

ESRC research helping industry Social science aids growth, shapes business and fuels innovation

Social sciences are vital to UK industries

The ESRC and the social sciences have a key role in understanding industry and driving national productivity. Our funding has had a direct impact on many businesses and industries across the UK – driving local prosperity and growth and improving innovative capability.

Supporting industry: Cross-cutting challenges

Social sciences are unique in their ability to work across industries and the different sectors – understanding the behaviours and wider factors that underpin economic growth and innovation, addressing the areas other research cannot.

They include:

- place understanding the role of industry in driving growth across the whole country and understanding regional variation
- transformative business practices understanding what drives innovation in business and how best to support it
- skills exploring the skills needed by employees and managers to underpin a modern economy
- digital infrastructure understanding the benefits and challenges of digital technologies and innovative use of data

Supporting industry: Creating collaborations

Fundamental to ESRC's work is engagement and collaboration with a range of stakeholder groups including industries and businesses.

In 2015/16 alone over 16 per cent of our grants included industry partnerships; we funded 17 new and 57 existing ESRC-supported Knowledge Transfer Partnerships (KTPs) with small businesses and social enterprises.

Our Impact Acceleration Accounts supported 67 projects with total project costs of ± 3.4 million, leveraging ± 2.5 million in additional support from business partners.

Our Phase Two Data centres are collaborating with a range of businesses focussing on using business data in new ways. Partners include Sainsbury's; E.ON; Shop Direct; Tesco; Argos; The Co-Operative Food Group; GlaxoSmithKline; British Gas; Boots; EasyJet; and AXA PPP.



Supporting industry: Aiding growth, productivity and innovation

ESRC invests in high quality, interdisciplinary research that improves growth and productivity in the UK and globally. Our current priorities demonstrate the breadth of social science research that contributes directly to the challenges laid out by the industrial strategy:

- Understanding the drivers of productivity across sectors and the whole economy.
- Developing new models and methodologies to understand the performance of the macroeconomy.
- Understanding the ways in which digital innovations can help and hinder individuals and businesses.
- How the impacts of innovations in leadingedge healthcare might help address mental health and wellbeing.

Research in social science is essential to unlock the complexities of economic prosperity for all; a prosperity which is environmentally, socially and financially sustainable. New research on the drivers of improvements in productivity is urgently required. The value of social science is that it provides robust evidence and insights at the level of individuals, local networks, organisations, sectors and whole societies.



Technology Readiness Levels (TRLs): Social science working across the spectrum

TRL 1-3

Social science research can help understand the context of new technologies and shape their development. The social sciences can also provide insights about ethical issues and regulatory challenges.

TRL 4-6

The social sciences can provide an awareness of public opinion and the societal acceptance of innovation. Social science research can also add value by exploring issues that may be faced as technology gets closer to market.

TRL 7-9

As technology becomes closer to market, social science research can provide insights about how to realise greater value in different ways (eg, business models and consumer behaviour).

Technology Readiness Levels (TRL)	
TRL9 Operations	
TRL8 Active Commissioning	
TRL7 Inactive Commissioning	
TRL6 Large Scale	
TRL5 Pilot Scale	
TRL4 Bench Scale Research	
TRL3 Proof of Concept	
TRL2 Invention and Research	1
TRL1 Basic principles	



Making a difference

An ESRC/Innovate UK-supported Knowledge Transfer Partnership between Newcastle University Business School and Addison Motors implemented 'lean' techniques for the company – segmenting the aftersales service into a 'green stream' for predictable routine servicing, 'amber stream' for semi-predictable work and 'red stream' for unpredictable work (such as car accident repairs).

The lean model maximised operational efficiency, increasing annual sales turnover by \pounds 720,000. Lookers plc, who acquired Addison in 2015, were so impressed by the improvements that they decided to roll it out across the entire Lookers Group.



Robotics and artificial intelligence

Social science can provide understanding and insights into many of the complexities of the shift towards greater integration of robotics and artificial intelligence in our personal and working lives.

Why social science is vital

Social science research will make a critical contribution to the move towards greater use of robotics and AI across all areas of our lives, addressing questions related to changing organisational behaviour, educating the workforce of the future, and the governance of this new technology.

The social impact of robotics and AI is expected to be significant and rapid, and social science can provide crucial insights into how humans and robots can co-exist in the future, ensuring that individuals can continue to have meaningful life roles, and exploring questions of trust and ethics.

Portfolio highlights

Robotics and AI offer an exciting new opportunity for existing social science expertise to be brought to bear on new technologies. ESRC has a long history of working collaboratively with other Research Councils across many areas related to wider digital and technological change, including: 'Ways of Being in a Digital Age' – one of our strategic priority areas.

Drawing on the recommendations of a soonto-be-completed systematic scoping review, we anticipate that automation of work and personal life will emerge as a strong theme. We have also supported relevant work around topics including the governance of science and technology and machine learning (£5 million over the next five years).

- Empathy and Trust in Communicating Online (EMoTICON), funded with EPSRC, AHRC and the Defence Science and Technology Laboratory (DSTL).
- The RCUK Digital Economy Programme.
- People at the Centre of Communication and Information Technologies (PACCIT)

Programme, completed in 2006 and funded in collaboration with EPSRC and the-then Department for Trade and Industry (DTI).

The Centre for Corpus Approaches to Social Science (CASS) looks at language interfaces in artificial intelligence and robotics.





Social science ensures that the latest research on the bioeconomy and innovation in the healthcare, food and energy production sectors is relevant and increases understanding of what a successful bioeconomy looks like.

Why social science is vital

Social sciences are vital to exploring the bioeconomy sector, with a number of areas needing critical research from the social science community:

- Continuing Nexus research to understand the trade-offs needed for sustainable management of resources, to enable a successful bioeconomy.
- Natural capital work and economic/social valuation of natural assets.
- Ethical, legal and social implications relating to bioeconomy, understanding public acceptability.
- Ability for businesses to adopt new models and technology.
- Identify business models that are needed to make implementation a success.

Portfolio highlights

We have supported a wide range of grants, centres and co-funded calls that have explored many aspects of the bioeconomy. These include:

- ESRC Centre for Genomics in Society (£4.1 million)
- ESRC Centre for Social and Economic Research on Innovation in Genomics (£5.6 million)
- Centre for Economic and Social Aspects of Genomics (£8.3 million)
- ESRC Genomics Policy and Research Forum Phase II (£2 million)
- ESRC Centre for Social, Technological and Environmental Pathways to Sustainability (£8.2 million over two awards)
- Social and Environmental Economic Research into Multi-Objective Land Use Decision Making (£1.8 million)
- Funded relevant research grants, eg, 'The transition to a sustainable bio-economy: innovation and expectations' (£253k)
- ESRC/FSA Understanding the Challenges of the Food System

- Global Food Security call, BBSRC/NERC/ ESRC/SG Resilience of the UK Food System in a Global Context
- ESRC contribution to the Sustainable Agriculture Research and Innovation Club with BBSRC/NERC
- ESRC contribution to the Tree Health and Plant Biosecurity Initiative (other co-funders are BBSRC, Defra, FC, NERC SG)
- ESRC contribution to Valuing Nature Health and Wellbeing research projects (other cofunders are NERC and AHRC)





Satellites and space technologies

Social science is critical to the governance, legal and data privacy frameworks that underpin the use of satellite and space technologies, exploring informed consent, public relationships and acceptability.

Why social science is vital

There is considerable potential for cuttingedge research combining social science and space applications. For example, new ways of combining social science research with satellite imagery to offer valuable insights to industry in a wide range of fields.

- Understanding what's available and what the possible uses might be, including the identification of policy and industry questions and how they relate to research activity.
- Considering the demand for data and skills and how they might be met, as well as training needs in the wider use of space tech.
- Understanding governance issues around the validity and authenticity of data, consent and personal data.
- Understanding the public relationships with satellite tech and data.

Social and economic research is therefore essential to realise the full potential of satellites – by ensuring that value is generated from satellite data and imagery; by overcoming related governance issues; and by realising the potential global impacts of rapid development in this area for society and business.



Portfolio highlights

ESRC has already begun funding research that draws on or helps to understand satellite and space technology, including:

- The Integrated Multimedia City Data project within the Urban Big Data Centre in Glasgow is collecting innovative data through a household survey, sensor data collection, textual and multimedia internet information retrieval, and very high resolution satellite data. This will allow us to understand the context and motivations driving the social aspects of the urban environment (£7.6 million to the centre).
- Earth observation and socio-economic data visualisation in support of marine governance and future marine economic prosperity and health – Eleni Papathanasopoulou, Plymouth Marine Laboratory (£115k).
- Changing Socio-Spatial Inequalities: Population change and the lived experience of inequality in urban South Africa – Christopher Lloyd, University of Liverpool (£422k).
- Antibiotics and Activity Spaces: An Exploratory Study of Behaviour, Marginalisation, and Knowledge Diffusion

 Marco Haenssgen, University of Oxford (£204k).



Transformative digital technologies

Social science is needed to enable us to understand the interactions between people and technology, the skills required for the new digital economy, consumer behaviour, policy and regulation, cyber security and public trust in new technologies.

Why social science is vital

There is potential for research to improve the skills required for transformative technologies to be effective and to explore their potential business and social applications:

- Research opportunities around social science input to developing transformative technologies and the skills and methods trained social scientists can bring to bear.
- Specific expertise and thus applications in retail and financial services; understanding and development of potential markets for transformative technologies.
- Providing the economic evidence to ensure that the UK realises the full benefit of digital infrastructures and makes informed policy decisions.

Portfolio highlights

We have a long history of funding research that explores new technologies, and their influence on behaviour. This includes:

The ESRC-funded Consumer Data Research Centre that has classified every neighbourhood in England according to how those who live there use the internet for consumer purposes. Key attributes to this Internet User Classification include: education, employment, engagement with new innovations in information and communications technology and locally available broadband infrastructure (\pounds 5.2 million).

- We contribute to the RCUK Digital Economy Programme which addresses four challenge areas: Sustainable society; Communities and culture; New economic models; and Information technology as a utility.
- A Knowledge Transfer Partnership that helped financial trading company London Capital Group Holdings to improve their risk management procedures – increasing sales by £250,000 and leading to expected profit increases of £2.2 million.
- A Knowledge Transfer Partnership between Cardiff University and Admiral to work on two Big Data analytics projects. Admiral is one of the UK's largest car insurance providers, with over 11 per cent market share and market-leading financial results. To be at the forefront of capitalising on Big Data analytics the company wanted to use the

academic 'know-how' in analysing the high volumes, variety and velocity of their Big Data and the technological capacity to design and embed a platform which will capture data more effectively.





Cutting-edge healthcare and medicine

Social science can support innovation for system effectiveness and efficiency, and enable improvement through research on regulation, reform, economics, security, skills, behaviour change, organisational design and care.

Why social science is vital

There is potential for social science to help improve healthcare systems and medicine through research that examines:

- Growth of the service industry, and with a health system in crisis – fertile ground for innovation in services – the way in which treatments, diagnostics and care services are delivered both in institutions and in the home.
- Contribution to the development and implementation of new technology including its demand, interfaces, usability, behaviourally informed interaction, uptake and use.
- The conditions for innovation and how to enable innovation at a range of levels within a system, including levers for change. This relies on a good understanding of how people and organisations behave and interact, attitudes and how society and the economy works.
- Regulation, health and life science policy and funding models.
- Skills requirements, how best to skill up and re-skill the workforce.



Portfolio highlights

We have supported research that investigates healthcare and medicine through grants, crosscouncil projects and RCUK programmes. Research includes:

Centre for Economic Performance (CEP) – has conducted research on themes such as competition in the health service, informal care, affordability, workforce management.

- Centre for the Microeconomic Analysis of Public Policy – has conducted research on themes such as challenges for health spending, competition and choice in the NHS, private provision, GPs and quality of primary care.
- A project in the ESRC Centre for Research on Learning and Life Chances (LLAKES) has looked specifically at employee-driven innovation in the health sector.
- Funding a diverse portfolio with over 85 grants between 2011 and 2016 directly relevant to innovations in health and social care:
 - the use of data research employing untapped data to create new knowledge to bring about innovative approaches.
 - grants focused on innovative ways of organising healthcare, competition, productivity, reducing costs, stakeholder involvement and entrepreneurship.



New energy technologies including battery storage and grid technology

Social science helps to understand how people use energy - this must underpin innovative approaches to energy supply.

Why social science is vital

Social sciences are vital to exploring the energy sector and understanding how and why people use energy.

Energy production, storage and use forms a complex socio-technical system, which we need to understand in order to be able to transform it to be fit for purpose in the 21st century. Changing lifestyles, new worlds of work, the global movement into cities, new forms of transport, and rising prosperity all drive changing patterns of energy consumption. Understanding the dynamics of consumption provides the opportunities for innovative approaches to meeting those energy demands.

Portfolio highlights

We have supported research that investigates energy use and energy technologies through grants, cross-council projects and RCUK programmes. Research includes:



- The Nexus programme developing new thinking to understand the connections between energy, food and environmental change:
 - Centre for the Evaluation of Complexity Across the Nexus (CECAN) will pioneer, test and promote evaluation approaches and methods across the energy, environment and food nexus
 - Nexus Network: Five research partnership awards will advance understanding of the food-energy-water-environment interactions and support actions to improve their sustainability
 - The Sustainable Urban Global Initiative/ Food-Water-Energy Nexus is a live research call jointly established by the Belmont Forum and the Joint Programming Initiative Urban Europe.
- DEMAND Centre (Dynamics of Energy, Mobility and Demand) with EPSRC – exploring what energy is for and how it is used, ie, to accomplish and achieve other things, and not as consumption for consumption's sake.
- UKERC (UK Energy Research Centre) with EPSRC and NERC – research into sustainable future energy systems.



Manufacturing processes and materials of the future

Social science research underpins the business models to drive value from innovation in materials and manufacturing.

Why social science is vital

 Social science engagement will support development of new business models for commercialisation and value generation, inform the design of labour market policies to supply the new industries with appropriately skilled resources, and contribute to the creation of a policy environment to support, nurture and accelerate the development of world-class firms competing effectively in international markets.



Portfolio highlights

We have supported research that investigates manufacturing through grants, centres and cross-council projects. Research includes:

- The Enterprise Research Centre work on adoption of advanced manufacturing technologies, innovation processes in firms and growth strategies, firm growth and transition to export markets (£4.5 million).
- Developing workplace skills strategies, learning for changing technologies via two completed ESRC centres – the ESRC Learning and Life Chances in Knowledge Economies and Societies (LLAKES) and the ESRC Centre for Knowledge and Organisational Performance (£ 4.1 million and £4.4 million).
- Advanced Institute of Management Research (AIM) completed in 2012 was the UK's largest management initiative and was jointly funded by ESRC and EPSRC.



Creative and cultural industries

Social sciences add value to research underpinning innovation in the creative and cultural industries by understanding changes to business models, regulation, skills, employment and working practices in a rapidly changing sector.

Why social science is vital

Social sciences are vital to exploring the creative industries and, specifically, to examine:

- Creative industry business models and understanding how to capture value in a digital age.
- The impact of Pay What You Want and Freemium models, limits of advertising-based revenue streams, 'fair' revenue streams for artists when their work is accessed through platform businesses.
- Skills and employment in the creative and cultural industries and the nature of creative work – whilst employment in the creative sector can be more precarious and is increasingly involving 'pro-ams' (professional amateurs) it has also been suggested that it will be more resistant to automation than other sectors.

This area requires interdisciplinary research – collaborations between social, arts, humanities and computer science researchers as well as creative practitioners. This can make use of existing interdisciplinary investments and networks across the Research Councils (including the Digital Economy next stage

hubs and Content Creation and Consumption research grants, as well as AHRC investments under the digital transformations theme). But the added value of a social science-led investment in this area would be a core focus on business models and employment practices that cuts across the various sub-sectors of the creative industries.

Portfolio highlights

We have long supported creative and cultural industries through individual grants, working with other research councils and contributing to RCUK programmes that examine the digital economy in general and creative industries in particular. Research includes:

- A contribution to the CREATe centre with AHRC and EPSRC – helping to improve UK and EU copyright legislation, and the creative industries to navigate copyright legislation, to enable the creative sector to use digital resources (£800k).
- Collaboration in the RCUK Digital Economy Programme, ensuring that questions of business models, innovation, skills and

working practices are considered in this interdisciplinary area. Key investments here include the NEMODE network plus new economics models with \pounds 1.5 million from the cross-council budget.

Funding a diverse portfolio through the ESRC responsive mode – from work on entrepreneurialism among young women in the classical music profession, to the relationships between ownership, strategy and content in TV production companies; and from tagging online music content for emotion to the role of digital visualisation in architecture.





Social science impacts: Industry

ESRC-funded researchers are making a difference to UK businesses and industries.

- An ESRC-funded Knowledge Transfer Partnership between financial trading company London Capital Group (LCG) and the University of Southampton significantly improved the efficiency and effectiveness of LCG's risk management decisions – increasing sales by £250,000 and leading to expected profit increases of £2.2 million. The researchers developed a client risk assessment model which ranks the company's clients in terms of risk and predicts investors' financial decision behaviours in real time, identifying high-risk clients with 86 per cent accuracy.
- The ESRC Centre for Economic Performance has pioneered new ways to quantify management quality that has been implemented in over 20,000 organisations in 34 countries around the world, including manufacturing firms, retail stores, hospitals and schools. The research shows that key factors causing poor management are low levels of competition, poor skills and weak governance.
- An ESRC-funded Knowledge Transfer Partnership project between Birmingham City University and Hockley Mint revealed a market opportunity for promoting and selling ethically produced jewellery, leading to a shift in Hockley Mint's strategy – launching new product lines and a Fairtrade Ambassador Scheme. Sourcing gold from Fairtrade mines has improved miners' working conditions, reduced the environmental impact of gold mining, and led to a £200,000 increase in annual company turnover.
- English language teaching contributes over £2.5 billion to the UK economy annually, according to Government estimates. The British National Corpus, developed by ESRC CASS centre researchers, contributed to the Oxford Advanced Learner's Dictionary worldwide sales of 35 million copies and language tests for more than 600,000 students annually. The research team collaborated with Trinity College London to create more effective English language tests, which are taken by over 600,000 students in more than 60 countries each year.
- Recommendations from the ESRC Centre for Research on Socio-Cultural Change changed Enfield Borough authorities' strategy for local regeneration, instead persuading major employers to use local businesses and workers to benefit the local economy. This led to two new job creation partnerships, with British Gas and Thames Water, and several hundred jobs anchored by a £10-million British Gas contract.