic and applied research.

Covering the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities, the Councils coordinate and fund collaborative research in their own facilities and in higher education institutions and provide access to large scientific facilities. The Councils also work in partnership with business and other research investors at home and abroad to drive the successful exploitation of research outputs.

The nine English Regional Development Agencies (RDAs) (www.englishrdas.com) and specialist teams within the Devolved Administrations in Northern Ireland, Wales and Scotland, bring investment into their regions and support enterprise and new businesses. With science and innovation a national priority, this is reflected in regional strategies and support for UK and overseas investors in R&D. In the North West, for example, a region with total business R&D investment of £1.9 billion a year and international companies including AstraZeneca, BAE SYSTEMS and Rolls-Royce, the North West Regional Development Agency has invested £262 million in science and innovation over the last three years. Projects include the £15 million Northwest Science Fund for research with potential business impact, a £50 million investment in

the Daresbury Science and Innovation Campus, which includes fundamental and commercially-driven research facilities, the UK's new £21 million Centre of Excellence in Accelerator Science, £35 million investment in the Liverpool Innovation Park and the £60 million Manchester-based UK Biobank which enables scientists from around the world to explore the roles of nature and nurture in health and disease.

Among the 170 universities and higher education institutes in the UK are the top six in Europe and two of the top four in the world. In total, they produce more than 300,000 graduates, over 100,000 Masters graduates and 125,000 Doctoral postgraduates each year. The percentage of science, engineering and technology degrees taken in the UK is higher than in countries such as Japan and France and the awarding universities benefit from more than £5.5 billion in funding for R&D each year.

The UK Government's Higher Education Innovation Fund, which provides £110 million a year for research-to-market activities within universities, has further stimulated real-world R&D, with the number of patents granted from university research rising by 98 per cent and the gross income from intellectual property increasing by 112 per cent as a result.

In the last three years alone, 25 university spin-outs have floated on the stock market at a combined value of £1.5 billion. UK universities are experienced international research partners and most have departments dedicated to promoting and enabling collaboration between global industry and academia.

Overseas organisations own 37.5 per cent of patents in the UK, compared with just over 12 per cent in the US and less than 4 per cent in Japan

CASE STUDY: TOSHIBA

Japanese conglomerate Toshiba found the pioneering science and partnering experience it was looking for at Bristol university.

With Professor Joe McGeehan, Professor of Communications Engineering as its Managing Director, Toshiba's Telecommunications Research Laboratory (TRL) has established a global reputation as a centre of wireless research excellence. The ground-breaking advances made by the £45 million TRL owe much to the expertise and facilities of the Centre for Communications Research at Bristol University. TRL has participated in international seminars, missions and events hosted by the South West Regional Development Agency and Toshiba is a key player in the Mobile Virtual Centre of Excellence (Mobile VCE), a UK-based international partnership, part-funded by the Engineering and Physical Sciences Research Council (EPSRC), which brings together the global industry and universities to undertake and exploit leading-edge research. From the outset, TRL has received support from UK Trade & Investment. 'UK Trade & Investment has been very supportive from the beginning when they came to see us to find out how they could help,' says Professor McGeehan. 'We needed to get on the map within Toshiba itself and within the industry around the world. They enabled us to interact internationally and to talk to the right people in Government and corporations.'

Professor Joe McGeehan
Managing Director, Toshiba's
Telecommunications Research Laboratory
(TRL).

The biotechnology and pharmaceuticals sector is by far the largest investor in R&D in the UK with a combined spend of £7.4 billion in 2006



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CASE STUDY: CELLARTIS

This Swedish company came to the UK when it wanted to establish its first overseas operation within a dynamic stem cell community to drive progress in high-volume stem cell production.

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The company was invited to participate in a £9.5 million research project with the entrepreneurial, publicly-funded innovation fund ITI Life Sciences. They received practical help from Scottish Development International and Scottish Enterprise as well as £1.2 million from the Regional Assistance Allowance to equip and set up their new R&D centre from where the company is now working with the universities of Glasgow, Dundee and Heriot-Watt. 'If you want to internationalise in the stem cell environment, Scotland is much more developed than anywhere else.'

Mats Lundwall
Chief Executive, Cellartis

Biotechnology & healthcare

The UK is one of the world's Life Science leaders and UK industries are spending £7.5 million each day on R&D, attracting major R&D investments from every one of the world's top pharmaceutical companies. As a direct result, the UK has created one in four of the world's top 100 medicines and 45 per cent of all pipeline products in Europe.

Such high pharmaceutical R&D demand has resulted in the UK contributing to decades of outstanding research and novel approaches, underpinned by Government funding for health which is greater than any other country outside the US. This has created a globally-admired regulatory regime and clinical trials environment, and a mature, thriving industry generating annual revenues of more than £23 billion.

Extending its lead

Already the most popular location in Europe for investment in biotechnology and healthcare, the UK continues to strengthen its position. Government funding for biotechnology research has increased to £2.5 billion. Three Knowledge Transfer Networks supporting the biotech and healthcare technology sectors have been established. New facilities such as the £34 million Government-funded National Biomanufacturing Centre and Scotland's £56 million Regenerative Medicine Centre have opened. New investment is also being made in key areas such as stem cells, which is receiving an additional £100 million.

A healthy lead is also being developed in the field of synthetic biology, which has been described as 'moving from reading the genetic code to writing it'. Importantly, it is already addressing the adequacy of existing regulations for future research and applications.

Driven by leading academic departments, notably at Imperial College London, the UK biomaterials sector is delivering significant advances. NovaThera, a spin-out from Imperial College London, has developed a nanoglass textile material for complex surgical and new regenerative medicine applications. Edinburgh and

Nottingham universities have both made world-beating breakthroughs in tissue scaffold techniques. And, working with Leeds University, UK company DePuy Orthopaedics has developed new materials for artificial hip and knee joints.

The combination of these new attractions and UK expertise in neurosciences, oncology, infectious diseases, vaccines, monoclonal antibodies and tissue engineering is encouraging even more global names to join Pfizer, Lilly, Novartis, Johnson & Johnson, GlaxoSmithKline, Sanofi Aventis and Takeda in increasing their investment in UK R&D.

Eli Lilly is spending £195 million expanding its R&D facilities, while Amgen has set up an £88 million International Development Centre in London. Agricultural research leader Syngenta has made an additional £100 million investment in research and manufacturing in the UK. Leading Japanese pharmaceutical company Sosei bought UK biopharmaceutical firm Arakis to expand its R&D facility and Eisai is building a £75 million business hub in Hertfordshire which will include an R&D centre.

Capitalising on expertise

AstraZeneca, one of 200 biomedical companies in the UK's North West biotechnology cluster, is setting an impressive example among UK firms, spending nearly 15 per cent on R&D as a percentage of sales in 2006 and investing £60 million in the expansion of its oncology research centre. Scientific and investment activity on a similar scale is replicated throughout the UK's clusters.

Twenty five per cent of Europe's biotechnology companies and the world's largest medical research charity,

'London is the only biotech cluster that can be described as a science park with a stock exchange in the middle.'

Tony Jones

Director of Biotechnology and Healthcare, London First, which promotes the interests of business in London.

the Wellcome Trust, are all in Cambridge. As is Solexa, the high-throughput DNA sequencing Cambridge University spin-out bought by US Illumina for £341 million and Genzyme, which chose the UK for its first discovery laboratory outside the US.

The south east of England is home to 25 per cent of the European biotechnology industry. London, meanwhile, has a cluster of 100 biotech businesses, 28 universities and five renowned medical schools. It also has the brand new UCL Partners, Europe's largest academic health science partnership of hospitals and medical research centres. Among the capital's dynamic young companies are Ark Therapeutics, which develops gene-based therapies for vascular disorders, and London University spin-out Lipoxen which has created efficacy-enhancing delivery solutions for drugs and vaccines.

In Scotland, where its 592 life science companies are increasing by an average of 20 per cent a year, the £50 million Translational Medicine Research Collaboration (TMRC) represents one of the most successful features of the UK's Life Sciences landscape: powerful multi-disciplinary partnerships. By bringing together business (Wyeth in this case), universities, development agencies and the NHS, TMRC is able to fast-track research, capitalising on national expertise and creating global advances.

Overseas investment in the UK life sciences sector grew by 37 per cent in the year 2005/06

Advanced materials

Leading investors in advanced materials R&D spend £54 million a year in the UK. This is helping to secure competitive advantage in traditional materials such as metals, ceramics, wood, glass and industrial minerals as well as driving world-class developments in newer areas such as biomaterials, nanomaterials and polymers.

Building on a materials heritage spanning the world's first artificial heart and the lithium ion batteries that power today's laptops and mobile phones, the UK is meeting growing global demand for advanced materials in industries ranging from avionics to cinematography and medicine to electronics.

At the heart of materials research activity in the UK are international companies such as Kobe Steel, Corus, Cookson, Siemens and Pilkington and outstandingly successful spin-out companies such as Tissue Regenix and Cambridge Display Technology. This is underpinned by over 30 universities with leading materials departments and a raft of research facilities. Both the Centre for Materials Discovery at Liverpool University and the new £113 million HECToR supercomputer, for example, play an important role by championing and speeding the discovery of innovative materials.

Such investments are expected to help secure the UK's position in materials science for the future. With materials becoming the differentiating enabling technology, nano-scale engineering of materials is opening up new applications and industries and materials advances are playing an increasingly important role in energy efficiency.

Polymer pioneers

Research into the use of organic materials, particularly polymers, as the basis for novel light emitting diodes is being led by the UK. The University of Cambridge has been responsible for a series of important breakthroughs – and the creation of Cambridge Display Technology, the global leader in the new generation of display technology based on polymer organic LEDs (P-OLEDs), and Plastic Logic, which will be the first to market with a flexible display. UK researchers are also strongly supported by bodies such as the

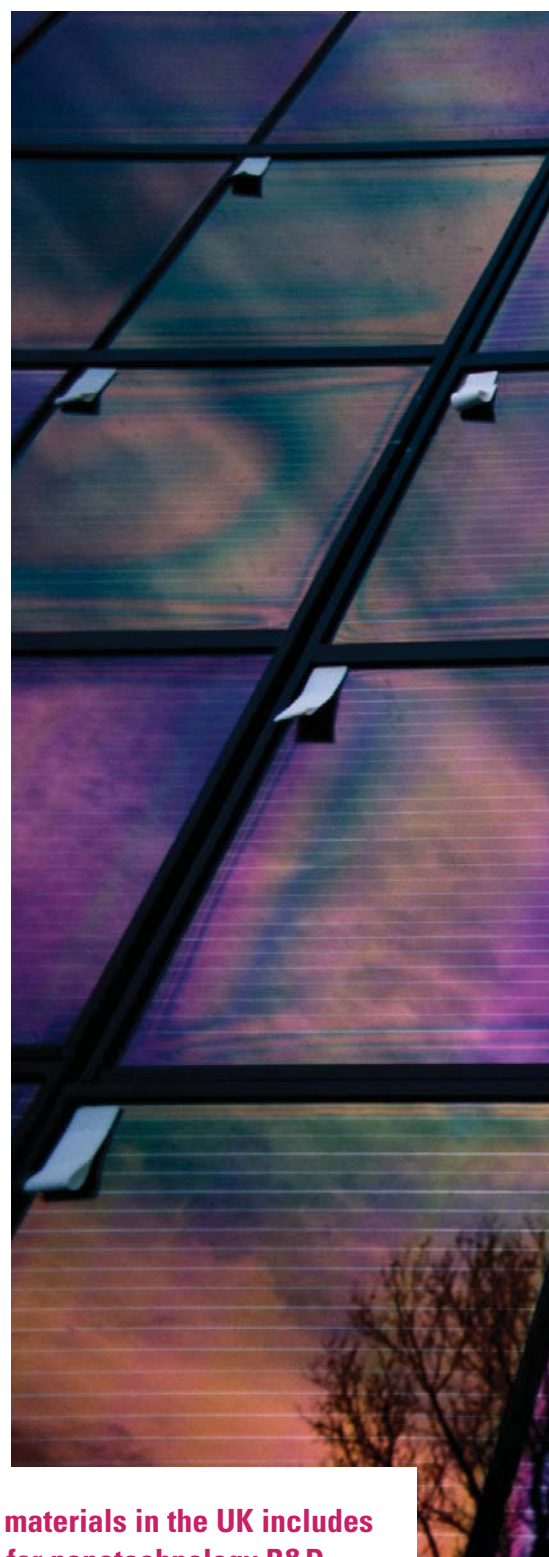
Knowledge Transfer Polymer Innovation Network, which enables the plastics industry and researchers to share knowledge, and the Centre for Phosphors and Display Materials, a division of the Wolfson Centre for Materials Processing at Brunel University.

Nanomaterial developments

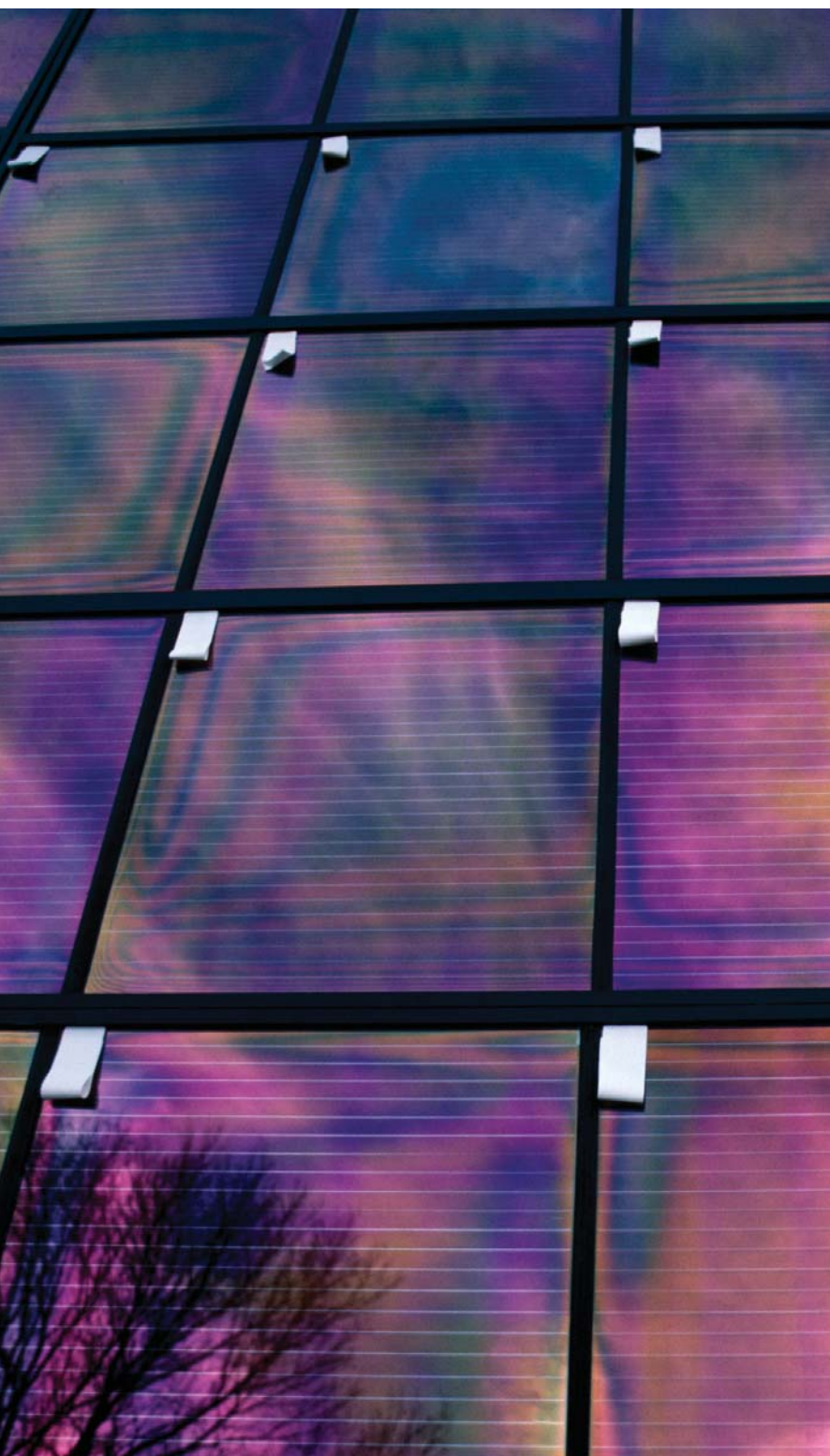
In the last decade, the UK has focused funding and research on the application of materials science at the nanoscale, supporting a doubling in size of the nanotechnology industry. Now encompassing 740 businesses with a turnover of £20 billion, the industry's impressive innovation track record is enabled by initiatives such as the Nanotechnology Knowledge Transfer Network, interdisciplinary collaborative R&D projects and the £150 million 20-centre Micro and Nanotechnology (MNT) Facilities Network which has helped hundreds of companies commercialise micro and nanotechnology R&D including materials, manufacturing, metrology and medicine.

This coordinated activity is delivering a wealth of significant results. University teams working at the interface between chemistry, processing, engineering, physics and life sciences are continually announcing new nanomaterials such as a zinc oxide nanowire that is itself a semiconductor. The university spin-out rate is soaring, with companies like Surrey NanoSystems, a carbon nanotube growth systems specialist, quickly establishing world-leading positions. Outward looking organisations like Nanoforce Technology based at Queen Mary College London are taking R&D to global industry, offering services to enable the exploitation of nanotechnology by the creative industries and beyond.

Government support for advanced materials in the UK includes a £90 million, six-year programme for nanotechnology R&D



An ambitious materials strategy is aimed at securing the future of a £200 billion industry employing 1.5 million people



CASE STUDY: CDT

A subsidiary of Sumitomo Chemicals and a pioneer in the development of P-OLED display technology which offers superior performance characteristics to other technologies, such as liquid crystal displays, in many applications, such as thin form factor, excellent contrast ratio, and low power consumption.

‘Our collaboration with Thorn Lighting and the University of Durham, which has received a £1.6 million investment from the Technology Strategy Board, will allow us to make fast progress in developing inks and device technology, as well as expand the application of our polymer organic light emitting diode (P-OLED) technology into the solid-state lighting market.’

Dr David Fyfe
Chief Executive Officer, CDT

CASE STUDY: OXONICA

An Oxford University nanomaterials spin-out with advanced products already launched into global markets and a portfolio of international partnerships.

‘The research base for nanomaterials across the UK’s universities is very strong. I have been impressed by the rate at which IP is being created.’

Dr Gareth Wakefield
Vice President R&D, Oxonica

Information & communication technologies

Home to Europe's largest ICT industry, the UK has secured a global reputation not only for its ground-breaking research, but also for its success in realising the commercial returns on its investment in R&D – 38 per cent of all spin-out companies from UK universities are in the ICT sector. This vibrant, value-added environment means that almost every major multinational ICT company has a presence in the UK.

The UK has one of the world's strongest ICT infrastructures and the industry accounts for around 15 per cent of the country's commercial R&D. It also has a liberal market characterised by early adoption of new technologies and a pioneering track record, from the invention of the World Wide Web to the first 3G roll-out in Europe.

Companies such as Sharp Laboratories of Europe, Oracle, Orange, HP Laboratories, Eidos, iSoft, Sage Group, LogicaCMG, Misys, Microsoft and Toshiba are capitalising on the UK's ICT innovation strengths. They are benefiting not only from the concentration of Centres of Excellence in the UK's software, IT services and telecommunications clusters, but also from the early commitment by industry, academia and Government to emerging, high-potential areas such as:

- next-generation networks and grid technology
- healthcare
- gaming and digital media
- the digital economy and the use of ICT to increase the efficiency of the financial services industry
- the environmental sustainability of other sectors

Looking to future challenges in this way is one reason for the UK's continued success in attracting inward investment in ICT – the sector accounts for one in five of all major new investments made by overseas organisations. Exceptional levels of R&D among fixed and mobile

'We have a world-class science base which results from a long history of leading research universities and science institutions. These have led to an extraordinary record of scientific discovery in this country.'

Mike Carr, Chief Science Officer, BT, the UK's third largest investor in R&D in any sector

telecoms firms in particular is also increasing the UK's innovation potential. BT spent £1,119 million on R&D in 2006, much on its ambitious transformation programme, 21st Century Network, while communications network specialist, Telent (previously Marconi) increased its R&D spend to £139 million.

Concentrations of excellence

A software development powerhouse, the UK encompasses particular expertise in areas such as pervasive systems, inter-enterprise computing, intelligent systems, modelling and informatics. The area around Cambridge has become an international leader in computer science and technology. It has 300 companies and commercial laboratories as well as the university's renowned computer science department, which has been responsible for the formation of over 120 companies, including Autonomy which is now one of Europe's best-performing software houses.

The Computer Science department at Cambridge University works closely with industry, highlighted by recent projects involving Boeing, BT, IBM, Sun and Thales. Meanwhile, mobile specialists such as Motorola and picoChip Designs

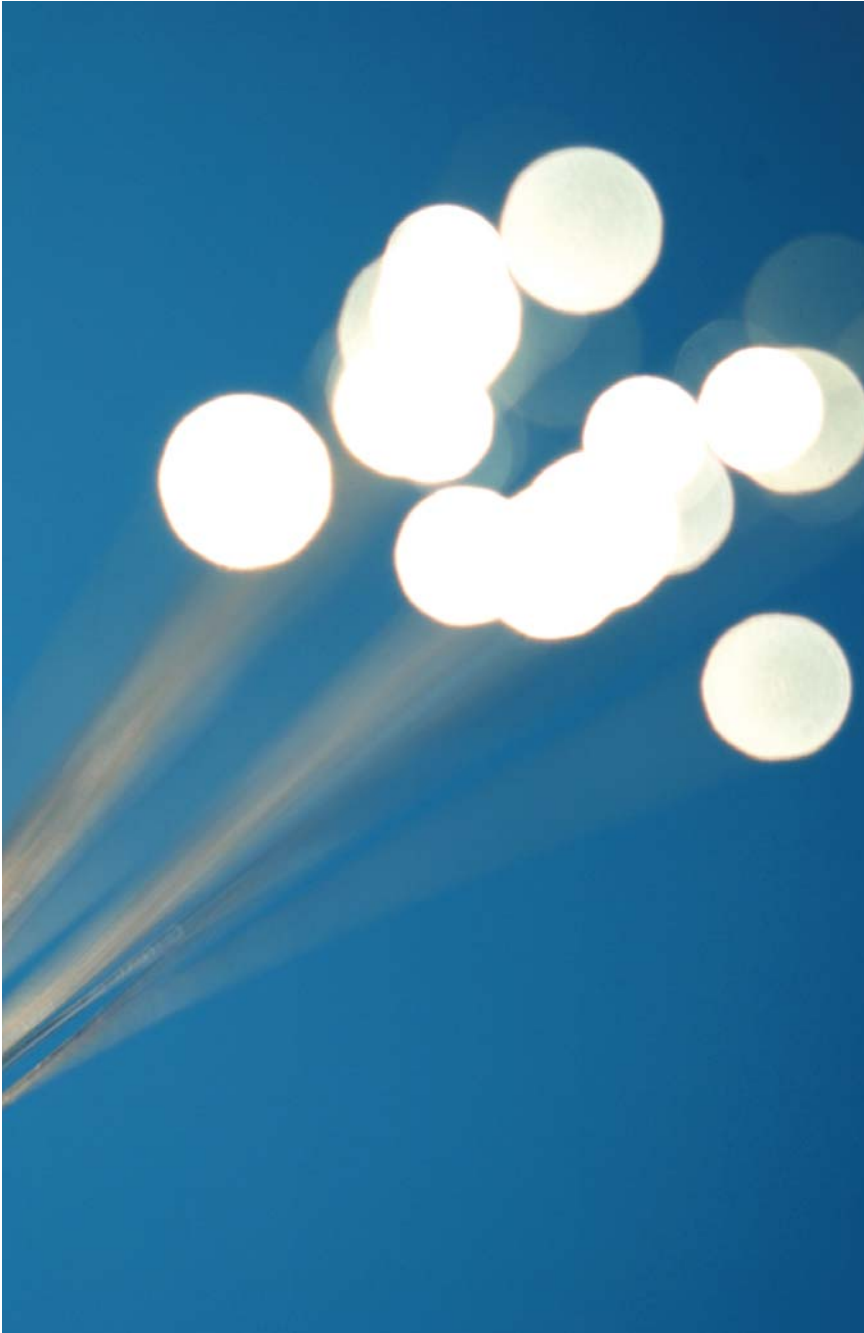
within the 'Wireless Corridor' around Swindon and Bristol benefit from breakthroughs being made in and around Bristol University. Software development expertise and innate creativity are ensuring that the UK is a significant force in the fast-growing digital media sector. London is the location chosen by a vast proportion of the world's film makers for special effects and post production. The capital is also home to some of the pioneers in the transition to digital cinema, such as film scanning and 3D, and to exciting web 2.0 companies such as Bebo and Last.FM.

Already the fourth largest developer of computer games in the world, the UK invests nearly £400 million annually in games creation as well as in enriching its deep talent pool with, for example, one of Europe's first dedicated schools of digital animation. Global innovators such as Electronic Arts, Microsoft Games, Sony and Sega have established development centres or European headquarters here, joining over 150 UK games development studios such as SCI-Eidos and Gameplay to create vibrant clusters in London and the South East, the Midlands, Yorkshire and Scotland.

The fixed-line telecommunications sector reported the fastest growth in R&D spending of any UK sector in 2006, with investment increasing to £1,127 million [Source: DIUS 2007 R&D Scoreboard]

‘During the past 10 years we’ve grown our UK R&D Centre from three researchers to over 100 and the access our location gives us to top UK and European talent plays a big part in that success.’

Andrew Herbert, Managing Director, Microsoft Research Cambridge, one of the fastest growing and most highly respected organisations in the world



Home to over 100,000 specialist software houses, the UK also has more software start-ups than anywhere else in Europe

There is great strength in simulation applied to diverse industries such as aerospace, medicine and entertainment. Government and industry are also investing substantial amounts in R&D for ‘Serious Games’ – the use of games technologies in training and education. The Human Interface Technologies Team at Birmingham University and the Serious Games Institute at Coventry University are among those leading developments in this area.

Gaining access to expertise

Throughout these clusters are creative initiatives that are helping global industry gain access to expertise capable of defining the future in their sectors. In the Midlands, for example, chosen by Indian IT giant Tata Consulting for its new innovation centre, ICT Innovation Clubs are channelling the diverse ICT expertise of 700 academics from nine local universities including Keele and Warwick into the business community to stimulate R&D.

Scotland’s ‘Silicon Glen’ boasts the Scottish Government-supported, Intermediary Technology Institute (ITI) Techmedia, which invests in market-driven IP in digital media and communications technologies. In London there is a major telecoms cluster that’s home to Vodafone, BT and Nortel as well as the ‘O2 Wallet’ pilot which unites Transport for London, Barclaycard, Nokia and AEG in a project that paves the way for mass-market use of mobile phones for cash payments, public transport and event ticketing.

A target to deliver 10 per cent of its electricity from renewables by 2010 has been set in the UK

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**CASE STUDY: CLIPPER
WINDPOWER**

A US firm developing a new generation of wind turbines in the UK after receiving £5 million of support from NaREC and One NorthEast development agency.

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'We look forward to a strong relationship with One NorthEast and NaREC, whose excellent engineering, testing and development capabilities will play a major role in the project's delivery.'

James Dehlsen
Chairman and CEO, Clipper Windpower

Emerging energy technologies

The UK is a global leader on climate change and hosts the critical infrastructure needed to deliver scientific breakthroughs and practical solutions. Targeted support for energy R&D and major demonstration projects is combining with the ambitions of UK-based academics and entrepreneurs to drive a thriving industry expected to increase grid-connected green energy threefold by 2015.

An exceptional range of R&D activities to improve the efficiencies of energy generated from traditional sources and to use energy from new sources has been stimulated as a result of the UK Government's commitment to reduce CO₂ emissions by 60 per cent by 2050. The UK renewable energy sector is expanding at a faster rate than ever: it includes over 1,000 innovative companies and is predicted to be worth £19 billion by 2020.

First in class

Government funding of £500 million for energy R&D between 2002 and 2008 and industry/academic initiatives such as SUPERGEN, which aims to radically improve the sustainability of power generation and supply, are securing significant achievements for the UK. The UK has the world's first production-scale plant for third generation organic PV cells. The world's first commercial flight with biofuels was flown from Heathrow. The world's first industrial-scale project to generate clean electricity from fossil fuels is underway in the UK and, by 2010, the UK will be home to the world's biggest biomass plant.

Leading companies such as EDF Energy, DONG Wind, BP Solar, Rolls-Royce, ConocoPhillips, Shell, Kodak and Johnson Matthey are undertaking R&D in emerging energy technologies in the UK, working with local organisations and benefiting from its Centres of Excellence such as the New & Renewable Energy Centre (NaREC). So convinced was energy giant E.ON of the UK's expertise in the sector that it established E.ON UK Renewables to operate wind farms, biomass-fuelled generation and hydropower schemes across the country.

The UK is the second most attractive location in the world for new renewable investment

Building on expertise

Capitalising on its extensive wind resources, the UK is home to nearly 120 wind farms and 300 innovative wind energy companies. The UK offshore wind programme is paving the way for the world's largest expansion of renewable energy including the world's largest individual wind farm, a £2 billion project off the Kent coast.

Marine energy, which also capitalises on the UK's oil and gas industry heritage, is a major focus for funding, with the £42 million Marine Renewables Deployment Fund helping visionary businesses take first-class R&D to market. Businesses like Marine Current Turbines, whose novel, windmill-like Seagen twin turbine tidal current device has received investment from EDF Energy, and Trident Energy. Trident Energy's wave energy conversion system is also being tested close to the UK's newest renewable energy centre, OrbisEnergy, which is part of an £8 billion investment in offshore energy in the East of England.

Dynamic government support for photovoltaics (PV) has enabled the UK's science base to leverage its photonics expertise and support the market's remarkable growth. UK research is at the forefront of developments involving scaling up production processes and improving thin film cells as well as taking a lead in emerging third and fourth generation PV technologies.

Capitalising on developments

The result is a plethora of PV spin-outs such as Whitfield Solar, whose low-cost solar concentrator contains 100 times less silicon than conventional systems.

This real-world focus is echoed in every energy arena, with Voller Energy Group, for example, commercialising portable hydrogen fuel cell technology and Ceres Power exploiting its revolutionary fuel cell technology capable of producing clean, silent electrical power and heat.



CASE STUDY: PELAMIS WAVE POWER

Pelamis Wave Power's wave energy converter was the first in the world to go into full commercial operation.

After receiving Government funding for its first prototype followed by venture capital of approximately £40 million, Pelamis conducted tests at the European Marine Energy Centre in Orkney and worked on validation programmes with the universities of Edinburgh, Glasgow and London City. Two UK wave farms using Pelamis machines are currently under development by ScottishPower and E.ON. 'We are delighted with the level of support, commitment and priority the Scottish Government is giving to this important new energy sector.'

Richard Yemm

Chief Technical Officer, Pelamis Wave Power

Electronics & photonics

Already home to a well-structured, broadly-based and innovative electronics and photonics industry, the UK has now also secured internationally-respected positions in emerging technologies such as spintronics, organic electronics and solid state lighting – and a reputation for helping international companies develop next-generation products.

With a £55 billion annual turnover, 12,500 businesses and an 18 per cent share of all inward investment, the UK electronics industry has the critical mass and expertise to drive developments crucial to every sector from medical equipment to consumer electronics and process control to lasers.

Having established its credentials by making many of the first global advances in flat panel displays, fibre optic systems and plastic electronics, the UK is now achieving similar success in many other areas, notably photonics, radio frequency and antenna design, digital radio, embedded systems, displays, optoelectronics, lighting sensors, imaging and electronic chip design and graphene.

Magnet for innovators

With the largest independent semiconductor design industry in Europe, a strong supply chain and a Government that has spent £120 million on electronics research in the last four years, it is clear why a growing number of overseas organisations view the UK as a prime location for innovation.

Most of the world's major electronics companies have established facilities in the UK, including 3Com, Cisco, Epson, Ericsson, Honeywell, IBM, Infineon, Intel, Mitak, Mitsubishi, NEC, Nortel, Panasonic, Philips, Raytheon, Sharp, Sony, STMicroelectronics, Visteon and Zarlink Semiconductor. Hitachi and Samsung are just two companies working closely with some of the 100 UK universities involved in electronics research.

Tapping into talent

While Samsung is progressing advanced electronic products with the help of three Scottish universities, Hitachi in Cambridge is developing a new generation of devices combining microelectronics with nanospintronics for hard disc and memory applications. Cambridge University is also working with Alps Electric of Japan, Dow Corning of the US and Carl Zeiss of Germany at its Centre for Advanced Photonics and Electronics (CAPE) to set industry agendas for the convergence of electronics and photonics.

Technical support for industry extends to a wealth of specialist centres of excellence such as the Electronics Design Centre in Scotland, whose research partners include Agilent and Fujitsu, and the Printable Electronics Technology Centre (PETEC). This new world-class prototyping facility, whose first phase is costing £11 million, is open to commercial customers wanting to develop and commercialise printed

CASE STUDY: ARM HOLDINGS

The world's leading semiconductor IP supplier whose chips are in most portable devices, including Apple's iPhone and 90 per cent of the world's mobile phones.

'We established a business model to ensure the continued evolution of our architecture – this involves partnering with customers, getting them involved in projects and having them make demands on us – it's the best way to get really good R&D to produce wealth.'

Sir Robin Saxby
Chairman, ARM Holdings



The EPSRC is currently providing £125 million of funding for 650 electronics research projects



electronics products including thin film transistors and solid state lighting applications.

World-beating businesses

The global success of dynamic UK firms in recent years demonstrates very clearly the net result of the UK's advances and ambitions. Wolfson Microelectronics, once a small spin-out from Edinburgh University, is now a market leader in high-performance mixed-signal chips for digital consumer products.

The products of ARM Holdings, meanwhile, are at the heart of the world's most advanced digital products from wireless, networking and consumer entertainment solutions to imaging, automotive, security and storage devices.

CASE STUDY: SIEMENS

Spent £69 million on R&D in the UK in 2007 and whose UK-based R&D company, Roke Manor Research, is one of the world's leading electronics and telecoms research centres.

'Innovation and R&D are integral to Siemens and to UK industry and its economy. The UK has an experienced and highly-skilled workforce including scientists and engineers with unique expertise. This skill-base allows us to concentrate our efforts on addressing underlying causes of a customer's problem rather than treating the symptoms.'

Peter Lockhart
Future Technology Manager, Siemens

The Technology Strategy Board has supported more than 500 motorsport-related research projects since 2004 worth over £750 million

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CASE STUDY: BOEING

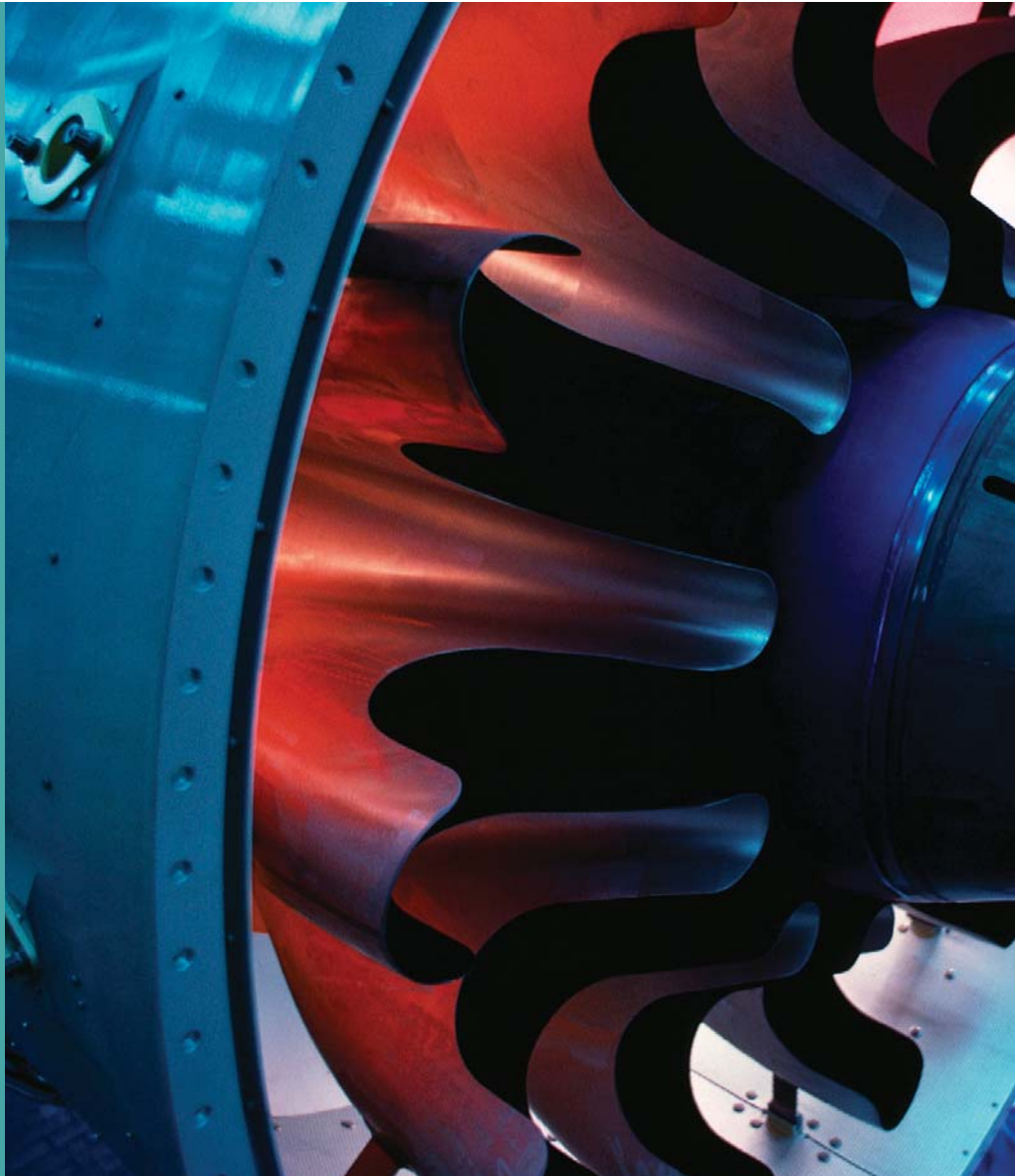
Boeing's flagship UK investment is the acclaimed £45 million Sheffield University Advanced Manufacturing Research Centre (AMRC) which fuses cutting-edge research with industrial application.

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'Boeing recognised that the UK has an exceptionally strong skill base and a mutual interest in technology development. We already have about 300 partners in the UK and are proud to build on these existing relationships through this new collaboration with Qinetiq.'

Brian Moran

Director of Industrial Participation, Boeing, talking about the company's investment in Portal, a modelling, simulation and analysis centre sited in the UK following 'invaluable' support from UK Trade & Investment.



'The Centre of Excellence in Customised Assembly (CECA) is absolutely the type of innovative, demand-led initiative we need to see coming out of our universities. Innovation in customised assembly is a major challenge for manufacturers, but one which is essential to our long-term competitiveness.'

Stephen Burgess, Director of Manufacturing Technology, Rolls-Royce, which has research partnerships with 25 UK universities such as Cranfield and Imperial College London.

Design engineering & advanced manufacturing

The UK has built on its illustrious history of innovation in the automotive, aerospace and manufacturing industries to establish outstanding expertise in current and emerging technologies, capitalising on natural national talent, strategic scientific investment and one of the world's most sophisticated infrastructures for effective R&D.



The manufacturing sector accounts for 75 per cent of all business research in the UK, with the aerospace and defence sector spending £2.4 billion a year, making it the second largest investor in R&D in the UK. And levels of R&D are rising. Airbus spending on R&D in the UK increased to £445 million in 2006 and Rolls-Royce's rose to £411 million. Ford's R&D intensity in the UK remained high in 2006, despite its widespread restructuring, with the company spending £584 million.

Research resources

Underpinning this buoyant position are world-beating businesses which are ably supported by substantial funds for research and creative initiatives for industry, such as the 16 Innovative Manufacturing Research Centres (www.epsrc.ac.uk/ResearchFunding/Programmes/BetterExploitation/IMRCs/default.htm) and the £30 million National Composites Network (www.ncn-uk.co.uk) which provides state-of-the-art facilities for composites development, validation and advanced manufacturing.

New centres of excellence enriching the R&D environment include the £4.8 million Centre of Excellence in Customised Assembly (CECA) which helps companies adopt more efficient ways of assembling products.

CECA joins the Warwick Manufacturing Group, a global research force working with the likes of Lotus, Jaguar, MG, Visteon, Rover and the leading independent joining technology R&D organisation TWI, whose members include Chrysler, Mercedes, Tata and Volvo, in providing unparalleled resources and expertise for industry.

Sectoral strengths

At the heart of automotive R&D is Motorsport Valley in Coventry, Solihull and Warwickshire, a global centre for the development of performance cars, chassis, engines, brakes, suspension and transmission systems.

Here, Qinetiq and BAE collaborate with Formula 1 racing teams; vehicle manufacturers such as Vauxhall and Nissan have R&D operations and specialists Lotus Engineering, Prodrive and Mahle Powertrain conduct world-leading R&D. Supporting them all is the Motor Industry Research Association (MIRA) (www.mira.co.uk), whose test facilities and 100 years of expertise have been instrumental in developments made by OEMs and Tier 1s for decades.

In the vanguard of aviation technology for over a century, the UK's aerospace clusters are a magnet for leading innovators. Bombardier looks to the UK for research for its regional aircraft, GKN uses UK expertise to pioneer automated manufacturing processes for complex composite components and Boeing capitalises on the talent of the UK's academic elite through long-term R&D collaborations.

Cranfield University, which produces 54 per cent of all UK aerospace engineers, has enabled Boeing to build a blended wing body aircraft demonstrator, while an RFID supply chain trial on the 787 Dreamliner was the focus of a project with Cambridge University. The success of such projects is testament not only to the skills and expertise within UK universities, but also to their experience in creating and managing the kind of virtual R&D groups which are vital to sustained progress.

Foreign firms account for 31.5 per cent of manufacturing R&D in the UK – compared with 18 per cent in the US and 3.8 per cent in Japan

Sustainable production & consumption

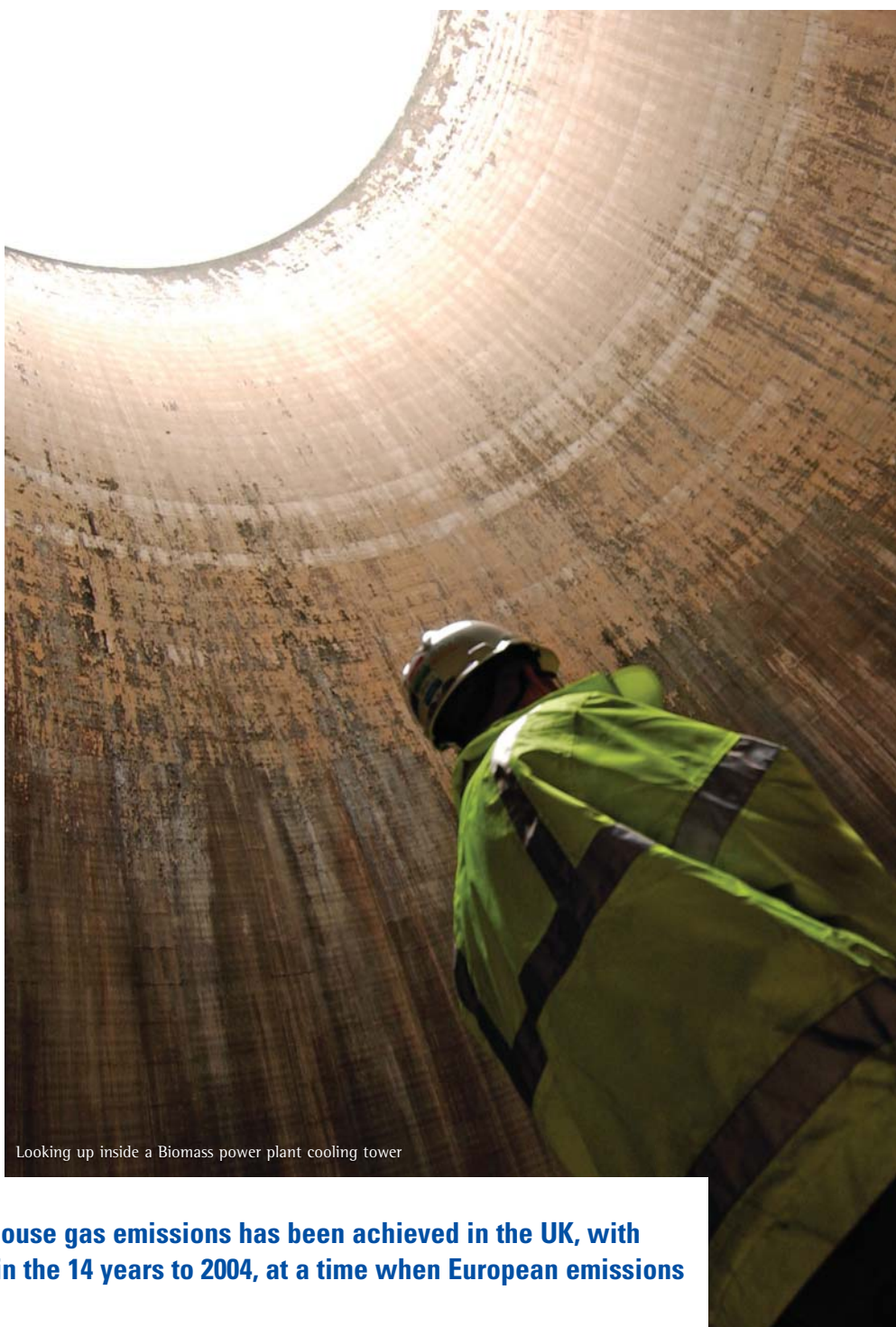
Fuelled by an enlightened support framework, creative science and clear Government goals, the UK's diverse and dynamic environmental industry is successfully rising to the challenge of finding novel ways to minimise damage to the natural world, securing both a global reputation and high levels of growth.

Environmental technologies are big business in the UK, where the industry encompasses over 17,000 companies generating an annual turnover of £25 billion. Capitalising on its engineering, science and design skills, the UK has developed R&D capabilities spanning cleaner technologies and processes, sustainable product and process design, water treatment, materials recycling, end-of-life technologies, waste and pollution, land remediation and resource efficiency.

Priority support

Making use of the earth's resources in a sustainable way is a cornerstone of Government policy. This commitment translates into Technology Strategy Board funding for Collaborative R&D of £8 million for waste management, £14 million for the zero emission enterprise and £6 million for the design of sustainable products, as well as initiatives such as the Sector Sustainability Challenge which provides a focus for priority technologies.

Overlaying these stimulants for new science is an innovative network of support including the Centre for Sustainable Engineering in Peterborough, a national knowledge centre for eco design, process and engineering best practice, and the Centre for Sustainable Design at the Surrey Institute of Art & Design, which acts as a focus for innovative thinking on sustainable products and services and facilitates research.



Looking up inside a Biomass power plant cooling tower

An impressive reduction in greenhouse gas emissions has been achieved in the UK, with emissions falling by 13.6 per cent in the 14 years to 2004, at a time when European emissions reduced by just 0.6 per cent

The Natural Environment Research Council (NERC) invests £320 million a year in research in 70 UK universities while the Engineering and Physical Sciences Research Council (EPSRC) has an annual budget of £500 million to spend on collaborative research covering the environment, water and waste



Breakthrough technologies

Researchers in the UK have responded to mounting pressure for more land to be reclaimed and more on-site treatments with a raft of world-class next-generation technologies. Stimulated by initiatives such as the Contaminated Land: Applications in Real Environments initiative, developments include Crown Bio Systems' low-cost portable toxicity testing system for rapid on-site detection and contamination mapping.

Advances in waste reduction, reuse and treatment have led to the creation of a vibrant UK sector with an annual turnover of £8 billion. The Waste and Resources Action Programme (WRAP) spends over £60 million a year on resource efficiency projects, with successes including techniques to recycle mixed plastics.

The Resource Efficiency Knowledge Transfer Network has supported research into the safe extraction and reuse of potentially hazardous liquid crystals from LCD screens, while the £50 million Business Resource Efficiency and Waste (BREW) Programme has funded research from which eco-bricks made from industrial waste have been produced.

Step-change developments

The water treatment sector in the UK, which generates annual revenues of more than £3 billion, has pioneered technologies such as ion exchange, reverse osmosis and tertiary treatment and is at the forefront of membrane filtration technologies and water recycling systems. Breakthroughs to emerge from the Centre for Ecology and Hydrology include a bacteria-based wastewater technology set to

revolutionise the treatment of toxic metal working fluids.

The UK is a global centre for green transport technologies. It was Ford's choice for a £1 billion investment in environmental technology research and is the home of a Sustainable Rail Programme which is at the forefront of driving energy consumption improvements. The UK is also at the heart of aerospace activity, which includes the five-year £95 million Environmentally Friendly Engine programme involving six UK universities and aerospace leaders such as Rolls-Royce, Bombardier and Goodrich.

CASE STUDY: SYNGENTA

Syngenta spends £99 million a year in the UK on agricultural/plant R&D, with much of its work aimed at developing products that will help produce sustainable farming systems.

'The UK remains an excellent place to invest in our R&D activities given the priority this is afforded by the Government. From our partnerships with the country's leading universities the UK is really setting itself up as a knowledge driven economy.'

Dr Michael Bushell

Head of Jealott's Hill International Research Centre, Syngenta's UK-based global centre for environmental sciences.

European R&D

The gateway to premier programmes and partners

Not only is the UK Europe's top R&D location and a leading choice for the European headquarters of global businesses, it also actively encourages and enables organisations to get involved with, influence and benefit from major European R&D programmes that shape new generations of technologies and new genres of products.

As one of the world's most innovative nations, the UK is well placed to meet the needs and respond to the challenges of global markets. But it is also geographically well positioned – and well served by transport links and time zones – to capitalise on its location between Asia and North America. Building on these natural advantages as a global science hub is assistance that puts UK-based organisations at a distinct advantage when it comes to accessing all that European R&D has to offer.

CASE STUDY: PROIMMUNE

Through the assistance of the two year EUREKA project MIDAS, a new test was developed that improves graft survival following organ transplants.

'The Eureka scheme stands out from other funding mechanisms because of its flexibility. Projects are selected on the basis of their overall merit as judged by experts, in a process that is non-bureaucratic and efficient.'

Dr Nikolai Schwabe
ProImmune

As the European Commission doubles its R&D budget to £53 billion for 2007–2013, the Technology Strategy Board is taking a leading role in coordinating and enhancing advice and guidance for UK organisations on Europe's main R&D programmes. Help is also to hand from the UK Research Office (UKRO) (www.ukro.ac.uk), which promotes UK participation in EU-funded research by disseminating information and providing advice and training for potential collaborators.

This dedicated support means that the UK is always well represented among the partners of EU Framework Programme (cordis.europa.eu/fp7/) projects. Tackling major issues with huge potential for the future, the Programme gives participating organisations a unique opportunity to boost Europe's, and their own, competitiveness. UK participants including GlaxoSmithKline, Pfizer, Lilly, the University of Oxford and many SMEs report benefits such as access to specific expertise and new networks, elevated profile and a strengthening of research capabilities.

Rapid access to a wealth of new knowledge, skills and expertise can also be achieved through EUREKA, the pan-European network for market-orientated, industrial R&D (www.eureka.be). As the EUREKA consortium that developed the Digital Audio Broadcasting (DAB) standard has demonstrated, being present at the start of industry-changing developments can transform the fortunes of collaborators.

The Enterprise Europe Network (www.enterprise-europe-network.ec.europa.eu) was launched in 2008 to offer a one-stop information source for European SMEs and entrepreneurs. The network offers effective solutions to over 40 countries, including the 27 EU member states.

CASE STUDY: EUROPEAN TECHNOLOGY FOR BUSINESS

Led the 25-partner EU Framework Programme project Healthy Aims, which has successfully exploited micro, nano, bio and wireless technologies to revolutionise the medical sector.

'As an SME in the UK with a strong focus on R&D we have found excellent support from the UK Government, industry and universities. Without this our company would not have been able to lead major UK and EU projects and introduce new innovative products onto the market.'

Diana Hodgins
Managing Director, European Technology for Business

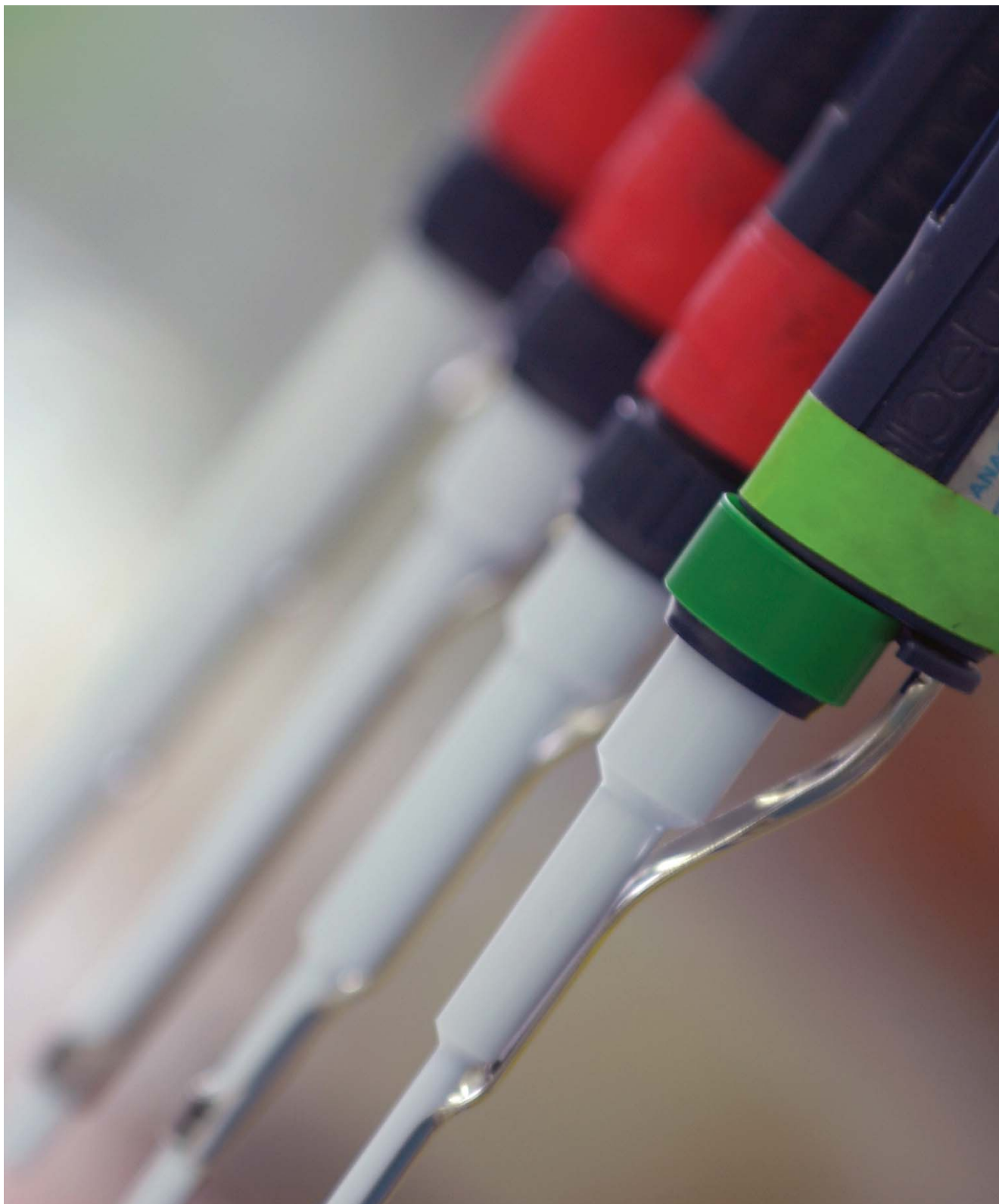
CASE STUDY: BIONEER

Establishing a UK base has enabled Bioneer, the Korean manufacturer of tools and diagnostic kits, to commence their European development.

'This is a wonderful place to work from. I can reach all the major pharmaceutical companies, scientific centres and universities in Europe by lunchtime.'

Peter Wolstenholme
Director of European Operations, Bioneer

Universities in the UK received €1 billion from the European Union between 2003 and 2006, representing almost 25 per cent of all European Union academic funding available for leading-edge projects across Europe



Enterprise in the UK

A great place to do R&D business

The UK's open and supportive environment for enterprise and a fiscal regime that encourages industrial investment in R&D have been augmented in recent years by enhanced tax incentives, reduced patent costs and major developments in skills and science parks. As a result, the UK remains the best R&D performer in the G8 leading economies and the best place for doing business in Europe.

Stable economy

Underpinning the country's success in attracting investors in R&D is a diverse economy with deep pools of expertise across the industrial spectrum and a long-standing commitment to providing advantageous conditions for overseas organisations. The UK's unique position as a gateway to international connections adds to these compelling reasons for undertaking R&D in the UK, acting as a springboard for global growth for investors and enhancing the value of their investment in the UK.

Low costs

Once here, these firms and their UK counterparts enjoy R&D, start-up and operational costs that compare very favourably with those in the US, Japan and Germany, as well as benefiting from one of the most supportive legal systems in the world for business. In assessment of 175 countries, the World Bank ranked the UK first within Europe for 'ease of doing business', a factor covering several legal issues including the ability to enforce contracts, ease of hiring and dismissing

workers, regulations to start a business and overall protection for business.

Generous incentives

Many more factors lie behind the UK's standing as Europe's leading investment destination for companies relocating and developing their business. For example, the UK has a low tax rate environment, with its corporate tax rate now one of the lowest in the industrialised world and its highest personal tax rate one of the lowest in the EU. On top of this, investors in R&D in the UK can take advantage of the R&D tax credit scheme (www.berr.gov.uk/dius/innovation/randd/randd-tax-credits/page11350.html).

Designed to encourage industrial investment in R&D, the scheme's rates have recently been raised, resulting in support for large companies increasing to 130 per cent of qualifying R&D expenditure and to 175 per cent for small and medium-sized enterprises.

R&D grants

There are also a number of Government grants of particular benefit to UK-based R&D investors. Administered by the Regional Development Agencies (www.englishsrda.com), these range from the Grant for Research & Development which enables entrepreneurs and smaller companies to carry out R&D on innovative products and processes, to Proof of Concept funding, which gives financial backing to inventors and researchers looking to demonstrate the commercial viability of their technologies.

'We are strongly appreciative of the R&D Tax Credit scheme in the UK. We were also impressed by the ability to recruit high quality scientific staff, at first degree and PhD levels, during the recent transfer of one of our technology centres from Chicago to Leeds and Port Sunlight.'

Dominic Tildesley, Chief Scientist for Unilever's HPC division



BG Premier Power, Northern Ireland, UK, Plant

Since the introduction of R&D Tax Credits, there have been over 22,000 claims, representing a £1.8 billion boost for companies of all sizes who have undertaken R&D in the UK



Organisations carrying out R&D in the UK benefit from a total of £300 million a year in tax relief and credits

CASE STUDY: SWORD

A French IT company whose investment in a new research centre in Wales owed much to the commitment and loyalty of the local workforce.

'When we tested the cultural behaviour of the workforce we were really impressed.'

Heath Davies
UK Managing Director, Sword

CASE STUDY: INTERCYTEX

A UK healthcare company developing cell therapy products for the woundcare and aesthetic medicine markets and the recipient of research funding from the Collaborative Research and Development programme.

'As an R&D company, we depend heavily on non-trading cash flows to enhance our product development and R&D Tax Credits contribute towards this. They assist the company in recruiting the best available research staff, the development of new and innovative products and reducing the timeline from pure research to marketing of products.'

Mike Panteli
Finance Controller, Intercytex

Selective Finance for Investment, a discretionary grant available in certain areas of the country, contributes to capital investments made in new or expanded facilities.

Capital access

For organisations looking for external investment finance, the UK's mature Venture Capital market and Alternative Investment Market (AIM), the most successful growth market for smaller companies in the world, can prove fruitful hunting grounds.

The 400 members of the British Venture Capital Association invested £10.2 billion in 1300 UK companies in 2006 and have demonstrated a dynamic response to emerging sectors. This is exemplified by the foundation of the £44.5 million AIM-listed Low Carbon Accelerator Fund dedicated to the growth of businesses with products capable of delivering immediate CO₂ emission reductions.

IP improvements

When it comes to commercialising R&D, the UK's progressive Intellectual Property (IP) system is renowned for providing robust, well-policed protection of new ideas, concepts and innovations. Inventors and businesses in the UK also now benefit – to the tune of more than £10 million a year – from new patent legislation that does away with unnecessary translations. The London Agreement greatly reduces the cost of patenting in Europe and increases the UK's appeal as a strategic location for global IP protection.

Highly-skilled people

One of the most significant benefits for innovation-based businesses operating in the UK is the highly-skilled and adaptable workforce. The combination of this skills pool with flexible working regulations and competitive labour

costs is a compelling message for organisations looking for a location to undertake highly specialised, high-risk R&D. The UK also achieves a competitive position when compared against other European countries in terms of the 'rigidity of employment' index (which covers issues such as fixed-term contracts and working time requirements), costs of redundant workers and non-wage labour costs. In this latter category, the UK holds the top position.

Skills development

Businesses involved in R&D in the UK very often find employee skills are enhanced by close collaboration with the UK's universities, many of which have extensive experience of developing tailored training programmes with individual companies to meet specific skills requirements. In addition to these training opportunities and Government-subsidised skills programmes, the UK is well served by over 8,000 commercial training organisations providing courses for all levels up to leading-edge skills development in high-tech sectors.

Science parks

A key strength of the UK as a location for R&D is its world-class network of science parks and business incubators which provide privileged links to universities and research centres, access to R&D facilities and equipment and technical and business assistance. Increasing demand is driving significant expansion of these centres, as the recent opening of a new purpose-built facility at Oxford's Begbroke Centre for Innovation and Enterprise demonstrates. Closely integrated with Oxford University, which signed more than 2,200 research-related contracts in 2006, the centre acts as a conduit for knowledge and technology transfer between researchers and entrepreneurs.

'The support mechanisms available through UK Trade & Investment are fantastic. UK Trade & Investment delivers.'

Louise Rutten, Chief Executive, Yellow Culture, a New Zealand company that's developed an innovative healthy food range in the UK.



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CASE STUDY: BLITZ GAMES

By working with regional centres of excellence such as Digital Central and the Serious Games Institute, in addition to collaborating with the universities of Birmingham, Coventry and Sheffield in a £2.09 million Serious Games R&D project, Blitz Games Studios is developing next-generation training solutions.

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The company is currently investing in a series of R&D activities with the support of the EU's IST programme, regional development agency Advantage West Midlands and the Government's Collaborative R&D Programme to capitalise on the potential of the emerging serious games sector. 'Using video games technologies and techniques to create training and education programmes is a new challenge and that is why we need to be engaged with other organisations, countries and research projects with different experiences and skills to ensure our company is at the leading edge of this new environment.'

Mary Matthews
Strategy & Business Development
Director, Blitz Games Studios, one of Europe's top video games developers.



Over £10 billion was spent by the UK Government on training programmes to enhance the development of the workforce in 2006

ACCESSING UK R&D

Advice and assistance for investors

Organisations around the world wanting to capitalise on the UK's R&D excellence can call on its dedicated global, national and regional networks and dynamic R&D initiatives to access the people, projects, facilities and funds they need to realise their R&D ambitions in the UK.

The UK Government has teams across the country as well as in Embassies, High Commissions and Consulates around the world who can provide everyone from individual entrepreneurs and specialist research institutes, to small and medium-sized companies and multinationals with tailored help to get their R&D projects up and running quickly and smoothly in the UK.



CASE STUDY: PIVOTAL ENGINEERING

The New Zealand developer of a high power density engine which asked the GPP to identify possible UK partners for its development programme.

'The concentration of interest from UK organisations in our Global Partnerships Programme (GPP) profile makes the UK the ideal place from which to direct European production.'

Paul McLachlan
Managing Director, Pivotal Engineering

At the heart of this support structure is UK Trade & Investment (www.uktradeinvest.gov.uk), the Government organisation that helps overseas and UK-based companies succeed on the world stage. As the UK Government's investment and trade development agency, it is one of the very best in the world, enabling every client to benefit from the unparalleled global reach and deep local knowledge of its technological and commercial experts. Its teams around the world act as a single point of reference for overseas organisations to access the full range of R&D resources throughout the UK.

A prime example of UK Trade & Investment's international teamwork and support in action is the R&D Programme, which provides practical help to multinational companies to undertake or increase their levels of R&D in the UK. By creating cross-Government 'Virtual Teams' for overseas clients to develop and deliver tailored packages of support, the R&D Programme connects clients to the cutting-edge research they need. Key to the Programme's power is its team of R&D Specialists, who have long and successful private-sector careers, first-hand experience of business R&D and extensive personal networks. The programme also helps innovative UK-based companies to boost their R&D output through trade development support.

UK Trade & Investment also offers a unique free partner-matching service, The Global Partnerships Programme (GPP) (www.ukinvest.gov.uk/gpp), which is operated within the R&D Programme. The GPP Programme puts research-led overseas businesses in touch with UK organisations to develop research and internationalise. The GPP operates a fast and robust partner-identification and selection process which has proven exceptionally popular and successful with companies in countries such as Canada, France, Israel, Italy, Spain, New Zealand and the US.

Over 85 overseas-based entrepreneurs have migrated to the UK with their leading-edge technologies to establish businesses here as a result of UK Trade & Investment's Global Entrepreneur Programme (GEP) (www.entrepreneurs.gov.uk). GEP combines the ability to open doors that only a Government initiative can offer with the commercial flair and acumen of its Dealmakers, successful entrepreneurs with extensive networks in business, government and financial markets. Dealmakers connect entrepreneurs with investors in innovation, management talent and strategic partners, helping them turn their technologies into global successes.

UK Trade & Investment works with organisations such as Regional Development Agencies (RDAs) (www.englandsrdas.com), Scottish Development International (www.sdi.co.uk), International Business Wales (www.ibwales.com) and Invest Northern Ireland (www.investni.com) to help companies find R&D partners, sites and staff, integrate with the local business and research communities and access UK and European R&D funding. They also provide hands-on help with relocating to the UK and moving staff and equipment to get companies going and growing in the UK, into Europe and the rest of the world.

Dedicated staff at 39 diplomatic missions in 24 countries play an important role in the UK's international efforts to engage with the world's R&D communities. This Science & Innovation Network (SIN), part of the Department of Innovation, Universities and Skills (DIUS) (www.dius.gov.uk), helps UK universities and research laboratories work with their public and private-sector counterparts abroad and also works to increase access to foreign funding for UK researchers and to attract R&D-intensive international investment in the UK.

At home, the RDAs have a critical role to play, providing support for inward

investors, access to regional centres of research excellence and clusters and exceptional local knowledge and contacts. Many have programmes dedicated to promoting international R&D in their regions, The Soft Landing Zone Programme is a national scheme which is co-funded and managed by Coventry University Enterprises (CUE).

It aims to deliver 'hands on' support to UK companies, engaged in R&D activity, to conduct business overseas, with a view to increasing their R&D levels back in the UK. The programme helps UK companies to develop international licence agreements, joint ventures, collaborative R&D projects, partnerships and introductions to Higher Educational Institutes and Research Centres through a network of 'Soft Landing Zone' offices overseas and makes good use of CUE's alumni network. Another good example is the South East England Development Agency (SEEDA) which connects organisations to its 24 universities and 17 science and business parks, to the consortia it has established for the health technologies, aerospace and digital and creative media sectors and to its Innovation Advisory Service which helps companies access the latest research.

'What I do is match world-class science with global entrepreneurs and investors to create world-class opportunities and find the components to make the project work.'

Toby Wilson Waterworth
Dealmaker, Global Entrepreneur Programme, which has brought in venture capital investment of over £100 million for overseas entrepreneurs since its inception in 2003

UK Trade & Investment is the Government organisation established to support companies in the UK doing business internationally and overseas enterprises seeking to set up or expand in the UK.

Assisting investors

With unrivalled local access and knowledge, UK Trade & Investment can offer overseas organisations the support and contacts they need to establish a presence or expand in the UK quickly and efficiently. Working in partnership with the Regional Development Agencies and the Devolved Administrations in Scotland, Wales and Northern Ireland, UK Trade & Investment provides confidential tailored advice and support in key areas.

- Access to industry networks and centres of excellence
- Introductions to sector leaders and business contacts including arranging visit programmes
- Information on the UK business environment including taxation and comparative cost analysis
- Assistance with finding land, property and sites and guidance on issues like planning
- Information on the UK labour environment including recruitment, retention, training
- Advice and information on UK grant schemes aimed at encouraging investment and job creation in specific industries and specific areas of the UK
- Access to UK and European programmes supporting technology and process transfer
- Assistance with regulatory issues
- Introductions to UK legal experts in employment law, contracts, work permits, immigration and unions
- A voice in Government for business interests
- Continued support through its Investor Development network to help companies mature and develop successfully.

Contacts

Carbon Trust

www.carbontrust.co.uk

Centre for Ecology and Hydrology

www.ceh.ac.uk

Centre of Excellence in Customised Assembly

www.ceca-uk.com

Centre for Sustainable Design

www.cfsd.org.uk

Department for Innovation, Universities and Skills (DIUS)

www.dius.gov.uk

Energy Technologies Institute

www.energytechnologies.co.uk

English Regional Development Agencies

www.englishsrda.com

The Enterprise Europe Network

www.enterprise-europe-network.ec.europa.eu

EUREKA

www.eureka.be

Innovation Platforms

www.innovateuk.org/ourstrategy/innovationplatforms.ashx

ITI Techmedia

www.ititechmedia.com

Knowledge Transfer Networks

www.ktnetworks.co.uk

Knowledge Transfer Partnerships

www.ktponline.org.uk

Motor Industry Research Association

www.mira.co.uk

The Natural Environment Research Council

www.nerc.ac.uk

Research Councils

www.rcuk.ac.uk

Technology Strategy Board

www.innovateuk.org

TWI

www.twi.co.uk

UK Research Office

www.ukro.ac.uk

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Solutions for Business

Funded by
UK Government

A range of UK Government support is available from a portfolio of initiatives called Solutions for Business. The “solutions” are available to qualifying businesses, and cover everything from investment and grants through to specialist advice, collaborations and partnerships.

UK Trade & Investment is the government organisation that helps UK-based companies succeed in the global economy.

We also help overseas companies bring their high-quality investment to the UK’s dynamic economy – acknowledged as Europe’s best place from which to succeed in global business.

UK Trade & Investment offers expertise and contacts through its extensive network of specialists in the UK, and in British embassies and other diplomatic offices around the world. We provide companies with the tools they require to be competitive on the world stage.

For further information please visit www.uktradeinvest.gov.uk or telephone +44 (0)20 7215 8000.

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