

POLICY EXCHANGE

TECHNOLOGY MANIFESTO

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#TECHMANIFESTO

“ Britain is well positioned to be a world leader in using technology for positive ends, but success will require the proactive attention of – and continuity of support from – successive governments.”

BY 2020 BRITAIN SHOULD AIM TO...

Build the most connected
and digitally skilled society
in the world

Be the best place outside of
Silicon Valley for technology
entrepreneurs to start and
grow a business

Use technology and data
to develop the smartest
government in the world

ABOUT THE TECHNOLOGY POLICY UNIT

Policy Exchange's Technology Policy unit helps politicians and policymakers unlock the potential of technology: for an innovative digital economy, a smarter public sector and a stronger society. Our aim is to be recognised as the pre-eminent thought leader on technology in UK policymaking.

For more information about our work, visit: policyexchange.org.uk/technology-policy or contact the Head of Unit, Eddie Copeland, at: eddie.copeland@policyexchange.org.uk 020 7340 2650.

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INTRODUCTION

This manifesto has been written to urge politicians and policymakers to put technology front and centre of their thinking for the 2015 general election.

It sets out a vision for how – during the next parliament – Britain can maximise technology’s positive contribution for individuals, businesses and government. It argues that all parties have a combined interest in working to achieve three principal goals: to build the world’s most connected and digitally skilled society; to make Britain the most attractive place outside of Silicon Valley for technology entrepreneurs to start and grow a business; and to make our government the smartest in the world.

These goals are needed because technology is changing everything. Personal computers, tablets, smartphones, operating systems, web browsers, fixed and wireless broadband, social networks, cloud computing, 3D Printing, Big Data and the Internet of Things have already transformed much of how we communicate, create, share, consume, learn, work and play.

Within the next decade, we can expect our homes to be adapted with smart meters, our urban environments with smart city technologies, and our workplaces with robotics and artificial intelligence.

Above all, technology is changing the British economy – and not just the technology sector. For individuals and families, using the internet now offers savings of around £560 per year through cheaper prices and better deals found online.¹ For businesses, e-commerce enables even the smallest of start-ups to reach customers in foreign markets as easily as those in the UK. The internet economy will account for more than 12% of UK GDP by 2016,² and Britain already has an online retail trade surplus of \$1 billion – more than the USA and Germany combined.³ The pace of change is staggering. It will only accelerate in future.

The challenge for policymakers is to keep up.

The internet defies boundaries; governments still operate nationally. Data provides the best insights when shared; the public sector still works in silos. New technologies offer opportunities and risks that have no precedent; regulation too often reflects the pre-digital era. Squaring those circles will be hard but essential for Britain's future, and especially for its economic success. Harnessed well, technology promises to deliver benefits and opportunities that were the dreams of science fiction just a decade ago. Mishandled or ignored, it risks unleashing new and damaging threats on a scale that we have barely begun to grasp.

Britain is well positioned to be a world leader in using technology for positive ends, but success will require the proactive attention of – and continuity of support from – successive governments. Citizens, non-profits and the private sector will have important roles to play, too. To borrow a line from Sir James Dyson, “we have the right components: the chassis, an engine and all four wheels. We just need fuel, perhaps a bit of tuning, and most of all a sense of direction.”⁴

One final note: our hope in writing this technology manifesto is not that each political party will create its own version. That is no more needed than an *electricity* manifesto or a *roads* manifesto. Rather, our key message is that technology is no longer peripheral to life, and nor can it be to policymaking. From education to healthcare and from energy to transport, no policy area is immune from its influence. It is the foundation on which Britain's economic future will depend.

That is why technology must play an integral role in all parties' policy ideas for May 2015.

INDIVIDUALS

By 2020, the UK should aim to be the world's most connected and digitally skilled society. Everything in this manifesto depends on this.

Building The Most Connected, Digitally Skilled Society In The World

Email, social media and apps are changing the way people communicate with friends, family and colleagues. New e-commerce models are creating businesses that five years ago did not (in some cases, *could not*) exist. Websites like Wikipedia are lowering barriers to accessing information; crowdfunding platforms to raising money; and Massive Open Online Courses (MOOCs) to enjoying world-class education. Individuals can find their next job online, manage their finances with e-banking, navigate with GPS-enabled smartphones, and get discounts on their weekly shop with a few taps on a tablet or clicks of a mouse. Even government is providing more of its services via digital channels.

In short, getting online is essential for accessing the best – and sometimes even the most basic – personal, educational and business opportunities. Digital connectivity is therefore a major factor in modern social mobility. It is also vital for the economy: Booz & Company estimate that between £14 billion and £63 billion could be added to GDP if the UK was a world leader in digital infrastructure, services and skills.⁵

Yet we are still a long way from achieving that goal for everyone. Nearly 10 million people in the UK currently lack basic online skills, such as being able to send an email or use a search engine.⁶ Of those, 6.4 million have *never* used the internet.⁷ Getting the nation online therefore requires investment not just in infrastructure, but in *people*. The Tinder Foundation and

Go ON UK believe it would cost £875 million to ensure the whole population had basic digital skills by 2020.⁸ Current plans commit to spending just a small fraction of that amount. The next government must make it a priority to end digital exclusion by investing in appropriate training to get everyone online. It is the essential step for breaking down social barriers, creating the widest possible domestic market for British businesses selling online, and ensuring that government can provide more services digitally. Countries such as Norway and Iceland have already demonstrated that it is possible, with over 98% internet penetration compared with the UK's 83%.⁹ The investment would be covered by expected savings of around £1.7 billion/year achieved by moving to digital transactions.¹⁰ Stimulating greater demand for broadband services would have the added benefit of improving the commercial case for private companies to invest in faster connections.

A connected society is also one that is confident to use the internet safely. Government has a role to play in raising awareness of the potential dangers of cyber crime, e-commerce fraud, online bullying, predatory behaviour, and harmful content. In all these areas, government must also be aware that technology can only go so far in protecting internet users. The most effective safeguard

is equipping individuals with the awareness and skills they need to manage online dangers safely.

The Future of Digital Skills

Beyond essential online skills, Britain urgently needs individuals who do not merely use technology, but who understand how it works and who can harness it to create innovative new products and services. Developing this talent is key to the future success of both our technology sector and of wider industry. More broadly, we must prepare citizens for the changing shape of the workplace. Technology has already revolutionised manual work through the automation of many sectors such as factories and farming. By 2020, it will increasingly disrupt or replace knowledge workers in more white collar professions, from logistics to translation. It is imperative that the workforce has the knowledge and skills to thrive in that new environment.

In September 2014, the UK will become the first G20 economy to implement mandatory computing lessons for 5-16 year olds on a national level. A major component part of the course will involve learning how to code.¹¹ This development should be universally welcomed: it is the only long-term answer to addressing the UK's need for technology

Increasingly, the most basic building blocks of our daily lives are being altered by technology in the name of the public good.

skills. The timetable for implementing the new curriculum is ambitious, especially given that many of the 50,000 teachers that will be needed to deliver the course will have no background in computing. Industry is ready and willing to help; government can assist by funding initiatives that help bring them together with schools that need support. Creating a faster route for former IT workers to convert to teaching would be another positive step.

We should also be clear about the goals of computing education: the aim should not be to create a workforce of programmers. Britain must instead differentiate itself in the global marketplace by educating students to combine technical expertise with analytical thinking; digital skills with creative pursuits; and coding ability with business acumen.

Digital Communities

Finally, as well as helping citizens to develop their own technical skills, government should involve them in decisions about how technology is used in their communities. Increasingly, the most basic building blocks of our daily lives are being altered by technology in the name of the public good. Smart meters can make energy networks more efficient by monitoring our homes. Smart city technolo-

gies promise to address some of Britain's most pressing urban challenges – from congestion to crime – by recording our individual movements. Breakthrough medical insights can be achieved by analysing our health data, saving millions of lives and billions of pounds each year.

These are worthy goals and Britain should aim for nothing less than to be a world leader in achieving them. Yet policymakers must be aware that they involve gathering and sharing data that was once private or not collected at all. Many of these applications involve using Internet of Things technologies, which create new and challenging problems for data protection. (If a sensor monitors our activity or the way we use certain devices, is that data personal or non-personal? How can citizens give consent for their data to be collected by smart city infrastructure?) Success therefore depends on public trust. Citizens will demand clarity on how their homes are monitored and who gets to use that information. They will insist that their cities are not treated as a collection of problems to be solved, but as organic communities in which real people live out their lives. And before letting their medical data be used, patients will rightly ask how such advances will benefit them personally. Technology is said to have the power to democratise society. For that to be

true, citizens must have a voice on the ends to which it is put. At the same time, politicians must never shy away from delivering the message that innovation is vital for Britain's success and – used well – can bring benefits for everyone.

In summary, individuals are at the heart of this manifesto. Citizens need to be online to ensure that technology does not create a new digital divide. Businesses need a workforce with the talents they need to innovate and grow. The public sector requires digitally engaged citizens in order to realise the huge benefits and cost-savings of digitising government services. Ensuring Britain becomes the most connected and digitally skilled society in the world should therefore be a major policy priority for the next government.

Recommendations

1. Government should **set a target for the UK population to have the world's highest rate of basic digital skills by 2020.**¹² This is the most fundamental requirement for increasing internet usage; enhancing social mobility; reducing social isolation for vulnerable people; helping British businesses innovate and lead the world at e-commerce; and ensuring that government can reap the benefits of moving to digital transactions. The estimated investment of £875 million thought necessary to achieve this is considerable, but would be offset by savings of around £1.7 billion/year attained by moving to digital transactions.¹³ Without this increased funding, around 6.2 million people will remain without basic online skills in 2020.¹⁴
2. Until the whole population is online, **public services delivered by post, telephone or face-to-face should – where appropriate – be replaced with quality, assisted-digital services for the 17% of UK citizens who are currently offline.** Government spends around £4 billion each year providing non-digital transactions. Better targeting of assisted digital support, procured from the private and voluntary sector, could save £2.7 billion from this budget.¹⁵
3. Government should **make a universal broadband service commitment, guaranteeing minimum speeds that rise relative to developments in technology and internet usage.** Current policies aim to provide superfast broadband (speeds of 24Mbps or higher) to 95% of households by 2017, with 2Mbps guaranteed for the remaining 5%.¹⁶ As individuals expect to download ever richer media content, 2Mbps will soon

be inadequate. Instead of stipulating a specific absolute minimum speed, those not covered by the superfast broadband plan should be guaranteed access to baseline connectivity that rises relative to the median speeds of the whole country.¹⁷

4. Government should **ensure that the Electronic Communications Code (ECC) is updated according to reforms proposed in 2013 by The Law Commission**.¹⁸ Making the ECC fit for purpose is a prerequisite for delivering efficient broadband services. The reforms would treat broadband infrastructure more like a traditional utility, helping network providers and landowners to reach agreement faster over issues such as accessing private property to fix and upgrade equipment, and agreeing a fair price for doing so.
5. Government should **commit to an education-first approach to internet safety**. Staying safe online does not only require avoiding extreme content, but also protecting against predatory behaviour, online bullying and e-commerce fraud on mainstream websites, for which technology can offer only partial defence. The most effective strategy for keeping internet users safe is education on safe usage, delivered through the school curriculum

and as part of regular public information campaigns provided by Government working in partnership with industry.

6. Government should **make a clear commitment that it will only seek to block websites that are illegal**. ISPs, social media platforms and search engines cannot and should not be expected to be the internet's police; blocking of content must happen with complete public scrutiny, according to the rule of law. It is right that access be denied to websites providing illegal content, especially those related to child sexual abuse, for which the model used by the Internet Watch Foundation (IWF) has proven highly effective. Legal content should be self-regulated by optional filters which are controlled by parents and guardians.
7. **Data Protection legislation should be updated to take account of the Internet of Things (IoT), and focus on regulating the use rather than the collection of data**. By 2020, there are expected to be at least 26 billion connected devices across the globe, communicating with each other and with users – the so-called “Internet of Things”.¹⁹ IoT technologies will directly affect citizens through their use in smart grids, smart cities’ infrastructure and healthcare devices. Information collected from sensors

about an individual's activity, movement or possessions can blur the boundary between personal and non-personal data. In many applications, it may also be impractical to gain prior written consent for data collection. Legal clarity is needed to ensure the safe and fair use of citizens' data, whilst also encouraging innovation.

8. **A competitive grant pot of £3 million/year should be established to provide funding to third parties that help teachers gain skills to deliver the new Computing curriculum.** Around 50,000 teachers will be needed to teach the course across the 5-16 age range. Organisations, individuals and businesses should be able to compete for funding from government by presenting a business case for how they would help teachers. This scheme would quickly stimulate the growth of innovative solutions – from providing direct training to bringing teachers together with IT experts from industry – and ensure public money was targeted at the most cost-effective interventions.

9. **Public services which involve personal data should be designed on the presumption that the citizen is in control of their data.** For example, in the realm of electronic medical records, patients should have direct access to their own electronic healthcare record and be able to decide who they share that data with. They should be able to manually assign access rights to the general practitioners and doctors of their choosing. In circumstances where citizens are not able to control who views their information, they should be able to view who has accessed their record and have the right to ask why they have done so.

BUSINESSES

Technology will be the single most important determinant of the future shape and success of the global economy. It should be the primary driver of Britain's economic growth, too.

Making Britain The Best Place Outside Of Silicon Valley For Technology Entrepreneurs And Start-Ups

Whilst thousands of different companies together make a successful economy, those that stand to make the greatest difference are high-impact, high-growth technology businesses that can give birth to new industries, create thousands of jobs, and make a major contribution to UK GDP. To succeed, those businesses need not just ambition, agility and great ideas, but also technology skills, access to finance and reliable ways to protect their ideas. In the ruthlessly competitive and highly-

mobile technology sector, Britain must be a leader in providing all three. To attract entrepreneurs, companies and foreign direct investment, successive governments must communicate to the world that Britain is the best place outside of Silicon Valley for technology businesses.

To achieve that, actions will speak louder than words.

Start with skills. High-impact enterprise is built on human capital. Our digital economy boasts the highest business creation rate amongst all economic sectors,²⁰ 20% growth in revenues²¹ and an 8% rise in employment.²² To be successful, Britain therefore needs to attract, develop and retain the most talented

Policymakers must understand that individuals with advanced digital skills are in demand around the world.

scientists, engineers, designers and coders. Yet currently we face a chronic shortage of workers with these skills; one million technology jobs need to be filled by 2020.²³ The replacement of ICT with Computing in the school curriculum is the long-term answer. But the need is now. In the near-term, with almost half of all technology-sector employers looking abroad to hire talented staff, the only practical way to get more skilled individuals into the workforce is from overseas. Yet recent changes to the UK's visa regulations have effectively shut the door to many of the best and brightest from around the world, and even to international students who have studied in the UK. As a result, between 2010/11 and 2012/13, the number of (non-EU) international students entering STEM subjects at UK universities fell by 8% for undergraduates and 20% for taught postgraduates. For Computer Science, both undergraduate and taught postgraduate entrants experienced a decline of 38%.²⁴ Policymakers must understand that individuals with advanced digital skills are in demand around the world. If they are unable to work in Britain, they will simply take their talents and businesses to countries which have more welcoming policies, such as the USA, Canada or Australia.²⁵ Visa reform should be a top priority for the next government.

As well as having the right skills, taking an idea from inception to market, and preparing for long-term expansion, requires money. In recent years, the Enterprise Investment Scheme (EIS), Seed Enterprise Investment Scheme (SEIS), Start-Up Loans initiative and Business Angel Co-Investment Fund have made a significant improvement to early stage funding.²⁶ But, if Britain is serious about creating companies of the size of Google, Facebook or Twitter, finance must be available to help businesses scale fast. As the digital economy matures, the next government should work with banks, private investors and the venture capital industry to help plug the current funding gap.²⁷ Moreover, it should focus on attracting foreign direct investment (FDI). Britain currently receives 30% of all software FDI in Europe – by 2020, the government should target achieving at least 50%.

Thirdly, if data and creativity are the raw material for the digital economy, then the rules around copyright and intellectual property (IP) are of fundamental importance for high-impact technology enterprises.²⁸ For firms to secure investment and have the confidence to export to global markets, they need to be able to protect their ideas simply and cheaply. Reforms introduced since the 2011 Hargreaves Review have tackled outdated protections for copyright holders, provided consumers with

exceptions for private copying and created a system that makes it easier for SMEs to protect their IP. But technology evolves fast and will constantly push the boundaries of existing legal structures. The government must ensure that legislation keeps up. Promoting greater education and awareness of the intellectual property system amongst entrepreneurs will be also crucial if British tech firms are to realise the full value of their ideas.

Leading The World At E-Commerce

Technology is not just important for the technology sector itself. Businesses live or die by their online presence and 75% of the economic benefit from the internet is felt in the wider, non-digital economy.²⁹ As the World Wide Web celebrated its 25th birthday, the government set out plans in the *Information Economy Strategy* to encourage 1.6 million small businesses that already have a basic web presence to transact and sell more online. That is laudable: businesses that transact with customers via the web typically grow three times faster than those which do not, yet currently only a third of SMEs sell their products online.³⁰ Helping more to do so makes plain good sense for the economy. However, for the scheme to be effective, the

industry and third sector partners that will take the lead in delivering this goal need clarity on its objectives, the role that Whitehall departments will be expected to play and the level of funding that will be made available. Secondly, and just as urgently, a plan is needed to help the 16% of SMEs that currently have no online presence at all, for which no specific action is currently envisaged.

Once businesses are online, their next requirement is to have access to the widest possible markets – including those abroad. Currently the most significant market is the European Union, which accounts for more than half of all British exports in services, and 70% for SMEs.³¹ Having the most advanced digital economy in the G20 and a world-leading online retail trade surplus of \$1 billion, the UK has the most to gain from expanding its access to European customers. However, as both the Business Taskforce and EU E-commerce Taskforce recently reported, regulatory burdens, such as disjointed VAT rates, payment services, rules on labelling, sales promotion, web content and data handling across 28 member states still act as artificial barriers to further online trading. The next government should work with EU partners to ensure that the European Digital Single Market evolves in a way that supports UK businesses.

Finally, to thrive, businesses must be able to transact online and manage their data safely. The Cabinet Office estimates that cyber crime costs the UK around £27 billion each year. During 2012, 93% of large corporations and 87% of small businesses reported a cyber breach, with the cost estimated at being between £450,000 to £850,000 for large businesses and between £35,000 to £65,000 for smaller ones.³² This is hugely disruptive to big corporations, and potentially fatal to SMEs, which often lack the funds and resources to protect themselves. Whilst action has been taken by government, the scale of the problem highlights that there is more left to do.

The challenges for harnessing the full potential of technology in business are significant, but Britain has every reason to be ambitious. We are already the highest net exporter of computer and information services among the G7 countries.³³ Tech clusters in London, Cambridge and Oxford are standing out from the international crowd. E-commerce accounts for a greater percentage of GDP in the UK than in any other G20 country, and our online retail market is expected to be worth £140 billion by 2016.³⁴ The next government's goal should be nothing less than to make Britain the fastest growing digital economy in the world.

Recommendations

- 10. The two-year Post-Study Work Visa for students receiving good degrees in STEM subjects should be reinstated.** The scrapping of the visa has been a major factor in the steep decline in the number of (non-EU) international students applying to study STEM subjects at UK universities. Having trained students at British universities, we should aim to take full advantage of their skills in the workforce.³⁵
- 11. The cap of 10 endorsements per academic institution should be removed from the Tier 1 Graduate Entrepreneur Visa.**³⁶ Entrepreneurial talent is unlikely to be evenly distributed between universities and this policy therefore risks blocking some of the most talented international graduate entrepreneurs from remaining in the UK. It is revealing that the number of Graduate Entrepreneur Visas granted in 2012 was just 45 (out of a quota of 1,000), and in 2013 was 115 (out of a quota of 2,000).³⁷
- 12. The salary threshold should be removed from the Tier 2 Visa requirements for skilled migrants securing employment in the digital economy.** Start-up businesses in the technology sector should be able to take on staff for a two-year probationary period without a requirement to pay a high up-front

salary.³⁸ 35% of UK Computer Science graduates do not receive an annual salary in excess of £20,000 six months after graduation.³⁹ The visa requirement to earn at least £20,300 inhibits migrants' employment by technology start-ups who can often afford only low starting salaries, or provide payment in stock options.⁴⁰

13. Government should **aim to sign up 50% of the top 100 graduate employers to an accredited scheme that enables some of the best graduates to work for, or co-found, a start-up.** To participate, an employer would identify one or more successful applicants in each year's graduate scheme cohort, and then pay them their standard graduate salary to spend their time working for a start-up. The employer would take an equity stake in the business and guarantee to hold a graduate job open should the venture fail within two years.⁴¹
14. To aid start-ups' agility, government should **develop an opt-in, light-touch regime enabling employers in the digital sector to execute rapid no-fault dismissal of highly skilled staff in exchange for forgoing non-compete clauses and claims over intellectual property developed by employees outside their core work responsibilities.** Research from the United States

concluded that, on balance, the enforcement of non-compete clauses impedes entrepreneurship and regional growth. This scheme would be an option *only* when dealing with highly skilled employees in the digital sector – like programmers, user-interface designers and other employees with high-end technical expertise. It would not be an option for businesses in general or as a way to undermine the rights of staff in lower pay brackets.⁴²

15. Government should **set a target for the UK to attract 50% of all software Foreign Direct Investment in Europe by 2020.** Currently, the UK receives a third of all software FDI in Europe. Attracting more will be the most effective means to increase levels of later stage equity funding for UK tech companies with ambitions to expand. Domestically, government should seek to unlock corporate venture capital by revising restrictive accounting rules;⁴³ and consider the case for introducing tax incentives, similar to those that existed under the Corporate Venture Scheme.⁴⁴
16. Government should **conduct annual reviews to ensure that legislation and the regulatory and legal system surrounding intellectual property keep pace with technological change.** Advances in technology lead to new

The UK must remain vigilant in protecting against patent thickets and patent trolls.

models for creating and sharing content, such as the emergence of the second-hand digital goods market, digital inheritance and 3D printing, which challenge existing legal frameworks surrounding IP. As the technology sector makes increasing use of patents,⁴⁵ the UK must remain vigilant in protecting against patent thickets⁴⁶ and patent trolls, undertaking annual reviews of their prevalence and effects as our IP market becomes more technologically rich.

17. Government should **publish a technology impact assessment, forecasting how new technologies are expected to affect each sector of the UK economy by 2025**. Such research will be vital to ensure that future UK or international legislation (such as the EU's General Data Protection Regulation) does not hinder innovation; to assist the education sector in keeping up with the skills needed by industry; and to enable targeting of investment in technologies that produce the most economic benefit.⁴⁷
18. Government should **provide a detailed roadmap on how it will maximise the impact of initiatives to help 1.6 million SMEs transact and sell more online**. Government is right to make industry and the third sector take the lead in getting businesses online, but for their work to be effective, those organisations

require a clear commitment on the extent of funding by government and a consistent team within Whitehall with which they can collaborate.⁴⁸ For the 29% of disconnected business owners who are not confident internet users, the government should support targeted, locally-delivered, face-to-face basic training programmes around online skills for business.⁴⁹

19. Government **should target achieving a \$2 billion online export surplus by 2020 by taking a leading role in negotiations over the future shape of the European Digital Single Market**. The EU accounts for half of all UK services exports (70% for SMEs) and is therefore a vital market for online businesses. Government should lobby to remove artificial barriers to online trade wherever they exist. With a range of government departments holding a stake in the creation of the Digital Single Market (e.g. HM Treasury over VAT rates, BIS in e-commerce policy, DCMS in broadband rollout), a permanent group should be established to co-ordinate the various departmental efforts across Whitehall and spearhead British interests in Brussels.⁵⁰
20. Government **should increase the proportion of funds from the National Cyber Security Programme (NCSP) that is targeted towards the investigation and**

prosecution of cases of online crime.

As the proportion of criminal activity that takes place online rises (with a cost of £27 billion to the UK economy in 2012), government must ensure that the National Cyber Crime Unit, local police forces and the wider criminal justice system have the funds, training and expertise necessary to effectively address cybercrime and cyber-enabled fraud and theft. Only 16.1% of the National Cyber Security Programme (NCSP) budget for 2013/14 is directed towards Law enforcement for combatting cyber crime.⁵¹

GOVERNMENT

Now, more than at any point in our history, there is an opportunity to reinvent how government works. To save billions rather than millions. To provide services that are designed for the individual rather than one-size-fits-all. That opportunity must be grasped.

Using Technology To Power Better Public Services

The public sector is under constant pressure to deliver more with less. At the same time, citizens increasingly expect government services to match the quality of those they experience elsewhere in their lives, particularly from online retailers. Happily, technology has advanced to a point where it is possible to achieve both.

The future of government is digital government: *delivering more with less by being smarter.*

The government's approach to IT has changed significantly since 2010. Large contracts are being phased out and replaced with software developed in quick, iterative cycles using agile methods. The Cloudstore (an online catalogue of cloud-based services) is enabling a greater number of suppliers to deliver those smaller contracts. The founding of the Government Digital Service (GDS) in 2011 has led to the creation of gov.uk: a single domain to replace more than 300 departmental and agency websites. And by March 2015, 25 of the government's highest volume public-facing transactions will be converted to the digital-by-default standard: "Digital services that are so straightforward and convenient that all

Replacing an inefficient paper-based process with an electronic version still leaves an inefficient process.

those who can use them will choose to do so, whilst those who can't are not excluded".

The results to date have been impressive. The measures described above were claimed to have saved the taxpayer over £500 million in 2013; digitising public services is projected to save around £1.7 billion each year after 2015.⁵² But there is still a very long way to go. On a daily basis, two lorry loads of paper are delivered to the DVLA and the Crown Prosecution Service prints one million sheets of paper. The government provides more than 770 transactional services, but around half of these do not offer any digital option at all. Change will be hard to achieve, but the benefits are huge. If the rate of public sector productivity growth can be accelerated to match that in comparable parts of the private sector, by 2020 a digitally transformed government could be up to 8% more efficient than if it continued doing business as usual. This could free up to £24 billion a year to be spent on improving public services, expanding digital skills initiatives, or deficit reduction.⁵³

Whilst work on improving the public face of government transactions must continue, the major work is required behind the scenes. The primary goal for the next parliament should be to phase out the hundreds of bespoke pieces of hardware, software and processes used

across the public sector and replace them with simple, standardised and interoperable building blocks that can be locally assembled and used repeatedly. Adopting such a 'Government as a Platform' (GAAP) model, based on open standards, is the only viable way to reduce the costs of IT, simplify interactions between different branches of government, and free departments to work with the best value vendors. For this to happen, the Government Digital Service cannot be an island of innovation in an otherwise unreformed civil service. Its role should be to develop and manage the platform; the rest of government needs to adopt it. At the same time, government must not simply replace bespoke IT systems bought from external suppliers with bespoke IT developed in-house. Wherever possible – and like every other industry sector – it should source off-the-shelf solutions, moving from making to *consuming* IT.

Local government must not be left out of the digital revolution. Local authorities face similar budgetary pressures and deliver some of the most frequently used citizen-facing transactions. Though they must be free to determine their own course, local authorities will fail to achieve the benefits of digital government if they try to undergo the transformation completely independently of one other. A local GDS hub should be established to help

them apply platform technologies, converge on open standards and replace more than 400 local authority websites with a single domain, in the style of gov.uk.

Above all, policymakers must accept that IT alone cannot improve government. Replacing an inefficient paper-based process with an electronic version still leaves an inefficient process. As businesses have long known, IT is transformative only when it changes the way people work. That means breaking down silos, it means sharing more data, and it will almost certainly mean that fewer staff will be needed to perform particular tasks. The next government must not shy away from the hard but inescapable need for organisational change.

Using Data To Deliver Smarter Government

Digital government is also about being smart with data. Across the public sector, extraordinary quantities of information are amassed or created in the course of running public services. In the arena of tax alone, HM Revenue & Customs reportedly holds over 80 times as much data as the British Library.⁵⁴ This information is an asset. There is a huge opportunity to unlock its value by using big data analytics to enable evidence-based policymaking and improve the efficiency of

government operations. Achieving cutting-edge performance with big data could save the public sector between £16 billion and £33 billion a year – that is equivalent to £250 to £500 per head of the population.

To date, government has barely scratched the surface of these possibilities. To make progress, two things are needed: capability and public trust. Analysing data on the scale of government requires specialist skills that have not traditionally been part of Civil Service capabilities. In the same way that the establishment of GDS was required to lead a technological change throughout government, a dedicated Data Analytics team is needed to lead a data revolution. As with GDS, it will not be enough for them to work alone – really influencing the way government works will require departments to engage with the data, using their specialist knowledge and experience to achieve meaningful policy outcomes.

The recent furore over care.data highlighted the level of public mistrust of government combining and processing different datasets. If that trust cannot be restored, there is a real risk that progress will be stymied. Government cannot afford to let that happen. An independent data ethics committee should therefore be established with representation from government, business, charity, legal

and citizens groups, to create a Code for Responsible Analytics and guide government in novel uses of data.

Open Data

If knowledge is power, then the open data movement offers fundamentally to rebalance the relationship between government and citizen. For the first time, it is technically possible for citizens to have access to the same information as those that govern them. Open data's other virtues include increasing transparency, spurring innovation and improving public services. There is also the economic benefit: making public sector information (PSI) open for use has been estimated to be worth over £6 billion to the economy.⁵⁵ A key objective in 2015 must be to ensure that open data is not a passing fad, but a permanent shift in the way government works.

The best means to achieve this is to ensure that it delivers on its goals. Several measures could help. To be truly transparent, public sector bodies should declare the key targets they aim to achieve and the measures by which they should be judged. They should then ensure that datasets that track progress against those measures are made easily searchable on the relevant data store. They should also be required periodically to audit and declare

all the non-personal datasets they hold, so citizens have visibility of what data they could request, and know what is missing. If we are serious about innovation, publishing a schedule of when future datasets will be released would help start-ups and SMEs plan ahead and develop new products. And to improve public services, public sector bodies should be open with citizens about the challenges they face and positively engage civic groups in creating new solutions. Moreover, with the widespread adoption of smartphones, platforms based on open standards (e.g. Open311) should be established to give citizens an automated way to send data to government. This would empower communities to report on and help resolve issues in their local communities, from pot holes to park littering.

Harnessing the full power of technology and data offers the chance to deliver government that is smaller, better, faster and stronger. Britain has long prided itself on having the best civil service in the world; we should now show the world how to recreate it for the 21st Century. The barriers to realising this vision are not technological but *organisational*. It will require new skills, new capabilities and new ways of working.

Changing that is the next great challenge for digital government.

Government should commit to the wholesale adoption of a Government as a Platform model, based on open standards.

Recommendations

21. By the end of the 2015 parliament, **the 150 highest-volume government transactions should be converted to the digital-by-default standard.** The top 150 government transactions account for more than 95% of all citizen and business interactions with government. Following the completion of the 25 exemplar services in March 2015, the next 125 should be transformed. Departments should then prioritise the conversion of remaining transactions based on expected outcomes.
22. Government should **commit to the wholesale adoption of a Government as a Platform (GAAP) model, based on open standards.** Harnessing the common building blocks of software, hardware and processes developed by GDS and off-the-shelf solutions provided by external suppliers, is essential for limiting the number of bespoke products that have to be built and supported. Proactively encouraging and supporting government agencies to converge on shared capabilities, based on open standards, would enable government to use its size to secure the best value when purchasing from suppliers.
23. **A local GDS hub should be set up within Socitm, supported by the LGA, SOLACE and DCLG.** The body would provide

practical support to help local authorities apply Government as a Platform resources; advocate the adoption of open standards across the sector; and establish a single website for local government. Local authorities should be free to choose whether or not to use these services, but would be likely to find them available for a fraction of the cost of their current IT expenditure. As well as saving money, this could help create a more predictable and consistent experience for citizens as they move around the country.⁵⁶

24. **The Civil Service competency framework should be updated** to ensure that every individual working in government has a baseline level of ability in critical thinking, quantitative analysis and digital skills. Government should invest in stretching, high-quality training and development for its staff, and particularly those responsible for delivering transactional services on behalf of their departments.⁵⁷
25. **Government should establish and encourage the wide adoption of electronic proofs.** For the most important interactions in our lives, government issues the credentials required to prove that we are who we say we are, or have the attributes we lay claim to. At present, these proofs are almost exclusively analogue: birth certificates, marriage certificates,

exam and degree certificates, driving licences, P60s and P45s. Digitising these documents is a necessary step to achieve fully digital government services. Adoption of electronic proofs would also be of huge benefit to citizens in their dealings with the private sector, such as retail banking, enabling completely digital transactions to take place where currently a paper-based proof of identification is required.

26. Electronic purchasing, based on open standards, should be the default for government departments. Government is a major purchaser but is not as nimble as it should be. A widely adopted electronic platform for government buying could significantly lower prices and reduce bureaucracy. This would also provide the critical mass for widespread adoption of electronic invoicing, saving businesses billions of pounds a year.⁵⁸

27. Departments should expose Application Programming Interfaces (APIs) for all government services. The internet provides an opportunity to separate the different layers of public service delivery. Exposing read and write APIs would allow anyone to write apps capable of communicating with government systems, opening up a new wave of innovation as developers compete to meet user needs.⁵⁹

28. By the end of the 2015 Parliament, paper-based processes should be eliminated for routine interactions within and between government departments.

All internal government communications should be conducted via digital channels to improve their speed and efficiency, and to reduce cost and waste.⁶⁰

29. An Advanced Analytics Team should be established in the Cabinet Office, with responsibility for identifying big data opportunities and helping departments to realise them. The team should work with departments to apply data and analytics in new and more sophisticated ways; spread awareness and demand for cutting-edge data techniques amongst senior public sector leaders; and achieve savings and benefits for central government, over and above existing plans, worth at least £1 billion.⁶¹

30. Government should set up an independent Committee of Data Ethics, responsible for writing a Code for Responsible Analytics and guiding government in novel uses of data.

Public trust is critical for the success of government data activities: both the letter and spirit of the right to privacy must be respected. As technology offers an array of new and low cost ways to collect and harness information, an independent ethics committee

with representation from government, business, charity, legal and citizen groups is required to advise government and ensure that innovation proceeds alongside appropriate protections for individuals' data.⁶²

31. Public sector bodies should be required to audit and declare on data.gov.uk (or a similar data portal) the non-personal datasets they hold, and publish a schedule for their future release.

This process would increase transparency and strengthen the role of the Open Data User Group, by letting citizens and businesses see what data is available to request. Providing a release schedule would help businesses allocate their resources and secure investment. Audits should be conducted at least every five years.⁶³

32. Ordnance Survey should cease to be a trading fund and be removed from the Shareholder Executive to make their maps and data free to use. A report conducted for BIS listed geospatial data as being amongst the most valuable and frequently requested forms of Public Sector Information. The vast majority of central government departments and local authorities, together with

public bodies such as Transport for London, use OS maps to plot their data. Current licence agreements prevent some of the most valuable data sets held by those organisations from being syndicated as open data.⁶⁴

33. An information marketplace should be established to enable businesses and citizens to provide data to government.

Radical reform of government can begin by empowering citizens and businesses to report on and help resolve problems in their local communities. Local and central government should publish their data needs on data stores and set up interfaces based on open standards (e.g. Open311) to deliver them. Procurement models will need to be examined to ensure that start-ups providing data can be remunerated.

ENDNOTES

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24. Higher Education Funding Council for England, Written Evidence to the House of Lords Science and Technology Select Committee on International STEM students, March 2014, p.177-181.
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26. In 2012/13 there was an almost 90% increase in the number of firms receiving funding under EIS and SEIS compared with the previous year. The Start-Up Loans scheme has provided more than £74 million to almost 15,000 businesses. Numbers as of March 2014.
27. Stephen Welton, CEO of the Business Growth Fund, claims that investments in early stage companies in the UK match the level of investment in Silicon Valley. However, larger, later-stage investments in the UK are nearly four times lower in the UK than in Silicon Valley.
28. Intellectual property is hugely important for the British economy. UK investment in assets protected by intellectual property rights stood at £65.6bn in 2011, representing half of all investments in intangible assets, and more than the combined investment into plants and machinery and vehicles (Intellectual Property Office, "Estimating UK investment in intangible assets and Intellectual Property Rights", March 2014).
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35. A 2011 UKCISA survey found that of all the changes to visa rules in 2011, the abolition of the Post Study Work visa was rated as having the most negative impact on their decision to study in the UK. Several bodies submitting written evidence to the House of Lords Science and Technology Committee in 2014 agreed that it was the most significant factor causing the drop in the number of international STEM students (see p.226, University of Leicester and University of Plymouth). A recent IPPR report has found that among Indian students, 51% agreed that the restrictions on their ability to work in the UK after studying would put off 'most' coming to the UK. (IPPR, "Britain wants you! Why the UK should commit to increasing international student numbers", November 2013).
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38. Recommendation from Policy Exchange, "Bits and Billions: A blueprint for high-impact digital entrepreneurship in the UK", September 2012.
39. Figure from Universities UK in written evidence to the House of Lords Science and Technology Committee, p. 217–218. Though these statistics do not account for non-EU students, we would not expect a significant difference by country of birth.
40. The salary threshold is linked to wage inflation, as recorded by the Average Weekly Earnings Index. 25% of London start-ups offer stock / share options to new graduate employees. (Adzuna, "Tech Jobs Trends", October 2013).
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42. Recommendation from Policy Exchange, "Bits and Billions: A blueprint for high-impact digital entrepreneurship in the UK", September 2012.
43. Current accounting rules force corporate investors, when acquiring an equity stake of 20% or more, to record their share of the investment's profit or loss in the overall corporate balance sheet and into a syndicate.
44. The Corporate Venture Scheme, which expired in 2010, provided corporates investing in small companies with a minority shareholding with a relief against corporation tax of up to 20% of the amount invested, as well as deferral relief against gains and loss relief. Estimates suggest that as much as £488 billion in cash and equivalents sit on the balance sheets of UK corporates.
45. The introduction of the Patent Box scheme in April 2013 allows innovative companies to apply a lower

- rate of Corporation Tax of 10% for profits earned from patents.
46. The Intellectual Property Office conducted preliminary research in July 2013 into the existence of patent thickets in the UK. They found that they were particularly present within the computer technology and digital communication sectors. (IPO, "A Study of Patent Thickets", July 2013).
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 48. In the North East, 88% of online SMEs increased revenue by as much as £10,000 as a result of using the internet (Go ON UK North East, "North East SMEs missing out on vast digital benefits", October 2013).
 49. 29% of disconnected business owners are not confident internet users (Lloyds Banking Group, "Britain's Digital Opportunity", March 2013).
 50. This group would follow on from the European E-commerce Taskforce, convened by Government to explore the reasons for low levels of European cross-border online trading. In its final report it identified measures to improve the environment for businesses and consumers to increase rates of European e-commerce. The taskforce comprised e-retailers, service providers, consumer groups, industry bodies and government agencies. It met between March and June 2013.
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 52. Cabinet Office, "Sprint 14: Speech by Francis Maude", January 2014.
 53. Policy Exchange, "Smaller Better Faster Stronger: Remaking Government for the digital age", September 2013.
 54. BBC News Online, "On the trail of the offshore tax dodgers", December 2011.
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 56. Local authorities must have the independence to be able to decide whether or not this approach is right for them. However, it is likely that many would choose to do so given the likely cost savings and the fact that Institute for Fiscal Studies estimates suggest that local authorities face a real terms cut of 40% by 2018.
 57. Recommendation from Policy Exchange, "Smaller Better Faster Stronger: Remaking Government for the digital age", September 2013. In a recent survey of public sector staff, 72% of respondents agreed that it is becoming increasingly important for civil servants to know how to access, share and use data. In the same sample, a majority said they did not know how to access or interpret data sets, and could not cite specific data initiatives or their benefits.
 58. Recommendation from Policy Exchange, "Smaller Better Faster Stronger: Remaking Government for the digital age", September 2013. Achieving a price reduction of 10% on just 10% of government spending would be worth over £2 billion/year.
 59. Recommendation from Policy Exchange, "Smaller Better Faster Stronger: Remaking Government for the digital age", September 2013. Imagine, for example, a service that securely integrated a citizen's online bank account with their tax return, or one that let them notify public and private organisations of a name or address change.
 60. Recommendation from Policy Exchange, "Smaller Better Faster Stronger: Remaking Government for the digital age", September 2013.
 61. Recommendation from Policy Exchange, "The Big Data Opportunity: Making government faster, smarter and more personal", July 2012.
 62. In interviews with Policy Exchange, civil servants report being hindered from using large-scale data analysis and insights due to the lack of an agreed framework which describes the appropriate circumstances in which data can be used and combined.
 63. This could be done by crowdsourcing information from data users in different departments.
 64. BIS, "Market Assessment of Public Sector Information", May 2013.

ABOUT THE AUTHORS

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