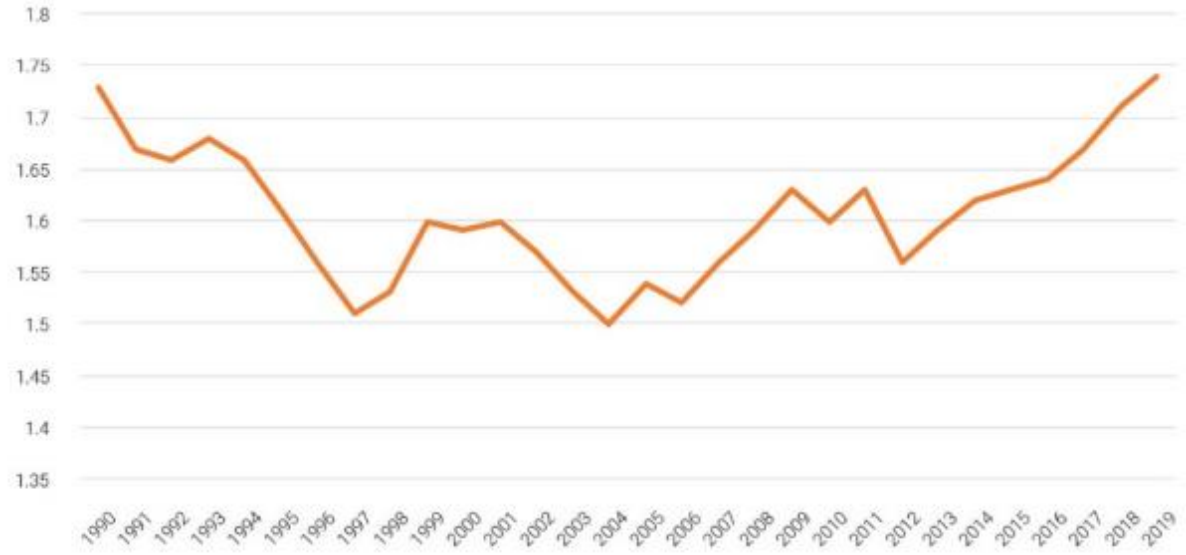
Research and Development: Why has it been so low?

Research and development (R&D) is critical for a nation's successful innovation and long-term prosperity. The evidence suggests that on average £1 of public R&D investment generates around £7 of net benefit to the UK. In addition public investment in R&D encourages even more investment from the private sector.[1]

The chart [2] shows the general flow of UK spending on R&D as a percentage of GDP from 1990 to 2019. Figures from the Office for National Statistics reveal that R&D had also been falling throughout the 1980s from just over 2% in 1981. As we can also see on the chart expenditure continued to fall through the nineties. It fell steeply again from 2002 to reach its lowest point of 1.50% in 2004. It fell yet again from 2011 on the back of the government's austerity programme but has been relatively stable since reaching 1.74% in 2019.[3] At 1.74% the UK's total spending on R&D is still well below the OECD current average of 2.4%. It ranks below countries such as Israel, Korea, Sweden, Japan, Germany, the United States and France.[4]

Spending on R&D as a percentage of gross domestic product (GDP)



OECD data show that the UK fell from having the highest level of R&D investment compared to many other countries at the beginning of the 1980s to nineteenth place by 2012. The UK was the only OECD country in which R&D spending actually fell as a percentage of GDP over that period. The UK's level of business investment in R&D also fell during the same period. Coutts and Gudgin conclude that the lower levels of R&D investment since 1980 are most likely associated with the decline of manufacturing over this period - the UK experienced the largest decline in the importance of manufacturing of any OECD country.[5]

The low level of spending also reflects a reluctance on the part of business leaders in large companies to invest in research. They appear to be much more concerned with maintaining and increasing their profits in the short-term. At the same time a significant proportion of revenues go towards buying back their company shares with a view to enhancing pay and bonuses. "*Such spending has occurred at the expense of investment and innovation……*" [6] The low level of business investment is acknowledged in the UK government's recent

publication on research and development: "*British business invests less in R&D compared to similar nations, and this investment is concentrated in major players in just a few sectors*." [7]

The UK's spending is also below the EU's current average of 2.32%.[8] The UK is ranked 11th among EU countries. The Netherlands, France, Finland, Belgium spend over 2%, while Denmark, Germany, Austria and Sweden commit over 3% to research and development. The target agreed by the EU in 2010 was for all countries to reach 3% by 2020.[9] In March last year the UK government announced that its intention was to increase total R&D investment to the OECD average of 2.4% of GDP by 2027. This includes full funding for EU programmes, such as the UK's association with Horizon Europe. The government announcement adds that that if the UK is unable to associate to Horizon Europe, the funding will go to UK research and development programmes.[10]

One of the main arguments used to restrict public investment is that of 'crowding out'. This refers to the way in which public investment is said to hold back private investment. During the 2010 budget debate for example the former chancellor, George Osborne, said that public spending "*crowded-out private endeavour*". Although the term has a long history it is particularly associated with the 1970s. Tomlinson concludes: "*The idea that public sector growth had been at the expense of private sector investment was not supported by the data*". The argument suggests that large-scale public borrowing raises interest rates, increases the costs of borrowing for the private sector and in that way reduces private investment. It usually harbours a 'private sector good, public sector bad' assumption. [11]

The economist Mariana Mazzucato argues that state involvement is essential for economic growth, innovation and new developments. Much of the apparently private sector innovations, she says, began with government funded research and support. For example the main technologies which make up the iPhone originated from research funded by the US government – not just the internet itself but also GPS, lithium batteries, cellular technology, touch screen, LCD display and even the Siri voice personal assistant. Apple initially received $500,000 from the Small Business Investment Corporation, a public financing arm of the American government. And the algorithm that led to Google's success was funded by a public sector National Science Foundation grant. "…….*active strategic public sector investment is critical to growth. That is why all the great technological revolutions – whether in medicine, computers or energy – were made possible by the state acting as an investor of first resort*." [12]

Sources

1. Balance and effectiveness of research and innovation spending, Science and Technology Committee, House of Commons, September 2019 page 9 https://publications.parliament.uk/pa/cm201719/cmselect/cmsctech/1453/1453.pdf
2. 2019 R&D expenditure data analysed: Are we on track to reach 2.4%, National Centre for Universities and Businesses , August 2021 page 4 https://www.ncub.co.uk/wp-content/uploads/2021/08/Gerd-v2-1.pdf
3. Gross Expenditure on R&D (GERD) a percentage of GDP, ONS August 2021 https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/timeseries/glbh/gerd See note 1 below
4. UK Innovation Report, Benchmarking the UK's industrial and innovation performance in a global context, Institute for Manufacturing, University of Cambridge

2021, page 26 https://www.ciip.group.cam.ac.uk/reports-and-articles/uk-innovation-report/download/UK_Innovation_Report_FINAL_EWv10.pdf
5. The Macroeconomic Impact of Liberal Economic Policies in the UK, Graham Gudgin and Ken Coutts. 2015 pages 30 and 31 http://www.cbr.cam.ac.uk/fileadmin/user_upload/centre-for-business-research/downloads/special-reports/specialreport-macroeconomicimpactofliberalpoliciesintheuk.pdf
6. Rethinking Capitalism, edited Michael Jacobs and Mariana Mazzucato 2016, Innovation, The State and Patient Capital, Mariana Mazzucato, pages 100 and 101
7. UK Research and Development Roadmap, HM Government, July 2020, page 9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/896799/UK_Research_and_Development_Roadmap.pdf
8. Research and development statistics at regional level, Eurostat, May 2022 https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Research_and_development_statistics_at_regional_level#Research_and_development_expenditure
9. Gross domestic expenditure on research and development, UK: 2018, Office for National Statistics, April 2020 Section 7 See note 2 below https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/bulletins/ukgrossdomesticexpenditureonresearchanddevelopment/2018
10. Government announces plans for largest ever R&D budget, UK Government March 2022 https://www.gov.uk/government/news/government-announces-plans-for-largest-ever-rd-budget
11. Financial Statement, Hansard 22 June 2010 https://hansard.parliament.uk/commons/2010-06-22/debates/10062245000001/FinancialStatement
Crowding Out, Jim Tomlinson, History and Policy, December 2010 https://www.historyandpolicy.org/opinion-articles/articles/crowding-out
12. Who really creates value in an economy? Mariana Mazzucato, Social Europe, September 2018 https://www.socialeurope.eu/who-really-creates-value-in-an-economy#:~:text=That%20means%2C%20first%20and%20foremost,%2C%20and%20civil%2Dsociety%20organizations See note 3 below

Notes

1. There is no equivalent data for the decades 1950 to 1979. We've followed Coutts and Gudgin above in taking the ONS figure for 1981 as an indicator of R&D spending towards the end of that period, that is, just above 2%.
2. The latest release, 'Gross domestic expenditure on research and development, UK:2020' in November 2022, doesn't contain figures on R&D as a percentage of GDP due to ongoing methodological changes. Updates will be provided in later releases.
3. Mazzucato says that we romanticise private entrepreneurs and CEOs in large companies while ignoring the fact that that their success is dependent on public investment. She gives the example of Elon Musk who not only received over $5 billion in subsidies from the US government but his companies, SpaceX and Tesla, have been built on the technology developed by NASA and the US Department of Energy.