

DEBATE SUMMARY

Closing the US/UK productivity gap: connecting innovation and research to economic output

Held at The Royal Society on 2nd December, 2015.

The Foundation is grateful to BAE Systems, the Comino Foundation, Cranfield University, The High Manufacturing Catapult, the Michael John Trust and Public Health England for supporting this debate.

The hash tag for this debate is #fstproductivity .
Audio files of the speeches are on www.foundation.org.uk .

Chair: **The Earl of Selborne GBE FRS**
Chairman, The Foundation for Science and Technology

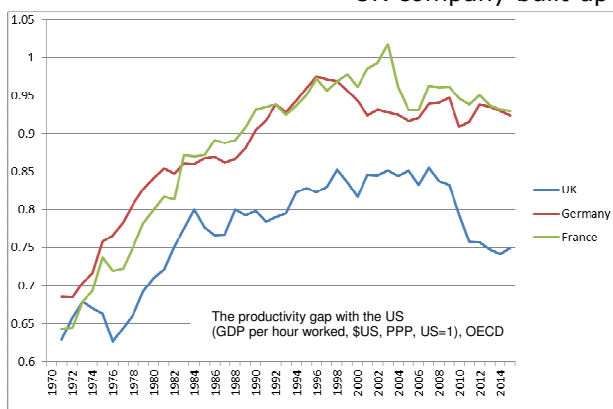
Speakers: **Dr Ruth McKernan CBE**
Chief Executive, Innovate UK
Professor Jonathan Haskel
Professor of Economics, Imperial College Business School
Antony Harper
Head of Research, Jaguar Land Rover

DR RUTH MCKERNAN Chief Executive, Innovate UK said that innovation contributed up to half of all labour productivity growth and that research and development (R&D) underpinned productivity. The UK spent no more than 1.8 per cent of GDP on R&D – less than the 2.5 per cent required to maximise productivity gains. Because every grant had to be matched by private sector money, Innovate UK's investment in over 5,000 companies (in key growth sectors) of £1.5bn of public money since 2007 had resulted in some £3bn worth of investment in innovation and had added £7.5bn to the UK economy and created an average of 7 jobs per company. All of its grant funding was awarded following competition.

Through its four Catalyst programmes (partnerships with Research Councils in biomedical, agri-tech, energy and industrial biotechnology) it provided funding to innovative businesses and researchers working in priority areas offering a clear and progressive route for development. In addition it sought to accelerate UK economic growth by nurturing small high-growth companies with strong potential for increased productivity and exports. An important feature of this activity was the fostering of collaborations with multiple partners and the identification of opportunities for the

application of new technologies developed in one sector into other sectors. Innovate UK aimed to build on innovation excellence throughout the UK, investing in local areas of strength. Innovate UK was responsible for the expanding Catapult programme (see the Foundation debate¹ of 12th November, 2014 at which Hermann Hauser reviewed the genesis and development of the Catapults) which had already acquired international recognition for excellence and was attracting investment from outside the UK. Innovate UK was exploring different funding models which would make the public investment go even further and possibly involve some payback from subsequent overseas purchase of a UK company built up with the help of Innovate UK funding.

She reminded the meeting that the scale of investment required as a technology progressed from basic research to production increased from stage to stage; the full returns on publicly funded research investment would not be realised unless substantial private investment was forthcoming later in the life cycle of a company.



PROFESSOR JONATHAN HASKEL noted as shown in the figure that the gap between the UK's productivity (defined as GDP per hour worked)

¹ www.foundation.org.uk

growth and that of the USA had narrowed appreciably in the last three decades of the last century (albeit not at the same speed nor to the same extent as in the case of France and Germany) but had expanded sharply after 2008, reverting to the position of 1980. He doubted whether this deterioration could be fully explained by some sudden worsening since 2008 of the "usual suspects" (lack of investment, lack of skills, adverse business climate). He had begun to wonder whether the particular characteristics of the UK economy were no longer properly reflected in the internationally established definitions underlying R&D and GDP data.

He referred to a number of areas where the UK had undeniably demonstrated highly successful innovation (profitable creative arts such as the Beatles and Harry Potter, civil aviation, retailing, computer games and the City of London) and argued that the definitions for R&D and investment data did not include a value for R&D or investment expenditure on design, branding and market research or even financial services. He went on to argue that this oddity would not necessarily matter but for the evidence that in the UK the scale of investment in such "intangibles" was growing at a faster rate than investment in "tangibles" (e.g. computer hardware, machinery, buildings, vehicles) and had actually overtaken it in the year 2000. A false diagnosis of the state of the UK economy risked incorrect policy prescriptions. We needed not only to understand better why measured investment and GDP had fallen so sharply but also to know what steps might advantageously be taken to build on the proven strengths of unmeasured investment: "innovation policy and productivity evidence needed a reboot."

TONY HARPER based his presentation on the experiences of his company and industry as they underwent transformation from the gloom of Autumn 2009, when factories were closing and when total closure loomed, to the promise of a bright future in Autumn 2015 when millions of pounds were invested to increase capacity. The near-death experience of 2005, combined with the external challenge posed by the need to move to a low carbon environment, had forced the UK automotive industry to collaborate and co-operate. It was important for the industry to commit itself to long-term innovation to support the entire value chain; supporting only individual elements would fail to deliver the best improvements in productivity. He pointed to the creation of the Automotive Council in 2009, to the formation of the Advanced Propulsion Centre in 2013 to position the UK as a global centre of excellence for low carbon power-train development and production and to the investment by Innovate UK in automotive low-carbon research. He noted that Germany achieved better productivity than the UK even though the quality of its universities nowhere near matched that of the UK's (its highest ranking university was only 60th in the world). An important target now for the Automotive Council

was to remedy the lack of good connections between the sector and UK universities. The UK needed substantially to increase the technical literacy of management; at present it could not match that of Germany.

He welcomed the fact that UK research centres were now so well regarded overseas that they were attracting inward investment. He underlined Dr McKernan's point about the need for substantial private investment to follow on from public investment in the early stages of innovation. The supply chain for the UK automotive sector was not at present adequate for the industry's needs. The supply chain needed rebuilding and revitalizing with new technologies. The UK automotive sector's competitive position was hampered by having to rely on foreign suppliers to fill the gaps.

In the discussion periods before and after dinner there was wide-spread support for the points made in the three presentations as well as praise for the work of Innovate UK.

Many contributions focused on Professor Haskel's points about the adequacy of the aggregated statistical data about investment and productivity to convey an accurate measure of the true productivity gap between the UK and the US or to give the correct signals for policy formation. It was argued not only that there were significant variations between different economic sectors but also that the scale of the post-2008 decline in UK productivity was exacerbated by the relatively larger weight of the financial sector in the UK economy. It was pointed out, however, that international data were meaningful only if based on internationally agreed definitions. Moreover, the US shared the UK's position in having large volumes of "intangibles" excluded from the data.

What impact would the introduction of a minimum wage have on innovation? The panel thought that the impact would be positive for productivity but adverse for employment. Indeed the UK's current relatively high employment rate was the logical corollary of the UK's comparatively poor productivity performance. However, higher productivity and greater innovation should lead to increased output and an expanding economy and hence the prospect of improved employment opportunities.

One contributor pointed to the £700bn a year spent on pay in the UK and wondered whether pay systems in this country were well geared to the country's needs. It could be that the pay disparity between the financial sector and other sectors was in part a consequence of government actions based on a belief that the banks were too big and too crucial to be allowed to fail.

Several contributions touched on the adequacy of industry/university collaboration (see the Foundation debate on the Dowling Review on 7th

October 2015), including collaboration between universities and Catapults.

Were University Technical Transfer Offices a help or a hindrance? It was pointed out in the USA, MIT did not have anything of the kind but had an industrial liaison office which succeeded in developing close partnerships - it might be a model worth considering by the UK. And it was also pointed out that the US was much better at fostering mutually beneficial exchanges between universities and companies at all stages of peoples' careers. But the impediments to such exchanges should not be underestimated.

A speaker stressed the importance (apparently recognised in Germany) of a stable and consistent policy environment for investment in innovation. But another speaker said that stability of policy should not be at the expense of changes in response to international competition.

However, the government's statement at the conclusion of the recent Comprehensive Spending

Review had provided a welcome prospect of better policy stability.

Other points made in the course of discussion included: when comparing the UK and Germany it had to be acknowledged that very different management cultures obtained;

- 1 Innovate UK's policy and practice in putting competition at the heart of its grant-giving were a positive and valuable incentive for companies;
- 2 The UK needed to do better in obtaining financial benefits from its high quality research, thus generating more resources to be ploughed back into research;
- 3 Did higher GDP really lead to a better sustainable life for the community? GDP, as currently measured, did not provide a full measure of well-being.

Sir John Caines KCB

Reports

The productivity gap with the US
(GDP per hour worked, \$US, PPP, US=1), OECD
<https://data.oecd.org/lprdy/unit-labour-costs.htm#indicator-chart>

The House of Commons Science and Technology Select Committee Report
The Science Budget
www.publications.parliament.uk/pa/cm201516/cmselect/cmsctech/340/340.pdf

Ensuring a successful research endeavour: review of the UK research councils - The Nurse Review
www.gov.uk/government/publications/nurse-review-of-research-councils-recommendations

The Dowling Review of Business-University Research Collaborations
www.raeng.org.uk/publications/reports/the-dowling-review-of-business-university-research

Spending Review and Autumn Statement 2015
www.gov.uk/government/topical-events/autumn-statement-and-spending-review-2015

Useful links:

BAE Systems
www.baesystems.com

Biotechnology and Biological Sciences Research Council
www.bbsrc.ac.uk

Catapult Centres
www.catapult.org.uk

Comino Foundation
www.cominofoundation.org.uk

Cranfield University
www.cranfield.ac.uk

Department for Business Innovation and Skills
www.gov.uk/government/organisations/department-for-business-innovation-skills

Economic and Social Research Council
www.esrc.ac.uk

Engineering and Physical Sciences Research Council
www.epsrc.ac.uk

EngineeringUK
www.engineeringuk.com

Government Office for Science
www.gov.uk/government/organisations/government-office-for-science

The High Value Manufacturing Catapult
www.hvm.catapult.org.uk

HVM Centres

The Advanced Forming Research Centre (AFRC)
www.strath.ac.uk/afrc

The Advanced Manufacturing Research Centre (AMRC)
www.amrc.co.uk

The Centre for Process Innovation (CPI)
www.uk-cpi.com

The Manufacturing Technology Centre (MTC)
www.the-mtc.org

The National Composites Centre (NCC)
www.nccuk.com

The Nuclear Advanced Manufacturing Research Centre (Nuclear AMRC)
www.namrc.co.uk

The WMG Centre HVM Catapult (WMG)
<http://www2.warwick.ac.uk/fac/sci/wmg>

Imperial College London
www.imperial.ac.uk

Innovate UK
www.innovateuk.gov.uk

Jaguar Land Rover
www.jaguarlandrover.com

Natural Environment Research Council
www.nerc.ac.uk

Public Health England
www.gov.uk/government/organisations/public-health-england

Research Councils UK
www.rcuk.ac.uk

Rolls-Royce
www.rolls-royce.com

Royal Academy of Engineering
www.raeng.org.uk

The Royal Society
www.royalsociety.org

The Royal Society of Edinburgh
www.royalsoced.org.uk

The Science Council
www.sciencecouncil.org

Science and Technology Facilities Council
www.stfc.ac.uk

Tata Group
www.tata.com

techUK
www.techuk.org

UK Trade and Investment
www.gov.uk/government/organisations/uk-trade-investment

University of Cambridge
www.cam.ac.uk

University of London
www.lon.ac.uk

University College London
www.ucl.ac.uk

University of Oxford
www.ox.ac.uk

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