

CONSULTATION PAPER 155

Science, Innovation and Technology

Liberal 
Democrats

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Background

This consultation paper is presented as the first stage in the development of new Party policy in relation to Science, Innovation and Technology. It does not represent agreed Party policy. It is designed to stimulate debate and discussion within the Party and outside; based on the response generated and on the deliberations of the working group, a full policy paper will be drawn up and presented to Conference for debate.

The paper has been drawn up by a working group appointed by the Federal Policy Committee and chaired by Dr Jonathan Everett. Members of the group are prepared to speak on the paper to outside bodies and to discussion meetings organised within the Party.

Comments on the paper, and requests for speakers, should be addressed to: Joseph Wright, Policy Unit, Liberal Democrats, 1 Vincent Square, London SW1P 2PN. Email: policy.consultations@libdems.org.uk Comments should reach us as soon as possible and no later than 5 April. Further copies of this paper can be found online at:

<https://www.libdems.org.uk/members/make-policy/policy-consultations>

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1 Introduction

1.0.1 In the past, much of the UK's success has been built upon technological innovation. From steam power in the 18th century through to advanced life sciences today, Britain has been a major technological innovator.

1.0.2 However, we cannot rely on past achievements to be an indicator of future success. The UK still has good fundamentals in place – including world-leading universities and a thriving start-up culture – but these are under increasing pressure, and the benefits and costs of technological development are not equitably distributed across society.

1.0.3 Britain and the world face a huge number of challenges; climate change, an ageing population, economic stagnation, inequality and increasingly divided societies leading to political extremism. We believe that technology and innovation can help provide many of the solutions to these challenges.

1.0.4 This consultation paper seeks views on the main ethical, economic, social and political issues in Science, Innovation and Technology policy.

1.0.5 This paper asks key questions on the following 6 key areas:

1. Education and Skills
2. Public Services
3. Business and the Private Sector
4. Inequality
5. International and Global Collaboration
6. Artificial Intelligence and Machine Learning

1.0.6 Liberal Democrats believe that science, innovation and technology are essential to the future success of the UK and the world. The purpose of science isn't just economic growth, but also personal development, curiosity about the world, and tackling shared problems. Science should also be enjoyable and creative - whether at school, in the workplace or in a research laboratory.

1.0.7 Together with upcoming papers on Opportunity and Skills and The Future of Work, we aim to develop a full Liberal Democrat economic programme for the mid-2020s and beyond.

Questions

1. What Liberal Democrat values should be brought to the forefront of our approach to science and innovation?
2. Do you agree with the overall approach outlined above? What would you change?

2 Education and Skills

2.0.1 A separate Policy Working Group on Opportunity and Skills is looking at the overall architecture of skills and education policy in the country; for the purposes of this consultation and paper we are interested specifically in skills and education relevant to science and technology. There are three challenges we are looking to address:

- Tackling the digital divide and improving digital literacy
- Ensuring that skills and retraining are available to everyone, throughout their lives
- Ensuring our universities have access to staff and can effectively collaborate, both internationally and with the private sector

2.1 Schools

2.1.1 Schools are the foundation of our education. They set people up for the rest of their lives. Our educational system should instil in pupils the confidence to become a lifelong learner, or even innovator, in science and technology.

2.1.2 Education must be balanced, giving all pupils a good mix of STEM and digital skills, humanities, arts and physical subjects, all of which contribute to the science and technology industries and well rounded individuals.

2.1.3 We also need to tackle digital illiteracy and the digital divide. The pandemic showed that many people from less well off backgrounds lacked access to the digital technology many take for granted, seriously impacting on their education.

Questions

3. How do we improve digital literacy and tackle the digital divide in schools?
4. How do we ensure a balanced education that provides the skills and knowledge students need?
5. What skills and knowledge will be needed to prepare current students for the decades ahead?

2.2 Skills and Further Education

2.2.1 Alongside the wider skills policy outlined in upcoming policy paper Opportunity and Skills, we want to ensure that individuals and businesses have the appropriate skills and knowledge in the science and tech sectors.

2.2.2 Given the rapid pace of technological change, with new sectors emerging providing opportunities for people with technical skills and literacy, we need a system that regularly retrains and reskills people throughout their lives.

Questions

6. How do we ensure that everyone is included in technological change and able to participate in society and in the economy?
7. How do we ensure that businesses have access to the scientific and technical skills they need?
8. How do we enable our Further Education institutions to teach the skills needed for newly emerging industries?

2.3 Universities

2.3.1 Universities are at the forefront of science, innovation and technological innovation in the UK. But universities need to be able to co-operate globally. The UK currently has association status with Horizon

Europe and Copernicus, two research schemes that bring together institutions across Europe.

2.3.2 According to a 2022 Independent Review, the research funding system could be simplified. Currently, most research funding comes from UK Research and Innovation, but there are a wide range of funding sources that are often difficult to navigate. The system has been accused of being too conservative, failing to invest in more blue-sky proposals.

2.3.3 Britain's universities also have a mixed track record on spin-outs (start-up companies that are created based on intellectual property generated through a university's research) and developing technology with the private sector compared to our competitors in other nations. We want greater collaboration between the two sectors with universities driving more innovation.

2.3.4 Finally, the Conservatives' approach to immigration has left many universities starved of international talent; they face visa fees that are much higher than in comparable countries.

Questions

9. Is our current system of research funding fit for purpose and if not, what would you change?
10. How do we improve collaboration with the private sector and reduce the barriers to spin-out innovations?
11. How do we reduce barriers to international talent coming to the UK?

3 Public Services and the Public Sector

3.0.1 Under the Conservatives, Britain's public services have steadily deteriorated, with insufficient investment across the board. We want to tackle underinvestment in the public sector, make use of new technology to improve public services and ensure that people's rights are protected.

3.1 Public Investment

3.1.1 The public sector in Britain has failed to invest enough. Our schools, hospitals, prisons and public realm are literally crumbling, and transport projects are being axed at ministerial whim.

3.1.2 Partly, this is due to Treasury Green Book and OBR rules on what counts as capital spending and investment. The OBR only considers returns over 5 years - so any long term projects are classified as delivering no benefits, incentivising short term policy making. The Treasury also discounts future savings or returns when considering spending proposals, preferring short-term savings over better long-term outcomes.

3.1.3 As well as being a country that fails to invest, Britain is also a very expensive country to invest in. HS2 is estimated to cost £396m per mile of track, while Japan's new high speed Shinkansen line, opened in 2016, cost £50m per mile including an undersea stretch. We want to make investing in new technologies and infrastructure more affordable.

Questions

12. How can we ensure the public sector invests reliably for the long term?
13. Are Treasury and OBR rules on investment fit for purpose?

14. Does the civil service have the skills and knowledge to support a more digitalised society and to utilise digital technologies?
15. How can government procurement stimulate innovation

3.2 Local Government

3.2.1 Local government is at the forefront of delivering public services: everything from bin collections through to social care. It provides vital services on which everyone relies. However, over a decade of Conservative government has left local authorities starved of resources, expected to deliver more and more with less and less. As such, many authorities are unable to take advantage of new technologies, lacking staff with the technical knowledge and the capacity to undertake new changes.

Questions

16. What local government services would benefit the most from harnessing new technology?
17. How do we improve technological expertise in local government?
18. Are there any other barriers to bringing in technology-driven efficiencies in local government?

3.3 Health

3.3.1 The absolute and relative costs of healthcare have grown rapidly over the past few decades, with an ageing population and increasing numbers of people with complex needs. Technology offers the possibility of making our NHS both more effective and efficient, as well as allowing us to live longer lives in good health.

3.3.2 Patient data is currently not easily accessible - both moving within the NHS to different trusts and being accessible for medical research. We

want to make health data more accessible, whilst also ensuring that individual patient data is kept private and only used for the public good.

Questions

19. How do we get the right balance of protecting patients' data with making it available for medical research?
20. How can we enable the sharing and moving of patient data within the NHS?
21. What area of the NHS requires technological modernisation the most?

3.4 Criminal Justice

3.4.1 The criminal justice system is under enormous strain; prisons are overcrowded and crumbling, courts have backlogs lasting years and the police are regularly found to be failing in key areas, as noted by the Casey Review.

3.4.2 Technology has the potential to help tackle many of these problems - as well as potentially make them significantly worse. AI and data analysis can help tackle crime and reoffending, but it can also reinforce existing biases in the system.

Questions

22. How do we ensure that new technologies do not reinforce biases in the criminal justice system?
23. What areas of the criminal justice system should we prioritise the development of new technology in?
24. How do we ensure that courts, police and juries have the right level of knowledge to understand and use new technology?

4 Businesses and the Private Sector

4.0.1 Business and the private sector is the leading driver of innovation and investment in the UK. We have many key strengths, particularly in financial technology (FinTech) and Life Sciences. However, Britain has historically suffered from underinvestment - in both people, capital and infrastructure.

4.0.2 We want to encourage greater investment, as well as developing successful British industries, with a particular emphasis on small and medium sized businesses.

Questions

25. Why has Britain's private sector failed to invest enough in science and innovation?
26. What are Britain's main strengths and weaknesses in the private sector? How do we build on these strengths?
27. What reforms to the tax system could encourage investment in science and technology?

4.1 Small and Medium Sized Businesses

4.1.1 Liberal Democrats believe in supporting small businesses - these companies embody the liberal idea of individuals working hard to better themselves and their communities and can be one of the biggest drivers of innovation in the economy.

4.1.2 Small businesses can face large barriers to adopting new technologies - they can lack access to finance, training, knowledge and appropriate workspaces for innovative working. Lab, factory and office

space often comes with high rents and not necessarily in ideal locations - particularly for those in rural and deprived areas.

Questions

28. How should we help small businesses take up new technologies?
29. What role can innovative working spaces play in encouraging innovation?
30. How do we support small businesses in this sector in rural and deprived areas?

4.2 Competition and Regulation

4.2.1 Competition is essential for an innovative and dynamic marketplace - only when consumers have genuine choices do we see good outcomes for society. Some aspects of the tech sector have become oligopolies or monopolies. Google has 91% of the search engine market share and Meta (owner of Facebook, Instagram and Whatsapp) has 75% of the social media market share. Meanwhile Apple is worth as estimated \$3 trillion - if it were a country it would be the 22nd biggest by total wealth.

4.2.2 Most of these companies are American global firms, which the UK alone would struggle to regulate. They have tremendous power, economic, political, social and technological, and have helped facilitate some of the most dramatic changes in society over the past 20 years.

Questions

31. How can the UK, both domestically and co-operating internationally, promote greater competition in the technology sectors?

32. How best can the UK regulate the activities of large multinational tech firms?
33. How do we ensure that our regulators have the right expertise to regulate rapidly emerging sectors?

5 Inequality

5.0.1 Britain is particularly held back by inequality: in the geographical distribution of innovation industries, as well as inequalities of gender, ethnicity, class and other protected characteristics. This limits our potential, coming at a great human cost as well as economic cost to the nation. We want to tackle these inequalities wherever we find them.

5.1 Regional Inequality

5.1.1 Various attempts have been made to address Britain's regional imbalances - from the Special Areas Development and Improvement Act in the 1930s through to Levelling Up in the 2020s. We also saw the European Regional Development Fund during Britain's time in the European Union.

5.1.2 Catapult Centres were introduced by Vince Cable during the Coalition government. They have generally been a success in driving innovation in many sectors, but there are a range of views about how to improve how they function and many have been less successful than others.

5.1.3 We need more investment and innovation outside the successful regions. We believe that we should build upon the existing industries and successes in the underdeveloped parts of the country - rather than starting from scratch.

Questions

34. How do we build on the successes of the Catapult Centres?
35. What regional specialisms should we build on outside the successful regions?

5.2 Gender, Ethnic, Class and Age Inequalities

5.2.1 There is also inequality of opportunity between different genders, ethnicities, socio-economic backgrounds and ages. 31% of core STEM students in Higher Education in the UK are women or non-binary - 20% less than their share of the overall population. In engineering and technology, they make up just 21%. Women make up around a quarter of the workforce - largely unchanged from a decade ago. Meanwhile, those in the highest family income bracket at age 16 in 1986 are more than 5 times as likely to progress to a professional level occupation than those in the lowest bracket.

5.2.2 There still remains a significant digital divide in the UK - 10 million people lack basic digital skills needed to navigate modern society. This disproportionately impacts lower socio-economic and ethnic minority groups as well as the elderly.

5.2.3 As well as perpetuating inequality, it also leads to bad outcomes for the whole of society. For example, it can lead to biases in society being replicated in algorithms and research outputs.

Questions

36. How do we encourage more women to study and work in STEM, as well as improving retention?
37. How do we tackle class barriers to studying and working in STEM?
38. How do we promote greater ethnic equality and diversity in STEM?
39. How do we tackle digital exclusion and increase digital literacy more broadly?

6 International and Global Collaboration

6.0.1 Technological progress is not just confined to domestic policy; for Britain to thrive we will also need to collaborate internationally. We see the three main challenges as:

- Promoting trade and regulating new forms of trade.
- Rebuilding collaboration with Europe.
- Navigating an increasingly tense geopolitical environment.

6.1 Trade and Investment

6.1.1 As liberals, we believe in an open economic system where free and fair trade can flourish, which will be good both for Britain and the world. The Conservative's botched deal with Europe has stifled exports to the continent, but Britain has struggled to export for more than a century. We believe innovation and investment can help improve our exports.

6.1.2 However, being such an open economy comes with risks - economic shocks from abroad or hostile business practices can stifle investment and employment at home.

6.1.3 Looking to the future, trade in data will significantly impact trade flows and become a major export. The EU has taken a protectionist stance - looking to put data privacy first, whilst the US has taken an approach to encourage the free movement of data.

6.1.4 Liberal Democrats also want to fix the Conservatives' failed deal with Europe, and get Britain trading with our nearest neighbours again. We have a comprehensive four-step roadmap for rebuilding our relationship with our nearest neighbours which is primarily focussed on building back

those trading ties and restoring the UK's relationships with its closest neighbours.

Questions

40. How do we promote a resilient science and technology sector?
41. How should we regulate the emerging trade in data?
42. As we work through our four-step roadmap, what specific EU programmes and policies should we seek to join or collaborate on to promote technological development and innovation?

6.2 A Changing World Order

6.2.1 Policy paper 157 *Liberal Values in a Dangerous World* sets out the Liberal Democrat response to a changing economic and political world order, and policy paper 145 *Democracy and Public Debate* sets out how Liberal Democrats would tackle online misinformation and threats to our democracy.

6.2.2 In the context of science and technology, we are seeing China take an ever increasing share of advanced technologies and vital industries, posing a potential risk to the security and stability of democracies in the future. However, it is still essential to trade and engage with the country, if we are to be prosperous ourselves.

43. How should the UK secure supplies of essential technologies, such as semiconductors and precious metals?
44. How should we engage with China and other authoritarian states economically with regards to new technology?

7 Artificial Intelligence and Machine Learning

7.0.1 Artificial intelligence (AI) and machine learning cover a wide range of technologies and are often only partially understood by commentators using the terms. The term 'AI' is often used to cover a range of situations where a machine performs a task that would usually require a human intelligence to accomplish – covering a whole range of examples from translation, summarising information to general problem solving.

7.0.2 We see the main challenge in the coming decade as:

- Developing ethical uses of AI and mitigating its risks.
- Finding an effective regulatory and competition framework for a multinational industry.
- Ensuring it is responsibly taken up by businesses.

7.1 Ethics and Risks

7.1.1 The use of large scale data, often gathered from thousands, or millions, of people without their knowledge or full consent, throws up a number of ethical challenges as well as potential risks.

7.1.2 It can easily replicate and reinforce existing biases, for example an algorithm which undertakes recruitment or credit scoring will draw upon historic data - which will frequently be the product of a sexist, classist or racist environment.

Questions

45. What risks does AI present?
46. How should individuals be able to protect their information and property from being used by AI?

47. How do we prevent AI from replicating existing biases?
48. What governance arrangements should be put in place to ensure AI is used ethically and its risks are mitigated or prevented?

7.2 Regulation

7.2.1 AI represents a difficult challenge for regulators. It is a rapidly evolving technology, which is hard to pin down and assess. As such, there is considerable disagreement about how best to regulate it - whether it should be the processes (algorithms, data inputs, developer training, etc.) or its outcomes (how it is utilised and what it is used for).

7.2.2 It will also be a technology that will soon be used across the entire economy and society - not just in digital sectors. As such, there is a debate as to whether it should have a single regulator or become part of the 'business as usual' of all regulators.

7.2.3 Finally, most major tech companies are global in scope and based abroad - In the USA predominantly, but also increasingly in China, Europe and elsewhere. The UK's ability to regulate the development of this technology is therefore quite limited and competition in the sector is currently between a few big players.

Questions

49. What should be the aim of regulating AI?
50. Should regulation of AI be in its processes or its outcomes?
51. Should AI regulation be a part of all regulators' remits, or should the UK have a single regulator for AI?
52. Should we be aiming for international convergence on regulation of AI? If so, how?

7.3 Uptake

7.3.1 At the moment, AI is associated with the tech giants like Google and Facebook, but it is increasingly being used by a wide variety of individuals and organisations. However, uptake varies considerably - the sole trader or small business with a few employees is unlikely to make use of the new technology, due to high costs, lack of technical knowledge or simply not having enough time to undertake the necessary research to know what product to buy.

7.3.2 The government introduced the Made Smarter for manufacturing following a review in 2017, which is designed to help increase the uptake of new and emerging technologies. Whilst it has had some success, uptake of new technology is still lagging behind.

Questions

53. How do we encourage greater uptake of new technology by smaller organisations?
54. How do we expand Made Smarter beyond manufacturing?

Annexe: Remit

The remit of this group is to review the party's policies on Science and Innovation, and make updated proposals which communicate our values of liberty, equality, democracy, community, internationalism and environmentalism in a way which helps secure the election of as many Liberal Democrats as possible, at local, regional and national level, in order to promote our vision of society and remove from power a Conservative government that is failing the country.

The group will be expected to build on existing policy proposals as set out in the 2019 Election Manifesto, Policy Paper 145 *The Nature of Public Debate* and Policy Paper 150 *Towards a Fairer Society*. The group is expected to consider and address Liberal Democrat principles on diversity and equalities in developing their proposals.

This group will as a top priority:

- Develop up to three headline policies on science and innovation which the party can communicate widely to win votes.

The working group is specifically asked to consider the following:

- How can the UK remain a major science power and how can science and innovation contribute to improving the UK's overall productivity? In particular:
 - How should the UK benchmark itself against other leading science nations?

- Does the current institutional landscape for science and innovation work and how can it be improved? How do Universities fit into this?
 - How can we ensure British science retains strong international collaborative partnerships, especially with Europe, and ensure UK skills are recognised in the global research and innovation community?
 - How can we ensure we have the skills we need to be a leading scientific and technological nation, including through a competitive visa offer to attract the world's best and brightest?
 - How can the regional disparities in research and development funding be reduced and how can science and innovation contribute to 'levelling up'?
 - How can science and innovation contribute to making public services more efficient and effective?
- How can we meet the challenges posed by the development of Artificial Intelligence. In particular:
 - Questions over large scale data harvesting used to train and develop AI models.
 - ethical challenges such as over privacy and surveillance and potential bias/discrimination in AI.
 - The question of when is it permissible to allow human judgements to be replaced by AI.
 - The role for the Fairness, Accountability and Transparency (FAcCT) framework in AI regulation.
 - Exploring the possibilities for a radical liberal vision for the role of AI in society, beyond existing models such as FAcCT.

- How can UK science and innovation contribute to solving key challenges such as:
 - climate change
 - loss of biodiversity
 - counter disinformation/national security
 - global pandemics

The group will also consider the need for institutional change at central, regional and local government levels to embed these approaches firmly in policy.

The group will take evidence and consult widely both within and outside the party. This evidence should inform the group's proposals, which will be presented alongside an analysis of costs and an Equalities Impact Assessment. It will also need to feed into the Future of Work working group in terms of the employment and labour markets impacts of technological change.

A policy paper of no longer than 10,000 words should be produced for debate at Autumn Conference 2024. Prior to that a consultative session should be held at Spring Conference 2024, and a draft policy paper should be presented to the Federal Policy Committee by June 2024.



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