



HM Treasury

The economic value of data: discussion paper

August 2018

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Executive summary

Technological change has radically increased both the volume of data in the economy, and our ability to process it. This change presents an opportunity to transform our economy and society for the better.

Data-driven innovation holds the keys to addressing some of the most significant challenges confronting modern Britain, whether that is tackling congestion and improving air quality in our cities, developing ground-breaking diagnosis systems to support our NHS, or making our businesses more productive. The UK's strengths in cutting-edge research and the intangible economy make it well-placed to be a world leader, and estimates suggest that data-driven technologies will contribute over £60 billion per year to the UK economy by 2020.¹

Recent events have raised public questions and concerns about the way that data, and particularly personal data, can be collected, processed, and shared with third party organisations. These are concerns that this government takes seriously. The Data Protection Act 2018 updates the UK's world-leading data protection framework to make it fit for the future, giving individuals strong new rights over how their data is used.

Alongside maintaining a secure, trusted data environment, the government has an important role to play in laying the foundations for a flourishing data-driven economy. This means pursuing policies that improve the flow of data through our economy, and ensure that those companies who want to innovate have appropriate access to high-quality and well-maintained data.

This discussion paper describes the economic opportunity presented by data-driven innovation, and highlights some of the key challenges that government will need to address, such as: providing clarity around ownership and control of data; maintaining a strong, trusted data protection framework; making effective use of public sector data; driving interoperability and standards; and enabling safe, legal and appropriate data sharing.

Over the last few years, the government has taken significant steps to strengthen the UK's position as a world leader in data-driven innovation, including by agreeing the Artificial Intelligence Sector Deal, establishing the Geospatial Commission, and making substantial investments in digital skills. The government will build on those strong foundations over the coming months, including by commissioning an Expert Panel on Competition in Digital Markets. This Expert Panel will support the government's wider review of competition law by considering how competition policy can better enable innovation and support consumers in the digital economy.

¹ Centre for Economics and Business Research, '[The Value of Big Data and the Internet of Things to the UK Economy](#)' SAS:2016, page 5 (viewed on 10 May 2018)

There are still big questions to be answered. This document marks the beginning of a wider set of conversations that government will be holding over the coming year, as we develop a new National Data Strategy.

While this is not a consultation document, any comments in response to this discussion paper can be sent in writing or by email to HM Treasury at:

Data Paper
HM Treasury
1 Horse Guards Road
London
SW1A 2HQ

Or: datapaper@hmtreasury.gov.uk

Chapter 1

The economic opportunity

Unlocking the value of data

- 1.1 The OECD estimates that in 2015, the global volume of data stood at 8 zettabytes (8 trillion gigabytes), an eight-fold increase on 2010. By 2020, that volume is forecast to increase up to 40 times over, as technologies including the Internet of Things create vast new data sets.¹ This sheer increase in quantity has pushed data up the political agenda, capturing the attention of businesses and policy-makers alike.
- 1.2 When it comes to data, however, volume is not the sole indicator of economic value. Most global data is unstructured, taking the form of pictures and videos, or the 'exhaust data' formed as a by-product of business. As long as such data is inaccessible for the purposes of analysis, or is unlinked and unaggregated, its potential value may remain unrealised.
- 1.3 Just as important as global increases in data has been the significant advances in data processing technologies over recent years. Cloud storage, new data science techniques, dramatic increases in processing power and speed, as well as the further development of Artificial Intelligence (AI) have all enabled economic actors to unlock new insights from their data assets, often in the form of trends, patterns and associations.
- 1.4 This potential to turn data into useful insights is an important factor in creating economic value, as these insights can be used by decision-makers to optimise the allocation of resources and develop new capabilities. Research has shown that firms adopting data-driven decision-making can have 5-6% higher output and productivity,² with the European Commission calculating that "even limited use of big data analytics solutions by the top 100 EU manufacturers could boost EU economic growth by an additional 1.9% by 2020."³
- 1.5 As the OECD has made clear, data-driven innovation can have a significant impact on well-being, as well as productivity growth.⁴ Data can be used to personalise services and improve the consumer experience in areas like mapping, retail and video/music streaming. And it can form the basis of

¹ OECD, '[Data-driven Innovation: Big Data for Growth and Well-being](#)' OECD Publishing:2015, page 20

² Brynjolfsson E and others, 'Strength in numbers: How does data-driven decision making affect firm performance?' SSRN:2011

³ ESPC Strategic Notes, '[Enter the Data Economy: EU Policies for a Thriving Data Ecosystem](#)' Issue 21:2017, page 1

⁴ OECD, '[Data-driven Innovation: Big Data for Growth and Well-being](#)' OECD Publishing:2015, page 29

brand new products across a range of sectors – from unlocking new healthcare treatments, to enabling smart devices.

- 1.6 In the public sector, data is playing an increasing role in transforming public services. This is particularly true in transport, where there has been significant data-driven innovation. Over the last ten years, Transport for London (TfL) has led the world in opening transport data free of charge, including to external app developers. A recent study by Deloitte found that use of this data now contributes up to £130 million per year to the London economy, for example through time-saving for Londoners, reduced costs for TfL, and high-value job creation.⁵
- 1.7 Data also plays an essential role in the development of AI and machine learning, in which a digital programme assumes the role of a decision-maker. The recent review of AI in the UK, led by Professor Dame Wendy Hall and Jérôme Pesenti, identified access to data as a key component in the continued growth of the UK's AI industry.⁶ AI in turn holds significant potential for economic growth, with one estimate suggesting that by 2030, AI could increase GDP by 10%.⁷

Data as an under-exploited asset

- 1.8 It is clear that the use of data has the potential to enhance economic competitiveness and productivity growth across the UK economy, whether that is through fostering new products, processes, organisational methods and markets, or even enabling entirely new business models.
- 1.9 Data also plays an increasingly important economic role in underpinning international trade and cooperation. According to the McKinsey Global Institute, cross-border flows of data grew 45 times from 2005 to 2014, and accounted for \$2.8 trillion (approx. 3.3%) of global GDP in 2014.⁸ Conversely, research has shown that restrictions in the flow of data across national borders can reduce growth.⁹
- 1.10 Yet the potential value of data can often go unrealised. According to the ONS, less than 10% of UK businesses use customer relationship management software to collect, store, and share customer information within their businesses, and only 6% of businesses use this information for marketing purposes.¹⁰ Some businesses even view data as a liability, particularly where personal data is concerned, and take steps to severely curtail access and usage well beyond the requirements of data protection laws. This can come at significant opportunity cost.¹¹

⁵ Deloitte, '[Assessing the value of TfL's open data and digital partnerships](#)' July 2017, page 5

⁶ Hall W and Pesenti J, '[Growing the Artificial Intelligence Industry in the UK](#)' October 2017

⁷ PWC, '[The economic impacts of artificial intelligence on the UK economy](#)' June 2017

⁸ McKinsey Global Institute, '[Digital Globalization: The New Era of Global Flows](#)' March 2016, page 10

⁹ Bauer M and others, '[The Costs of Data Localisation: Friendly Fire on Economic Recovery](#)' ECIPE: 2014

¹⁰ ONS, see Chart 25 – [E-commerce and ICT activity Statistical bulletins](#), 2016

¹¹ Higson C and Waltho D, '[Valuing Information as an Asset](#)', EURIM: 2010, page 1

- 1.11 In certain sectors, this opportunity-cost is particularly marked. Health is one example of a sector where data holds significant potential economic and social value, and yet data-driven innovation is only just beginning to emerge. In 2011, McKinsey estimated the potential value of US health data at \$300 billion per year, and yet five years later, they estimated that only 10-20% of that potential had been realised.¹²
- 1.12 Data analytics is still in its relative infancy and in some cases this failure to recognise the potential value of data may result from a lack of established use cases or a detailed evidence base. In other cases, the absence of data-driven innovation may result from a lack of digital capabilities in both the public and private sectors. This is something the government is seeking to address through its focus on digital skills and investment in digital infrastructure, as clearly stated in the government's Industrial Strategy¹³ and recent AI Sector Deal.¹⁴
- 1.13 More fundamentally, however, data has a number of features that potentially hold back its efficient, competitive and innovative use. These include the fact that:
- a) Data is 'non-rivalrous'. This means a single piece of data can be used in multiple algorithms and applications at the same time. However, non-rivalry means it can be difficult to establish the rights to use, exclude and transfer data.
 - b) Data can generate positive externalities. This means that while data can reveal new findings and insights if it is aggregated, linked and analysed, the benefits might not be directly foreseeable and may not always accrue to the data creator or controller. As a result, valuable data may be under-exploited or under-shared.
 - c) Data exhibits economies of scope. Merging two complementary datasets may produce more insight than keeping them separate. Again, this means that the potential value of data may not always be foreseeable to the data controller.
- 1.14 By obscuring the true economic potential of data, these features can lead to a mismatch between those who hold potentially valuable data, and those innovative businesses and entrepreneurs with the skills and inclination to exploit significant data assets. Only where data is able to flow freely between economic actors will its true potential value be realised. The government therefore believes that there would be economic and social value to the UK in pursuing policies which ensure that those companies who want to innovate in data have appropriate access to high-quality and well-maintained data from across the economy.
- 1.15 In developing this policy position, there are a number of challenges that government will need to address, not least in ensuring that access to data occurs in an environment where individuals' rights in relation to their data

¹² McKinsey Global Institute, 'The Age of Analytics: Competing in a Data-Driven World' December 2016, p.29

¹³ HM Government, 'Industrial Strategy: Building a Britain fit for the future' November 2017

¹⁴ HM Government, 'Industrial Strategy: Artificial Intelligence Sector Deal' April 2018

are subject to strong protections. These challenges are explored in the next section.

Chapter 2

Challenges for the data economy

Challenge One: Addressing ownership and control of data

- 2.1 Any attempt to improve access to data must take place within the existing legal framework with regards to data ownership and control. In the UK (as with most other countries) there is no comprehensive framework to determine ownership of data, which is not generally understood to be property.
- 2.2 There are, however, a number of routes available for economic actors wanting to control or restrict access to data, for example:¹
- a) Data protection law gives individuals rights over their own personal data if it is collected by someone other than another individual.
 - b) Organisations can establish copyright over a database, and therefore have some ability to control who accesses and uses the data it contains.
 - c) Where data is collected and stored, a premises or server owner can restrict access to a database.
 - d) Data that is produced through original research can also be copyrighted, and fair use exemptions will apply.
- 2.3 The Royal Society, amongst others, have argued that the current framework is unclear, and that this lack of clarity can be a barrier to effective trade and transfer of data.² In particular, there have been calls for reform of intellectual property rights in relation to datasets. The AI review recommended reforming copyright law to clarify that the right to read published research also entails the right to mine it for data.³
- 2.4 Some commentators have advocated for the law to be changed more fundamentally so that individuals can exercise ownership rights over their personal data. They argue that this would enable individuals to share in the revenues that companies have accrued through monetising their personal data.⁴

¹ The ODI blogs, '[How Do We Own Data](#)' August 2016 (accessed 09/05/18)

² Royal Society and British Academy, '[Data Management and Use: Governance in the 21st Century](#)' June 2017, page 32

³ Hall W and Pesenti J, '[Growing the Artificial Intelligence Industry in the UK](#)' October 2017, page 49

⁴ For example, the Financial Times, '[Digital privacy rights require data ownership](#)' 2018 (accessed 09/05/18)

- 2.5 This approach may have some advantages, particularly in its clear recognition that the collection of personal data can be an important enabling feature of digital business models which monetise user engagement.
- 2.6 However, there would be substantial technical and legal challenges in seeking to value individual contributions of data, not least because personal data often relates to more than one person. Neither is it clear what advantages data ownership would confer to the individual over and above a strong rights framework around consent, portability and removal of data, as introduced by the UK's new data protection laws. There are already several initiatives under development that would allow data subjects to extract value from their own personal data, which could operate within the existing rights-based framework.⁵
- 2.7 Furthermore, the Royal Society suggest that extending ownership rights to personal data would ignore the fact that the overall value of a dataset cannot be divided equally amongst its constituent parts.⁶ Whilst the supply of data is a necessary condition for creating economic value, it is not always sufficient. For example, the personal data of a single individual may not yield significant economic value when taken in isolation, as it is in the aggregation and effective use of data that value is often realised.⁷

Challenge Two: Maintaining protection of personal data

- 2.8 A significant proportion (although by no means all) of the data generated globally is personal data. This means it is information relating to an identified or identifiable person.⁸ Clearly, adequate protection of personal data is essential for both security purposes, and maintaining an individual's right to privacy. In a democratic society, public trust in the safe, transparent use of personal data is a cornerstone of the digital economy.
- 2.9 Personal data is also a significant source of economic and social value to both businesses and consumers. The Boston Consulting Group has estimated that across Europe, the quantifiable benefit from personal data applications could reach €1 trillion annually by 2020 – with two thirds of that benefit accruing to consumers, and one third to businesses.⁹ This is because personal data enables firms to deliver personalised goods, services,

⁵ For example, the MIT's '[Solid](#)' project and the '[Hub of all Things](#)' (accessed 09/05/18)

⁶ Royal Society and British Academy, '[Data Management and Use: Governance in the 21st Century](#)' June 2017, page 32

⁷ In recent position papers on corporate tax and the digital economy the government has discussed how users – through their engagement and participation with a platform – can create value for certain digital business models. These papers noted that the supply of data will often form part of this value creation process, although also recognised that the value created by users often occurs through a broader set of channels than data collection alone. See: HM Treasury, '[Corporate Tax and the Digital Economy: position paper](#)' November 2017

⁸ See: ICO, '[Guide to the General Data Protection Regulation \(GDPR\)](#)'

⁹ Boston Consulting Group, '[The Value of our Digital Identity](#)' Liberty Global: November 2012, page 55

recommendations and service improvements, amongst other things which lead to mutual benefit between buyers and sellers.¹⁰

- 2.10 As technology becomes increasingly important to user experiences, the reliance on personal data is likely to increase. Geolocation data, for example, is expected to transform the way that we interact with the high street, removing the need to queue and allowing greater personalisation of retail interactions. While this will bring significant opportunities for both businesses and consumers, there are implications for privacy and data protection.
- 2.11 As stated above, the government is committed to protecting personal data, including by providing new rights to ensure we are in control of our own data. The Data Protection Act 2018 updates the UK's existing data protection laws for the digital age. It sets new standards for protecting personal data, in accordance with the EU's General Data Protection Regulation (GDPR), and gives people more control over use of their data.¹¹
- 2.12 Under the new data protection laws, consumers will be better able to 'trade off' what is known about them, against benefits like product recommendations and personalised services. This approach ensures that individuals retain control of how their personal data is used, while still allowing innovation to take place. The Information Commissioner's Office has the power to levy fines of up to £17.5 million, or 4% of global turnover (whichever is greater), where firms breach the new data protection rules. This means that data processing organisations have strong incentives to put appropriate protections in place.
- 2.13 This approach should not be seen as a barrier to data-driven innovation, but an opportunity. By building a strong data protection framework, the government hopes to build public confidence in the appropriate sharing of personal data for social and economic means. In the longer-term, giving the public confidence that their data will be treated carefully by the organisations they share it with, not being passed on to or otherwise accessed by third party organisations without their knowledge, is likely to increase the availability of data available to innovative data-driven businesses.
- 2.14 The government also recognises that protecting personal data in this way will not always be enough, on its own, to prevent social harm. Information gathered through legal means could still be used for unethical practices, for example where there is risk of algorithmic profiling or discrimination. This is just one of the reasons why the government has created the Centre for Data Ethics and Innovation, which will have a role in ensuring that innovation in the use of personal and non-personal data remains safe and ethical. The Department for Digital, Culture, Media and Sport has published an updated

¹⁰ For more on this topic, see: Acquisti A and others, 'The Economics of Privacy' in the Journal of Economic Literature, volume 52: 2016.

¹¹ The government has previously published a future partnership paper on how to ensure the continued protection and exchange of personal data between the EU and the UK in light of the UK's withdrawal from, and new partnership with, the EU (Department for Exiting the European Union, '[The exchange and protection of personal data - a future partnership paper](#)' August 2017). See also: [The future relationship between the United Kingdom and the European Union](#), July 2018.

Data Ethics Framework,¹² to give civil servants guidance on the appropriate use of data in the public sector, and the confidence to innovate with data.

Challenge Three: Openness in public sector data

- 2.15 It is often suggested that an effective means of increasing the supply of data in the economy is to adopt an ‘open data’ approach, particularly with regards to datasets controlled by the government. For data to be considered ‘open’, it must be published in an accessible format, with a licence that permits anyone to access, use and share it. This requires it to be non-personal data (although it may be derived from personal data). In the UK, open public sector data is published under the Open Government Licence.
- 2.16 The UK tops the Open Data Barometer,¹³ having released over 45,000 datasets.¹⁴ The government has committed to “continue the drive for open data, maintaining [the UK’s] position as the world leader.”¹⁵
- 2.17 As previously noted, there are number of sectors (particularly transport) where open data has had a clear economic and social benefit. However, this does not mean that ‘open data’ is appropriate or beneficial for all forms of data. For example, it may not be the right approach where data is sensitive from a commercial or security perspective, or if anonymised data is at risk of reidentification. Or where data is already monetised, and where making it open would remove a source of income. This could harm business models which use resale to invest in better data gathering, and in the public sphere, could result in taxpayers replacing lost revenue.
- 2.18 Rather than rely on an open/closed distinction, data access should be seen as a spectrum, with different degrees of data openness. There may be instances in which it is appropriate to increase access to data, but where, as outlined above, it is inappropriate for that dataset to be made completely open. There may also be instances where the government wishes to retain control of valuable datasets that can be used for commercial purposes, in order to ensure that a fair proportion of the benefits derived from public data accrue back to the general public. In these cases, publication of public sector data under the Open Government Licence may be inappropriate. Given that the value of data will vary by sector, and given that the circumstances of data will change with each use case, decisions regarding open data should therefore be made on a case-by-case basis.
- 2.19 The government’s role in increasing access to public data is not limited to simply making data available. Availability is only one aspect of openness, and the government also has a role to play in increasing the value of data, through structuring and linking datasets. Where data is personal, the government recognises the value of effective anonymisation and aggregation as a route to unlocking new sources of value. And government

¹² Department for Digital, Culture, Media and Sport, [Data Ethics Framework](#) 2018

¹³ See: [The Open Data Barometer](#) 2016, produced by the World Wide Web Foundation (accessed 09/05/18)

¹⁴ See: [Data.gov.uk](#) (accessed 09/05/18)

¹⁵ [‘The Conservative Manifesto’](#) 2017, page 81

takes seriously its role in maintaining and updating datasets over the long-term, to give businesses confidence about the value of a long-term investment in data-driven technology.

Challenge Four: Driving interoperability and standards

- 2.20 As outlined above, a crucial factor in building economic value into data is the ability of a wide range of economic actors to link and aggregate appropriate datasets, and thereby to innovate and compete to meet consumers' needs. For this to happen most easily, data collectors need to subscribe to a set of standards that enable the interoperability of data. Government therefore has the potential to play a role in driving these standards – whether working with stakeholders to develop and encourage voluntary adoption of standards, or through regulation.
- 2.21 In 2016 the Competition and Markets Authority, on the back of their investigation into the retail banking market, ordered the nine largest banks in the UK to deliver 'Open Banking'. This radical intervention, driven forward by government through regulation (alongside the European Second Payment Services Directive), required the biggest banks to open-up current account data to FCA-registered third-party providers in a secure and accessible format, where individual data subjects made such a request.
- 2.22 Increasing access to data in this way is expected to have a significant impact on competition in the future banking market, allowing consumers and small and medium-sized enterprises (SMEs) to access a range of new and innovative products that better meet their needs. It is also expected to help grow the UK's FinTech sector, and strengthen the UK's position as a world leader in financial innovation. The Centre for Economics and Business Research has estimated that Open Banking may eventually boost UK GDP by more than £1 billion annually.¹⁶
- 2.23 This approach to the opening of privately-held data has the potential to transform competition in sectors across the economy. This is not simply true of consumer data. In transport, the recent Bus Services Act gave ministers the power to compel private bus operators to release open data relating to fares, punctuality and real-time location – an approach that could help spread the success of TfL's open data policy across the country. A move towards greater interoperability of data is also considered essential to the future of the NHS, and was highlighted in the National Information Board's 'Personalised Health and Care 2020 – A Framework for Action'.¹⁷
- 2.24 The Data Protection Act 2018 introduced an individual right to data portability, which may help drive the development of common standards for interoperability of data, given that data will need to be "ported" in an accessible format. This may improve access to data and lower the cost of

¹⁶ City AM, 'Open Banking could provide a £1bn boost to the UK economy as banks are forced to compete, says a new study' February 2018

¹⁷ NHS, 'Personalised Health and Care 2020' 2014, page 27 (accessed 09/05/18)

using it for both consumers and the companies they consent to share it with. The government will carefully consider how this right operates in practice across different sectors.

- 2.25 As part of this the government recently launched a ‘Smart Data’ review in the Modernising Consumer Markets Green Paper.¹⁸ This review will assess how best to ensure data portability is implemented in a way which supports consumers to get better deals in regulated markets. It will do this by seeking to identify those markets where data portability can have the biggest impact and how regulators can be empowered to introduce transformative changes for the benefit of consumers.
- 2.26 The newly-launched Expert Panel on Competition in Digital Markets will also have a wide remit to consider the important future tools and requirements for effective competition in the digital economy. This could potentially include the role of data portability, operability and common standards, for example, to reduce barriers to switching for consumers in non-regulated parts of the economy.

Challenge Five: Enabling safe, legal data sharing

- 2.27 The AI review identified legal barriers to data sharing as a key barrier to innovation within AI, and the same holds true for other forms of data-driven innovation. These barriers did not arise because the sharing is illegal (particularly in the cases of non-personal data), but because small firms and start-ups tended to lack the experience, expertise and mechanisms to strike agreements with data holders.¹⁹
- 2.28 Provided data sharing is safe, ethical and compliant with data protection laws, the government wants to make it easier for firms to share useful data, to support growth and innovation. A lack of effective data sharing would only serve to concentrate power within the hands of a few large businesses, and stifle the innovation, quality, and value for money that that arises normally in markets through effective competition and disruption.
- 2.29 Creating an effective market for non-personal data is therefore likely to form a key challenge in shaping the future of the data-driven economy. The AI review recommended that government work with the private sector to develop standardised, repeatable terms for access to data, building on the examples of mutually-beneficial data-sharing agreements that are already in use. These ‘data trusts’ could then be used by small businesses and start-ups, allowing more ideas to be tested in the market and at scale.
- 2.30 Clear frameworks for the anonymisation and de-personalisation of data will also be important in any developed data market. The Information Commissioner’s Office has undertaken significant work to provide clarity to firms looking to commercialise personal data through anonymisation, and the UK Anonymisation Network provides support and information to

¹⁸ Department for Business, Energy and Industrial Strategy, ‘[Modernising Consumer Markets: Consumer Green Paper](#)’ April 2018, page 23

¹⁹ Hall W and Pesenti J, ‘[Growing the Artificial Intelligence industry in the UK](#)’ October 2017, pages 45-46

businesses looking to undertake anonymisation of personal data. However, these resources are not always widely known, and many businesses are still nervous about the implications and risks associated with anonymisation. There is therefore a continuing role for public sector bodies and other key stakeholders in setting out principles for the safe, secure, and effective anonymisation of personal data, in order to enable effective data sharing.

- 2.31 The right to portability of data that is enshrined within the GDPR may also bring potential for greater innovation through data sharing. The voluntary donation of data for research purposes, for example through the Biobank project, has previously helped drive research and innovation in socially beneficial areas such as health. In a similar way, as the CEO of the Open Data Institute has put it, “the data portability right could lead to more people making the positive choice to donate data about themselves for good causes... data portability could provide a mechanism for some charities and civil society groups to engage people in collective action.”²⁰
- 2.32 Again, the newly-launched Expert Panel on Competition in Digital Markets has a wide remit and could consider whether there are currently effective tools and frameworks to ensure effective competition in markets for data.

²⁰ The ODI blog, [‘Will GDPR and data portability support innovation’](#) February 2018

Chapter 3

Positioning the UK at the forefront

The government's approach to data

- 3.1 The UK government has a clearly stated objective to “put the UK at the forefront of the AI and data revolution” and “make the UK a global centre for AI and data-driven innovation.”¹ This goal is one of the four “Grand Challenges” of the UK Industrial Strategy, and underpins the government’s approach to data, as found in the AI Sector Deal,² Digital Charter³ and the Digital Strategy, which also commits to making the UK “the best place to start and grow a digital business”.⁴
- 3.2 In recent years, the UK government has taken significant and unprecedented steps to position the UK as a world leader in data-driven innovation. It has opened-up and continues to open-up extensive public data assets in key sectors such as transport and geospatial. It has developed frameworks for safe, ethical access to data through world-leading initiatives like Open Banking. And work is ongoing across government, including through the £10 million Regulators’ Pioneer Fund that was announced at Budget 2017,⁵ to ensure the UK’s regulatory framework is sufficiently dynamic and flexible to adapt to the technologies and services of the future.
- 3.3 The government is also building digital capability across the economy. This has included significant investment to improve digital education at primary and secondary levels, as well as making digital skills training for adults a statutory right from 2020. In higher education, government-backed initiatives like the Alan Turing Institute have helped set the UK apart as a world-leading research base for data science and innovation, while substantial funding for new PhDs and fellowships in AI will help maintain the flow of world-class talent from our universities.
- 3.4 The AI Sector Deal is a package of up to £0.95 billion support for the sector, which includes government, industry and academic contributions. This is alongside £250 million already allocated for Connected and Autonomous Vehicles. As part of the AI Sector Deal, £113 million of Industrial Strategy Challenge Funding has been pledged to support new research programmes that use AI, data and digital technologies to enhance productivity in the

¹ HM Government, ‘[Industrial Strategy: Building a Britain fit for the future](#)’ November 2017, pages 36-38

² HM Government, ‘[Industrial Strategy: Artificial Intelligence Sector Deal](#)’ April 2018, page 11

³ Department for Digital, Culture, Media and Sport, ‘[Digital Charter](#)’ 2018 (accessed 09/05/18)

⁴ Department for Digital, Culture, Media and Sport, ‘[UK Digital Strategy](#)’ 2017 (accessed 09/05/18)

⁵ HM Treasury, ‘[Autumn Budget 2017](#)’, page 45

services sector, and to drive innovation in the use of robotics in extreme environments. To underpin this digital capability, the government is investing over £1 billion to stimulate the market to build the UK's next generation of digital infrastructure.

- 3.5 The government has committed to working with major public and private sector data holders to identify barriers to sharing data, and is exploring data sharing frameworks, such as data trusts, to allow and ensure the safe, fair and equitable data sharing between organisations. The government has also announced the creation of a new Digital Framework Task Group, tasked with developing a roadmap to capturing the opportunities presented by infrastructure data.⁶
- 3.6 The opportunities of data-driven innovation span both the public and private sector, and government has made significant investments in driving the digital transformation of the civil service, to ensure there is a skilled body of civil servants with deep expertise in digital and data-driven technologies. Work is also ongoing to make better use of public sector data assets, with the announcement of NHS Digital Innovation Hubs to support the use of patient data for research purposes, and a Geospatial Commission to unlock the value of geospatial data in the UK. Government has announced that key parts of the Ordnance Survey MasterMap will be made openly available – this release is one of the first projects to be delivered by the new Geospatial Commission⁷. The £20 million GovTech Fund announced at Autumn Budget⁸ will enable businesses and innovators to collaborate with government in solving public sector challenges, to ensure that the public sector can benefit from cutting-edge data-driven technologies.

Building on strong foundations

- 3.7 In the coming months, the government will be building on these strong foundations to further develop its strategic approach to data. This includes measures to unlock the value from geospatial data assets and further work to deliver the AI Sector Deal, including establishing a Data Working Group as part of the AI Council (a new industry body tasked with increasing growth in the AI sector and promoting its adoption in other sectors of the economy). As part of the Industrial Strategy's Grand Challenges, the Prime Minister recently announced an initial mission of government would be to "use data, Artificial Intelligence and innovation to transform the prevention, early diagnosis and treatment of chronic diseases by 2030".⁹
- 3.8 The government recognises that a key part of any strategic approach to data is maintaining public confidence in its innovative use. The Centre for Data Ethics and Innovation will therefore have a crucial role in providing oversight of the data-innovation landscape, with a responsibility to enable and ensure safe, ethical and ground-breaking innovation in AI and data-driven

⁶ HM Treasury, 'Data for the Public Good – Government Response to National Infrastructure Commission', July 2018

⁷ Cabinet Office, '[Unlocking of government's mapping and location data to boost economy by £130m a year](#)', June 2018

⁸ HM Treasury, '[Autumn Budget 2017](#)', page 45

⁹ Department for Business, Energy and Industrial Strategy, '[The Grand Challenge Missions](#)', 2018 (accessed 09/05/18)

technologies. Roger Taylor has been appointed as the new Chair of the Centre, and the government has launched a consultation on its remit.¹⁰

- 3.9 Data will also play an important role in consumer markets. The ‘Modernising Consumer Markets: Consumer Green Paper’¹¹ consults on a number of consumer and regulatory areas relating to data, and sets out how the government intends to enable consumers to take advantage of data-driven innovations, while ensuring their data and privacy rights are protected. The paper also announced a Smart Data Review, which will look at how data portability can help consumers to get better deals in regulated markets.
- 3.10 As outlined above, the potential value of data for businesses raises particular opportunities and challenges when it comes to competition in the digital economy. Many stakeholders have expressed concern that the dominance of a few, key digital companies places significant restrictions on access to data, with potential adverse effects on competition across a whole range of sectors. However, data-driven innovation can also facilitate new forms of competition and disruption in markets that were previously dominated by only a few incumbents.
- 3.11 To explore these and other issues further, the government is launching an Expert Panel on Competition in Digital Markets, chaired by Jason Furman, Professor of Practice of Economic Policy at Harvard University and former chief economist to President Barack Obama as 28th Chair of the Council of Economic Advisors (2013-2017). This panel will consider whether the competition regime – and pro-competition policy more generally – remains sufficiently robust to meet the challenges of the emerging digital economy, and will make recommendations on any changes that may be needed. The competition implications of concentrations of data among a small number of firms will be a consideration, and the Panel’s work will inform the government’s wider review of competition policy, which was announced as part of the Consumer Green Paper.

Next steps

- 3.12 There are still big challenges to confront and questions to answer if we are to take advantage of the UK’s unique strengths and capacity for data-driven innovation.
- 3.13 Government has announced the intention to produce a new National Data Strategy, to unlock the power of data in the UK economy and government, while building public confidence in its use. The five challenges outlined in this discussion paper will inform the development of this new strategy.
- 3.14 This document therefore marks the beginning of a wider set of conversations that government will be initiating over the next year, through roundtables and wider stakeholder engagement. These conversations will help inform the government’s strategic, long-term approach to data, as we seek to take

¹⁰ Department for Digital, Culture, Media and Sport, ‘[Consultation on the Centre for Data Ethics and Innovation](#)’, June 2018

¹¹ Department for Business, Energy and Industrial Strategy, ‘[Modernising Consumer Markets: Consumer Green Paper](#)’ April 2018

advantage of the significant opportunities and potential that data holds for economic growth and well-being in the UK.

- 3.15 While this is not a consultation document, the government is interested to hear the views of businesses, members of the public or other organisations. Any comments in response to this discussion paper can therefore be sent in writing or by email to:

Data Paper
HM Treasury
1 Horse Guards Road
London
SW1A 2HQ

Or: datapaper@hmtreasury.gov.uk

HM Treasury contacts

This document can be downloaded from
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Correspondence Team

HM Treasury

1 Horse Guards Road

London

SW1A 2HQ

Tel: 020 7270 5000

Email: public.enquiries@hmtreasury.gov.uk