EPSRC and TSB
Partnership in
High Value Manufacturing
The Government’s Plan for Growth and the recent Heseltine Review have emphasised the need for all of Government to work together to ensure economic growth. This theme is further developed through the Government’s Industrial Strategy, which has prioritised a number of important manufacturing sectors where the Government needs to adopt a coordinated approach. Research, technology and innovation represent a key component within the growth agenda, particularly in relation to the long-term competitiveness of manufacturing industries. The future success of UK manufacturing will depend upon the production of innovative products and systems that can compete successfully in domestic and global markets.

In addition, jobs generated in manufacturing create additional employment in the wider economy.

Investment in High Value Manufacturing activities by industry frequently depends upon successful engagement with the UK research and innovation base – both for the incorporation or development of knowledge and the availability of a skilled workforce. Innovation can occur in the research base, in industry or through collaboration between the two. The recent commitments in EPSRC Centres for Innovative Manufacturing and TSB’s Catapults should both increase and facilitate these interactions. Innovation should be the main driver in generating growth through industrial exploitation in the UK.

EPSRC and Technology Strategy Board have agreed a joint partnership in High Value Manufacturing, which aligns their complementary investment in research, development and technology.

EPSRC currently invests around £80 million annually through its Manufacturing the Future theme, in support of innovative research and skills. This is used to support a number of Centres for Innovative Manufacturing, strategic research programmes and a diverse portfolio of manufacturing research projects, fellowships and doctoral research studentships. The TSB High Value Manufacturing programme invests a comparable amount to promote business innovation within high value manufacturing companies. This includes the development and operation of the High Value Manufacturing Catapult Centres, support for Collaborative R&D projects and other related initiatives.

This partnership covers a combined public investment of over £150 million, which is used to stimulate long-term economic growth for the UK through manufacturing innovation.
EPSRC AND TSB AND MANUFACTURING

EPSRC and the TSB have shared goals, and complementary roles, in the support of High Value Manufacturing. In recent years they have collaborated effectively in a number of initiatives focused on manufacturing innovation. As a consequence, there is a close alignment between the science base investments made by EPSRC and the business-led programmes supported by TSB. The research and industrial communities in this area are also well engaged with each other, and with both EPSRC and TSB. There is a strong expectation from universities and companies for EPSRC and TSB to work together effectively.

The TSB High Value Manufacturing (HVM) strategy states: “High value manufacturing is the application of leading-edge technical knowledge and expertise to the creation of products, production processes and associated services which have strong potential to bring sustainable growth and high economic value to the UK. Activities may stretch from R&D at one end to recycling at the other. Such potential is characterised by a combination of high R&D intensity and high growth.”

Manufacturing the Future has been identified as a priority theme within the EPSRC Delivery Plan over the period 2011-2015. This seeks to develop new scientific understanding of manufacturing processes, technologies, products and systems.

The TSB aims to maintain or enhance the international competitiveness of UK-based manufacturing industries through the development and application of innovative manufacturing technologies in product, process and service areas within and across sectors. High Value Manufacturing has been highlighted as a cross-cutting competency within the TSB Strategic Plan, with increased investment in recent years.

EPSRC and TSB therefore occupy complementary positions within the innovation landscape. These are often defined as Technology Readiness Levels (TRL), which has been adapted from the NASA TRL model.

This partnership seeks to ensure there is a coupling or progression from low TRL activities supported by EPSRC, through the higher TRL activities supported by the TSB. It also seeks to increase the feedback from business about opportunities and challenges, thereby influencing longer term research agendas.

A PARTNERSHIP FOR HIGH VALUE MANUFACTURING

This partnership represents a joint commitment to sustain and further develop joint working between EPSRC and TSB, and ensure effective actions at both strategic and operational levels. It seeks to formalise current practices, which have developed naturally in an ad hoc fashion, and provides a framework for future collaboration.

The overall aim of this partnership is to generate economic growth for the UK by:

- Securing maximum advantage for UK manufacturing industry from the UK research and innovation base
- Capturing emerging science and technology opportunities for High Value Manufacturing
- Developing and sustaining manufacturing competencies in areas where the UK has potential to deliver economic impact across a number of sectors

In support of this goal, EPSRC and TSB will seek to:

- Ensure that there is a strong alignment between the science base investments made by EPSRC and the business-led programmes supported by TSB
- Ensure UK research and innovation infrastructure works in concert, and presents a coherent landscape for business
- Pool resources in areas of mutual and overlapping interest
- Share information and knowledge through regular interaction and communication
- Share feedback from projects and stakeholders, and use this to identify topics where there are new research and/or innovation support opportunities

This partnership between EPSRC and TSB covers the period defined by the Government Spending Review, until April 2015.
CURRENT ACTIONS

Strategic alignment
It is important that the research and innovation strategies of EPSRC and TSB are connected appropriately, in order to achieve an effective coupling of science push and market pull. Because science and technology emerges, develops and matures over a range of timescales, it is not always sensible to prescribe how and when these strategies should be coupled. It is more realistic to identify and seize opportunities as they become manifest. EPSRC and TSB will align their respective research and innovation strategies to accelerate the progression from research through to business implementation with the following actions:

Action 1. EPSRC is represented on the EPSRC Manufacturing the Future Strategic Advisory Team, which aims to identify emergent research opportunities and challenges, particularly those with potential for transformative impact.

Action 2. EPSRC is represented on the TSB HVM Landscape Steering Committee, which provides strategic direction in the building of key competencies required for competitive UK manufacturing.

Action 3. EPSRC and TSB have cross-representation in strategy development activities such as thematic evaluations, reviews and special interest groups etc.

EPSRC and TSB are key stakeholders in the Government’s Foresight programme in manufacturing, which aims to review the long-term picture for the manufacturing sector, investigating global trends, drivers of change and how the UK can maximise these opportunities.

Action 4. EPSRC and TSB will assist BIS GO-Science in the development of the Foresight agenda and will jointly review the conclusions and implementation plan for this exercise.

National capability
EPSRC and TSB will ensure that the UK research and innovation infrastructure works together effectively for national advantage – particularly the HVM Catapult, the relevant Knowledge Transfer Networks (KTN) and EPSRC Centres for Innovative Manufacturing.

Action 5. EPSRC and TSB will seek to motivate and mobilise joint working between the EPSRC Centres for Innovative Manufacturing and HVM Catapult, including encouraging collaboration on EPSRC and TSB programmes, staff exchange and joint dissemination.

Action 6. TSB technologists are represented on the Advisory Groups for individual EPSRC Centres for Innovative Manufacturing. They will advise Centres on how to progress promising outcomes, facilitate new collaborations and engage with TSB strategies and programmes.

Action 7. EPSRC and TSB will identify the KTNs best positioned to interface with business communities, particularly in areas of strategic importance, where there is a common interest. KTNs will be used to gather information, disseminate findings and communicate opportunities.

A number of EPSRC Centres for Doctoral Training (CDT) are closely linked to the HVM Catapult. The Catapult can offer some unique facilities and capabilities for the support of manufacturing research training and facilitates industrial engagement in high level training and skills.

Action 8. EPSRC will renew its CDT portfolio during 2013; TSB has been involved in setting the EPSRC priorities for manufacturing research training. The HVM Catapult will be encouraged (by TSB and EPSRC) to actively engage with this process and the successful CDT portfolio.

EPSRC and TSB will seek to ensure that the UK secures maximum value from engagement in collaborative European and international programmes.

Action 9. TSB, EPSRC and BIS coordinate UK policy input to European manufacturing initiatives and engagement with European stakeholders. Leading research universities and companies are represented on the UK Manufuture and SPIRE liaison groups.

Action 10. EPSRC and TSB, together with other stakeholders such as UKTI, support international initiatives such as Mission to China and possibly India and USA in future.

Joint investment
EPSRC and TSB will seek to establish clearer pathways from breakthrough research through to manufacturing impact.

Action 11. EPSRC will contribute to TSB Collaborative R&D competitions in High Value Manufacturing, focusing on areas where there is a strong and established EPSRC research capability. EPSRC will encourage leading academic researchers in these areas to engage with these business-led programmes, and thereby accelerate the industrial take-up and engagement with EPSRC research. EPSRC investment in TSB manufacturing programmes is currently ~£3 million per annum and is expected to continue at this level (dependent upon appropriate high-quality research proposals).
Adventures in plastic

Research into renewable polymers by two EPSRC-funded chemists at Imperial College London, Professor Vernon Gibson FRS and Dr Ed Marshall, led to the foundation of a spin-out company, Plaxica, to commercialise the scientists’ work. Since Plaxica’s 2009 launch, the company has gone from strength to strength, and is an acknowledged leader in eco-friendly next-generation bioplastics technology, employing 26 full-time staff.

The current generation of plastics is no longer sustainable because of the oil they use and the waste they leave. Plaxica is tackling this problem head on, and specialises in the production of bioplastics – plastics made from natural feedstock such as sugar and cellulosic based materials. The company’s aim is to reduce the reliance upon oil-based products by using more sustainable and environmentally friendly processes for use in a wide range of industrial and consumer applications, including packaging, textiles, electronics and automobile parts.

This success has been supported throughout by the Technology Strategy Board, which has invested £700,000 in Plaxica over four years, and investors including Imperial Innovations, the Carbon Trust, Invesco and the National Endowment for Science, Technology and the Arts (NESTA).

Crucial to the company’s success has been its association with the Centre for Process and Innovation (CPI) in Wilton, Yorkshire, which Plaxica approached to help develop its technology.

CPI is part of a new generation of UK-based technology innovation centres, and part of the High Value Manufacturing Catapult, a Technology Strategy Board programme, whose role is to bridge the gap between research and commercial reality. The CPI provided the ideal complement for the underpinning chemistry research supported by EPSRC, and the potentially costly development activity Plaxica needed to develop, prove, prototype and scale-up the next generation of its products and processes.

In 2012, Plaxica expanded to two laboratories at Wilton where it now runs a £2 million demonstration plant. In the four years since its launch, the company has raised around £11 million from its investors.

EPSRC Centres for Innovative Manufacturing

EPSRC Centres for Innovative Manufacturing are an integral part of the total UK innovation scene focusing on the discovering and understanding of future manufacturing processes and technologies. There are currently 16 flagship EPSRC Centres for Innovative Manufacturing which have been co-created with industry to address their long-term manufacturing challenges and/or emergent market opportunities.

These are national EPSRC centres and so a key aspect of their work is to create a national network of expertise in order to inform UK strategy and advise industry where to find the UK internationally leading academic excellence.

The EPSRC Centres are efficiently networked with the Technology Strategy Board’s activities, especially the Catapults, to enable their research to be further developed as smoothly as possible. In addition, they provide the opportunity to examine fundamental research challenges uncovered by the Catapults.

High Value Manufacturing Catapult

The HVM Catapult is the catalyst for the future of manufacturing in the UK, with the aim of helping to accelerate new concepts to commercial reality and thereby creating a sustainable high value manufacturing future for this country.

The HVM Catapult combines seven world class centres of industrial innovation into one cohesive force which will:

- Develop a network of leading suppliers who contribute to key UK industry supply chains
- Unite industry, government and research in a shared goal to make the UK an attractive place to invest in manufacturing

The Catapult builds on the strong existing UK science base, taking forward the research supported by EPSRC to fill the gap between proven concepts and full commercialisation.