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On behalf of the Center for Data Innovation ([datainnovation.org](http://datainnovation.org)), we are pleased to submit a response to the UK government's open call for evidence on its National Data Strategy, which aims to foster the use and power of data across government and the wider economy, and to develop a trusted data ecosystem.<sup>1</sup>

The Center for Data Innovation is the leading think tank studying the intersection of data, technology, and public policy. With staff in Brussels and in Washington, D.C., the Center formulates and promotes pragmatic public policies designed to maximize the benefits of data-driven innovation in the public and private sectors. It educates policymakers and the public about the opportunities and challenges associated with data, as well as important data-related technology trends. The Center is a non-profit, non-partisan research institute affiliated with the Information Technology and Innovation Foundation.

## AREA OF FOCUS 1. PEOPLE

### QUESTION 1.8.

Objective 1. To ensure that data is used in a way that people can trust  
Research area: Concerns around trustworthiness

**Has the General Data Protection Regulation (GDPR) made people more concerned about how personal data is managed? How has it influenced their behavior?**

The Commission claims that by giving new rights to consumers, the GDPR empowers people to “gain more control over their personal data.”<sup>2</sup> Unfortunately the GDPR has created the illusion of control through a consent policy which leads fatigued users to mechanically click through and agree with lengthy terms and conditions. According to a Eurobarometer survey released in June 2019, 4 out of five (81 percent) Europeans who provide personal information online feel they have no control or partial

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<sup>1</sup> UK Department for Digital, Culture, Media & Sport, “National Data Strategy open call for evidence” (UK Department for Digital, Culture, Media & Sport, June 10, 2019), <https://www.gov.uk/government/publications/national-data-strategy-open-call-for-evidence/national-data-strategy-open-call-for-evidence>.

<sup>2</sup> France24, “One year on, EU has 145,000 data law complaints” (France24.com, May 22, 2019), <https://www.france24.com/en/20190522-one-year-eu-has-145000-data-law-complaints>.



control over this information.<sup>3</sup> Compared to 2015, there are now nine European countries where Internet users are less likely to feel they have at least some control over their personal information, five where they are more likely to feel they have partial control, and the remainder have had no change. The European Commission has found that “at a country level there is no consistent relationship between awareness of GDPR and the level of control respondents feel they have over the personal information they post online.”

In addition and according to the same survey, Europeans are less likely to read privacy statements than they were in 2015 (-7 percentage points). Forty percent of respondents do not read the privacy statements on the Internet at all, and 47 percent only do so partially. One of the reasons is that users find these statements too long to read (66 percent), too difficult to understand (31 percent), or because they consider that consulting a website’s privacy policy suffices. Furthermore, the share of Europeans that have changed their privacy settings on an online social network has even decreased since 2015.

EU policymakers declared that “more than two-thirds of Europeans have heard about the regulation.”<sup>4</sup> But the results of the survey they refer to reflect the fragmentation and even isolation of a number of member states that are much less informed than others. For instance, in France, Italy, and Belgium, respectively 55, 50, and 47 percent of the population surveyed has simply never heard of the GDPR. The survey reveals that just 57 percent of Europeans know that there is a public authority in their country in charge of protecting personal data. This lack of awareness does not bode well with the official argument that the GDPR has provided citizens with tangible control over their data.

Proponents of the GDPR argue it has been instrumental in building user trust, as it limits how companies can use information that touches on someone’s ethnicity, political opinions, religious beliefs or sexual orientation. Yet according to recent Eurobarometer data that was collected in November 2018, European trust in the Internet is at its lowest in a decade.<sup>5</sup> In November 2018—six months after the GDPR went into effect—only 32 percent of EU respondents indicated that they “tend to trust” the Internet, down 2 percentage points from a year earlier.<sup>6</sup> This suggests that the EU’s approach to regulating the digital economy, particularly through the GDPR, has been largely ineffective in achieving one of its primary goals.

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<sup>3</sup> European Commission, “Special Eurobarometer 487a, The General Data Protection Regulation” (June 2019), <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/special/surveyky/2222>.

<sup>4</sup> France24, May 22, 2019.

<sup>5</sup> European Commission, “Trust in the Internet” (November 2018), <http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Chart/getChart/themeKy/18/groupKy/93>.

<sup>6</sup> Ibid.



### QUESTION 2.5.

Objective 2. To ensure that everyone can effectively participate in an increasingly data-driven society  
Research area: Inclusivity

**What can government do to support those in marginalized and vulnerable groups? What elements of our digital society would most benefit these groups?**

Data already plays a crucial role in guiding decision making, and it will only become more important over time. In the public sector, data is at the heart of important efforts like improving patient safety, cutting government waste, and helping children succeed in school. Many of these advancements are made possible by a new generation of technologies that make it easier to collect, share, and disseminate data. Government investments in critical data systems, such as nationwide databases to track healthcare spending and student performance over time, are integral to efforts to harness data for social good.

Communities are increasingly relying on data to improve quality of life for their residents, such as by improving educational outcomes, reducing healthcare costs, and increasing access to financial services. However, these opportunities require that individuals have access to high-quality data about themselves and their communities. Should certain individuals or communities not routinely have data about them collected, distributed, or used, they may suffer negative social and economic consequences. While many communities have adopted these technologies, others have not. There is a risk that areas within countries lacking high-quality data will become “data deserts” by comparison and their inhabitants will suffer accordingly. Data may also be scarce among certain demographics, and this data poverty can disadvantage these groups. For example, a lack of health data about certain minorities will contribute to unequal advances in healthcare outcomes.

To address the risk of a growing digital divide—the social and economic inequalities that may result from a lack of collection or use of data about individuals or communities, policymakers should make a concerted effort to build data-rich communities.

First, government-led data collection efforts should strive to obtain data about underrepresented and hard-to-reach populations to ensure all communities are represented in important datasets. In addition, when government agencies publish datasets, they should disclose any known shortcomings about the representativeness of the sample. Second, policymakers should insist that smart city projects are launched among diverse communities. One way to ensure this happens is for grant-making institutions to engage with local civic leaders so they understand the benefits of data and know how to integrate data-driven solutions into grant proposals. Third, policymakers should ensure that digital literacy programs help individuals understand the value of data-producing technologies, such as social media and the Internet of Things. Finally, researchers need to identify where the data divide is a problem and evaluate the effectiveness of different interventions.



## QUESTION 2.6.

Objective 2. To ensure that everyone can effectively participate in an increasingly data-driven society  
Research area: Data skills and employment

**How important are basic data skills for employment in today's economy? What is the basic level of data skills needed and what kinds of skills are needed?**

In the coming years, technology and automation will alter both the tasks performed by workers and the skills demanded by employers. These changes will affect workers at all skill and education levels, but particularly in lower-skilled occupations. More workers will have to cultivate not just skills in their conventional area (e.g., machinist, accountant, graphic designer), but also digital skills, such as statistics or the ability to calibrate a robot. In other words, more workers will need “double-deep” capabilities. This will in turn create demand for a new class of vocational skills that will be used to scale, operate, and optimize emerging digital technologies. And, perhaps most importantly, these new technical and vocational skills will have to be complemented with new kinds of “21st century skills.” Workers proficient in all three areas (a conventional skill, digital skills, and 21st century competencies) will be more able to “future-proof” their jobs.

To create competitive advantages, one of the primary differentiators for organizations in data-intensive sectors will be access to talented, data-literate workers. This is particularly true for government agencies. To improve public services with data-driven technology, they'll need to work harder than ever to recruit, hire and retain highly skilled data engineers and managers.

The spread of digital is impacting the labor market and needed skills. For example, countries need workers with the requisite computer science and data science skills to effectively develop and implement AI. A lack of workers with the right skills will restrict the number and type of projects organizations can pursue.

Yet while access to the most talented, data-literate workers increasingly defines which organizations win in the data economy, there are too few qualified people in the labor market.

Only 37 percent of Europe's active workforce has basic digital skills, while after 2020, 90 percent of jobs will require these basic digital skills. In addition, 40 percent of companies find it hard to hire IT specialists. In 2020, there will be a shortfall of 756,000 IT professionals.<sup>7</sup> European education systems are failing to produce data scientists, and Europe has not managed to secure sufficient investments for AI or a sustainable startup ecosystem. Employment in data-intensive industries is geographically concentrated in certain countries and regions, putting others at a disadvantage. This challenge will be pronounced for companies, but also for government agencies, which already have a problem recruiting the best and brightest from the private sector.

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<sup>7</sup> Péter Palotai, "E-Skills and Jobs in the Digital Age" (European Commission, May 10, 2017), <https://ec.europa.eu/epale/fr/content/e-skills-and-jobs-digital-age>.



Solutions require flexible budgets and organizational change. The UK’s Government Digital Service fundamentally rebuilt the nation’s public-sector strategy for IT, proving that disruptive innovation in government is possible. Moreover, government agencies do have an advantage in that many of the problems they are working on—like increasing access to affordable health care, improving the quality of schools, and making cities safer and cleaner—are the types of problems that attract the sharpest minds. While they may not be able to match the pay or benefits of Silicon Valley, they offer the chance to improve the world.

In the long term, policymakers should fix the workforce pipeline so that skills better match employer needs in the private and public sectors. But in the short term, governments will be in fierce competition with the private sector for the best data scientists. They will need to use all available resources to bring in the human capital that can ensure the opportunities from the data revolution do not pass them by.

While investment in basic education and technical and vocational training will remain a core component of developing and maintaining a skilled workforce, policymakers and workers must also recognize that it will be impossible to “frontload” skills and training that will remain relevant during an entire lifetime of work. In the future, new jobs and tasks requiring digital skills will appear—and evaporate—as new technologies burst onto the scene and disappear. Furthermore, working out new funding formulas for retraining and reskilling could end up being just as crucial as devising specific training and lifelong learning programs.

At the individual level, the proliferation of e-readers, online courses, MOOCs, podcasts, conferences, and professional development programs has enabled workers to take charge of their own personal development by making lifelong learning a habit rather than a chore. While it may be difficult to accurately predict the specific skills of the future, equipping workers and students with the ability to learn and adapt—in combination with technical training and lifelong learning—can help insulate them from disruption caused by new technologies and automation.

Enabling workers to get “better” skills and other competencies, not necessarily more, will be an important component of ensuring easier labor-market transitions. In this case, for most workers better skills mean skills more attuned to the needs of the employers. When worker skills are more developed and attuned to workforce needs, worker adjustment from dislocation becomes easier. Moreover, having a stronger base of general skills provides an important foundation if demand for a worker’s specific skills dry up.

Much can and should be done to reform British high schools so that they not only teach skills more relevant to what the vast majority of adults will use in the workforce, but do it in a way that gives students more choice to learn what actually interests them. Thus, reforms aiming to increase adoption of workforce-focused classes, such as business, statistics, and engineering, would all help future workers have a stronger base of skills with which to manage a more turbulent workforce. In addition,



more should be done to encourage and support corporate partnerships with new kinds of secondary schools.

The UK is already financing next-generation digital apprenticeship programs that train students in areas such as big data and web development. Going forward, formalized training programs will have to be designed and carried out more nimbly, and they will have to incorporate new instructional technologies, such as e-learning and massive open online courses (MOOCs), that could democratize and enrich vocational and technical education beyond the classroom or shop floor.

## AREA OF FOCUS 2. ECONOMY

### QUESTION 3.6.

Objective 3. To ensure that all businesses and non-profit organizations can effectively operate in an increasingly data-driven economy

Research area: Technological developments

#### **How do businesses envisage that future technological developments will change how they use data?**

Businesses already use data for everything from predicting inventory demand to responding to customer feedback to determining where to open new stores. For example, an emerging group of financial service providers use non-traditional data sources, such as an individual's social network, to assess credit risk and make lending decisions. And health insurers and pharmacies are offering discounts to customers who use fitness trackers to monitor and share data about their health.

In particular, artificial intelligence (AI) is already having a major positive impact in many different sectors of the global economy and society. For example, various organizations are developing AI-powered tools to predict crime hotspots or buildings' fire risk, to provide 24/7 real-time alerts on political, security, and safety threats, and to detect and filter out abusive language online and disinformation. In the healthcare sector, doctors are using AI to develop personalized treatments for cancer patients. AI systems also help diabetes patients make smarter decisions, and reduce the time needed to provide radiotherapy treatment to patients with head and neck cancers.<sup>8</sup>

In many ways, AI and other technologies will be driving innovation, generating substantial social and economic value, and transforming everyday life around the globe. Policymakers should consider these benefits as they evaluate the steps they can take to support the development and adoption of AI.

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<sup>8</sup> Daniel Castro and Joshua New, "The Promise of Artificial Intelligence" (Center for Data Innovation, October 2016), <http://www2.datainnovation.org/2016-promise-of-ai.pdf>.



#### QUESTION 4.1.

Objective 4. To improve growth and productivity through the effective use of data across the economy  
Research area: Productivity

#### **How is the effective use of data driving business productivity through increased efficiency?**

With the increased power and decreased cost of collecting, transmitting, and storing data, as well as an increase in machine-readable data, more and more companies are using more and more data to help them provide goods and services more efficiently. For example, as a result of greater data access and use, the value of the data economy in Europe could increase in value from €300 billion (1.99 percent of GDP) in 2016 to €739 billion (4 percent of GDP) by 2020.<sup>9</sup> In addition, open data initiatives are predicted to have the ability to save Europe's governments €1.7 billion by 2020.<sup>10</sup>

Data is also enabling important innovations in many sectors. For example, in education, data can help government leaders create more effective education policy, schools operate more efficiently, families find the best schools, teachers discover the most effective lessons, and students learn better. Data is also critical to the health and well-being of individuals, and it is being used to improve virtually every aspect of health care, from developing new drugs to delivering care to patients. Increased use of data in health care offers a broad range of benefits, including more personalized and coordinated care, better quality, faster treatment development, and lower costs.

Businesses are also using the latest innovations in information technology to radically improve financial services. These "fintech" companies are using innovative technology (e.g., artificial intelligence, blockchains, and mobile technology) and different business models (e.g., peer-to-peer networks) to increase productivity in the financial services sector and create more-convenient, higher-quality, and cheaper financial services.

Fintech promises to use technology to lower the cost of financial services and bring more people into the financial system. Robo-advisors use artificial intelligence to give access to personally tailored investment options to individuals who may not be able to afford a financial advisor. Using robo-advisors requires data: for instance, customers complete an online questionnaire to gather information such as personal incomes, investment goals, and attitudes toward risk taking. The services then use algorithms and asset-allocation tools to process this data, identifying acceptable levels of risk for each individual consumer and recommending the most appropriate investment portfolio. Online balance sheet lenders use algorithms that analyze a customer's business data, such as business transaction information,

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<sup>9</sup> "Building a European Data Economy," European Commission, n.d., <https://ec.europa.eu/digitalsingle-market/en/policies/building-european-data-economy>. See also Robert D. Atkinson and Stephen Ezell, "Promoting European Growth, Productivity, and Competitiveness by Taking Advantage of the Next Digital Technology Wave" (ITIF, March 26, 2019), <http://www2.itif.org/2019-europe-digital-age-a4.pdf>.

<sup>10</sup> Ibid.



sales and revenue, average delivery time, and social media. Borrowers can receive their approval decision from Kabbage within minutes, while others receive their funding within 24 hours.

Cryptocurrencies, crowdfunding, and alternative lending are opening new markets for both lenders and borrowers to invest and gain access to capital. Blockchains offer the potential to improve the efficiency of financial instruments while lowering costs by cutting out unnecessary intermediaries. European fintechs are already attracting considerable amounts of investment. In the first half of 2018, fintechs in Europe saw an estimated €23 billion in investment, compared with €12 billion in the United States and €14 billion across Asia.

#### QUESTION 4.8.

Objective 4. To improve growth and productivity through the effective use of data across the economy  
Research area: Broadening data access

**Should government encourage businesses and non-profit organizations to make more of the data they hold open? If so, how?**

Over the past few years, some scholars, advocates, and policymakers have argued that businesses which possess large quantities of data, such as social media companies, present inherent competition concerns. Some regulators have expressed a growing interest in regulating antitrust issues related to data, but have often mistakenly focused on large tech companies, such as Facebook or Google, rather than the entrenched sector-specific businesses that can use their exclusive access to key industry data to restrict competition in their industry. Policymakers should correct this oversight.

Indeed, competitors can often obtain similar data from other sources. But in some industries and markets, a number of established firms or industry associations have exclusive access to particular datasets, and are using their exclusive control of a particular dataset and market power to limit access to that data through both technical and administrative means, without any legitimate business justification. For example, in regulated industries like banking and transportation, firms are restricting access to data (such as customer financial transactions and airline tickets, respectively) by third parties.

Policymakers should take proactive steps to introduce rules that would prevent this type of conduct. Unless they intervene, this behavior is likely to continue to limit innovation and hurt consumers.

One way to prevent harmful practices is to require the data holders in certain regulated industries, such as financial services or health care, to maintain open application programming interfaces (APIs) that provide access to relevant information. APIs are software functions that allow developers to access data stored in computer systems in a pre-specified, machine-readable format. APIs are routinely used within organizations, but open APIs allow third-party access to information as well. Providing third parties with access to this information serves consumers by increasing market transparency and by allowing them





to make more informed choices. Increasing access to data will in this way help consumers and innovators.

The emergence of the data economy has led to a growing debate about data rights, related to both intellectual property (IP) and privacy. Getting the debate over data and IP rights is critical because regimes that tilt too far toward granting data rights run the risk of stifling needed data sharing, while regimes that tilt too far in the other direction risk limiting incentives for data collection and innovation. Organizations should be permitted to use the strongest tools available to keep their data secure. In addition, data sharing, like patent sharing, is valuable because data is more useful when combined than it is in discrete form. And the fact that combined datasets are more valuable than the sum of individual, but separate, datasets, suggests that any IP system for data should probably tilt toward data sharing. But that does not mean there should be no IP rights. The costs involved with the collection, cleaning, and curation of data are often non-trivial, and sometimes when organizations that engage in such efforts lack exclusive rights to use that data, their incentives for collection, cleaning, and curation are diminished.

As a result, government should respect and uphold the IP rights for data, just as they should for any other form of IP, to enable companies to create value from it.

This does not preclude the need for mechanisms and rules to facilitate data sharing between companies. Sharing data is indeed not a zero-sum game and businesses and consumers choose to share data because it is mutually beneficial. And with cloud computing, it is increasingly cheap and easy. For example, most major pharmaceutical companies have begun sharing historical clinical trial data with outside researchers, including competitors, rather than hoarding this information for competitive advantage.<sup>11</sup> Researchers can use this data to accelerate drug development, better understand diseases, and design more efficient clinical trials.

## AREA OF FOCUS 3. GOVERNMENT

### QUESTION 5.2.

Objective 5. To improve public services and government operations through the effective collection, sharing and use of data

Research area: Current use of data

**What are the main barriers to more effective data use within government? Are there barriers in cases where government works with the private sector?**

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<sup>11</sup> Cary Conway, "Project Data Sphere® Cancer Research Platform Achieves Key Milestones: Data from More 100,000 Patients and Over 133 Research Studies" (Business Wire, December 13, 2017), <https://www.businesswire.com/news/home/20171213005674/en/Project-Data-Sphere%C2%AE-Cancer-Research-Platform-Achieves>.



In recent years, policymakers have emphasized the importance of making data available for AI. While quantity is important, as developing AI systems can require vast quantities of data, and open government data can be a valuable platform for innovation, public sector data often suffers from data quality problems, such as a lack of standard identifiers and inconsistent definitions, that make analysis difficult. Policymakers should both invest in efforts to improve the government's existing data, as well as direct government agencies to develop shared pools of high quality, application-specific training and validation data in key areas of public interest, such as agriculture, education, health care, public safety and law enforcement, and transportation. For example, the UK government should work with law enforcement agencies, civil society, and other stakeholders to develop shared, representative datasets of faces that can serve as an unbiased resource for organizations developing facial recognition technology. Government can step in to provide high-quality data where it is sorely needed. Several government agencies, as well as large sectors of the economy, collect and rely on address data, but lack a single, comprehensive source for this information, resulting in duplicitous collection and fragmented datasets. Government data should be open and machine-readable by default. This means that, unless otherwise legally prohibited, government data should use nonproprietary, machine-readable formats, and be licensed to maximize reuse, meaning the data is free for anyone to access, modify, and use for any purpose.

In addition, as government data is only a fraction of the data that could be useful for AI development, policymakers should also promote the private and non-profit sectors providing voluntary access to high-quality data. In many cases where high-quality data exists, it is dramatically underutilized. For example, in the healthcare sector, government agencies, universities, and pharmaceutical companies may all have their own rich datasets that could generate substantial benefits for AI if widely shared, but these stakeholders lack the mechanisms to do so while ensuring that this proprietary and sensitive data is protected. The UK has already recognized this as a key barrier to AI development and policymakers are attempting to overcome it by developing a model for data trusts. Without a coordinating body like a government agency specifically devoted to developing and supporting these models, it is unlikely that organizations will develop them on their own. UK policymakers should continue experimenting with data trusts and other models to make existing high-quality datasets, including those developed and maintained by government agencies, a more widely available resource for AI.

Furthermore, since datasets are most useful when they are representative and complete, policymakers should accelerate digitization efforts to enable more comprehensive data collection. Many sectors lag in digitization, and organizations in these sectors are limited in their ability to use AI as a consequence. Policymakers should identify and implement policies that can accelerate digital transformation in relevant sectors. They should allocate funding for agencies to systematically improve the quality of the data they make publicly available, develop new high-quality data resources, promote the broader circulation of high-quality data that could serve as an invaluable resource to all organizations developing AI, and pursue a fully digitized economy.



The focus should not just be on improving data quality throughout government, but also developing strategies to address the data needs, particularly as they relate to AI, of universities, nonprofits, and businesses working to address issues related to their agency's mission.

### QUESTION 5.8.

Objective 5. To improve public services and government operations through the effective collection, sharing and use of data

Research area: Improving data use

#### **What best practice examples of data use in government can we learn from?**

New technologies will impact government agencies in several ways. For instance, AI will enable government workers to be more productive since the technology can be used to automate many tasks. In addition, AI will create a faster, more responsive government. AI enables the creation of autonomous, intelligent agents—think online chatbots that answer citizens' questions, real-time fraud detection systems that constantly monitor government expenditures and virtual legislative assistants that quickly synthesize feedback from citizens to lawmakers.

Furthermore, AI will allow people to interact more naturally with digital government services. Until recently, most interactions with computers required people to adapt to the needs of computers. Users push buttons on an ATM or move a mouse on a PC, not because these are the most intuitive ways to communicate as a human, but because these are the easiest ways to communicate with a computer. But improvements in natural language processing and speech recognition have given rise to virtual assistants like Apple's Siri, Amazon's Alexa and Microsoft's Cortana, which allow users to speak to a computer much like they would a human and increasingly in many different languages. For example, the startup X.ai has created a virtual assistant named Amy that schedules meetings for users automatically, saving individuals from most of the back-and-forth discussion that often goes into agreeing on a time and location to meet. Unlike a real-life administrative assistant who takes lunch breaks and goes home in the evenings, the virtual assistant can provide an immediate response at any time. And unlike previous attempts at improving meeting scheduling that might require individuals to use an online application, users interact with Amy by email the same way they would talk to a colleague.

While AI and other data-driven technologies are still developing, there are steps government agencies can take today. In particular, they should make investments in modernizing their data architecture and building application programming interfaces so that they will be able to use AI on the data they already collect. In addition, they should prepare to work with outside firms because most government agencies are not going to have the in-house expertise to build AI systems.



### QUESTION 6.1.

Objective 6. To achieve alignment in government around data, with data shared and used cooperatively wherever appropriate

Research area: Barriers to data sharing within government

**When should public authorities open up access to data they hold with other departments? When should they not?**

Countries have many opportunities to enhance their open data capabilities, such as by increasing international collaboration, better educating policymakers about the benefits of open data, and working closely with civil society on open data initiatives.

There are three main benefits to open data. First, data can transform how governments work and how they deliver services—enabling them to adopt more efficient and effective practices. Open data initiatives are predicted to save Europe’s governments €1.7 billion by 2020, and to create a market for goods and services worth €75.7 billion in Europe by 2020.

Second, citizens who have free access to government data are in a better position to hold legislators and public officials to account, such as by spotting wasteful spending or inefficient services. Finally, innovators in the private sector can use publicly available government data to develop services and solutions that can have widespread economic and social benefits. For example, potential applications include retailers using data about population demographics, infrastructure, and traffic to determine where to site their shops and insurance companies using environmental and public health information to better understand and price risks.

Policymakers should support three areas to successfully enable data-driven innovation. First, they should take steps to guarantee that data is available for use, such as by ensuring government agencies collect and release high-value datasets. Open government data promotes transparency, encourages citizen collaboration, and creates value through innovation and efficient decision-making. Making data available can also provide the private sector with the building blocks necessary to develop new products and services. Government agencies can also use data to improve their services and be more efficient.

Second, policymakers should enable the deployment of the technology platforms that underpin success in the data economy. This includes facilitating the deployment of digital infrastructure, such as fixed and mobile broadband Internet, plus data platforms such as intelligent transportation systems, electronic health records, and smart meters. In addition, policymakers should consider how they can support the development of the Internet of Things, particularly the development of smart cities that use data collected by sensors on physical infrastructure and digital transactions with government agencies.

Third, economic development efforts should include a focus on the data economy and helping transform existing industries to make better use of data. Reforms can start with developing the human capital necessary for data-driven innovation to thrive, and supporting businesses participating in the data economy. Virtually every sector of the economy can benefit from better use of data.



Broadening Europe's open data commitments to include data innovation will be particularly important for countries that are seeking to thrive in the data economy and take advantage of the economic potential of open data.

The G8 Open Data Charter supports the release of data to promote transparency. It is explicit about the quality and format in which data should be released.

Given the high degree of variation in countries' progress at fulfilling commitments to the Open Data Charter, each country has its own unique challenges. There is a need to collaborate internationally; a need to generate political will and visibility around open data issues; a need to provide support, education, and training to agency officials tasked with releasing open data; and a need to undertake more meaningful interactions with civil society to develop open data initiatives in the long-term. To the extent that countries still face technical barriers to open data release and use, such as metadata and licensing issues, international collaboration is important.

There is no need for countries to develop their own licenses when a number of adequate ones exist, including the UK's Open Government License and various Creative Commons licenses. It is also unnecessary for countries to build their national data portals from scratch when robust and internationally supported open source data publishing platforms such as CKAN exist, as well as commercial solutions. While there may be some utility in developing country-specific metadata schemes to reflect differing governance structures from country to country, this is also an area where governments with less experience can learn from countries with more mature metadata efforts.

A lack of political will and visibility around open data issues is the primary impediment to progress on Open Data Charter commitments. Where political will and public awareness of open data issues are relatively high, such as in the UK, government priorities have begun to shift from simply publishing data to creating strong user communities and maximizing government data's reuse value. The country's influential Open Data Institute is devoted to advancing the use of open data, and offers an excellent model for supporting and coordinating open data efforts between government agencies, civil society groups, and the private sector. In addition, the UK's Open Data User Group, an advisory council that reports to the country's Cabinet Office, represents a good approach to incorporating civil society and private-sector perspectives into government decision-making around open data. While not all countries have access to the same levels of expertise on open data as the UK enjoys, the notion of a unified civil society authority working to improve a country's open data initiatives and a government group of external open data experts could be helpful for all Open Data Charter signatories as they plan the way forward.

The UK is one of the world leaders in open data. Areas to improve include increasing consultation with civil society groups to identify gaps in data releases, ensuring that as much data as possible fall under open licenses, and fully implementing its "open by default" policy. In addition, the UK Government



Digital Service (GDS) has yet to appoint a new chief digital information officer (CDIO). This position is essential to champion open data across government, foster open data standards, develop greater data analysis skills and capabilities across government, and transform the management and use of data in decision-making processes.

Discussions about data need to balance individual privacy interests with the collective benefits that come from data innovation. To strike this balance, a chief digital officer appointed by each member state could not only champion data innovation domestically, but also serve on a new, independent, EU-wide advisory panel charged with counseling the EU on how to maximize opportunities to innovate with data, AI, and related tools, and develop a cohesive vision and strategy for capturing the full benefits of data-driven innovation in Europe.

While data-driven innovation in the public sector is important, EU member states should direct their chief digital officers to also encourage data-driven innovation in society more broadly, including in the private sector.