Response to the European Commission's Consultation on the European Strategy for Data

INTRODUCTION

On behalf of the Center for Data Innovation (datainnovation.org), we are pleased to submit comments in response to the public consultation on the "European Strategy for Data" (hereinafter the "EU data strategy") published on February 19, 2020 by the European Commission.[1] The Center for Data Innovation is the leading think tank studying the intersection of data, technology, and public policy. With staff in Washington, D.C. and Brussels, 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 technology trends such as predictive analytics, open data, cloud computing, and the Internet of Things. The Center is a non-profit, non-partisan research institute affiliated with the Information Technology and Innovation Foundation (ITIF).

SUMMARY

The EU data strategy is based on premises and notions that are fundamentally flawed. First, it calls for the creation of "personal data spaces," without providing evidence that consumers want these or providing specifics on how it would work. In addition, the strategy calls for expanding data portability requirements provided by the GDPR, but it fails to account for the cost and feasibility this would entail for companies. These proposals are likely to stumble on the roadblocks laid out by existing EU data protection laws. Indeed, the GDPR restricts the collection, processing, and sharing of personal data, which makes the viability of "personal data spaces" even more contestable. Combined with an unfortunate European legacy of failed cloud projects, the lack of technical details and specifics will not be ideal when it comes to persuading potential users of the credibility and security of the project.

Second, it asserts that the EU needs cloud providers owned and operated in Europe. The implicit assumption, which is backed by no evidence, is that the dominant U.S. cloud providers are neither secure nor trustworthy and therefore European cloud providers should be given preferences for hosting European data. The idea that "trusted, secure" European data spaces can only be hosted in Europe by European cloud services misses the mark. It is based on the mistaken belief that data is more private and secure when it is stored within a country's borders.[2] Non-EU cloud providers must

still comply with EU laws and regulations, just like EU ones. In addition, the strategy pushes for data localization in the hope that it will support digital development of EU companies. Data localization is at best a misguided temptation, at worse a counterproductive strategy: For all countries, the economy can be most innovative when individuals and firms can engage in digital activity and commerce without unnecessary restrictions on how they can use and transfer data. Building a European cloud is nothing less than a mercantilist, protectionist project, which aims to make it increasingly harder, even more than with the GDPR, for non-EU companies to sell to the EU without regulatory alignment. The EU should clarify that it is determined to work with its allies to implement its data strategy and seek interoperability with its trading partners on data issues.

Third, it assumes that private sector providers are incapable of creating shared sectoral data spaces themselves. While some encouragement from policy may be helpful, there are many examples of private sector providers sharing data.

Finally, it concludes that forced data sharing is the right solution, particularly to benefit European SMEs and if it comes at the expense of large foreign companies. But most business-to-business (B2B) data sharing is mutually beneficial. The Commission should clarify that private sector data sharing should be primarily voluntary. The EU should preserve and protect freedom of contract for B2B data sharing as long as data sharing does not present competition concerns. Moreover, the EU data strategy and the future Data Act should balance data sharing with the EU's privacy rules, while respecting and upholding intellectual property rights, factor in the safety and security risks data sharing can represent for companies, and encourage experiments with data sharing mechanisms such as data trusts.

In summary, the EU data strategy shoots at the wrong targets. To ensure these proposals are credible, EU policymakers should harmonize EU data governance frameworks and avoid the unnecessary duplication or expansion of rules. The EU should also work with its partners—including allied countries in areas where mutual engagement is beneficial, as well as the private sector, and it should invest in strategic technologies where it can still lead.

Finally, to strengthen the EU data strategy's proposed framework, the Commission proposes to address contextual aspects and challenges, including the lack of interoperability and common standards for better data sharing, the use of public sector data information by businesses, as well as the transformation of the labor market, the lack of digital literacy, and the lack of human capital supply in Europe. This submission offers recommendations for these three challenges. This submission also focuses on areas which merit further emphasis in the data strategy, namely:

clarification of the data strategy's funding approach, digitalization of businesses, completion of the digital single market, and commitment to digital free trade. The EU risks wasting its efforts if it sidelines these other priorities.

OVERVIEW

The goal of the EU data strategy is to build a single market for data so it can be more competitive in the global data economy. To this end, the European Commission proposes to adopt new legislation on data governance, access, and use; invest in Europe's data infrastructure; invest in skill development and data literacy, and establish "personal data spaces" to provide users with a set of tools that give them more control over their data; and create common "European data spaces"—digital environments with a shared set of technical and legal rules to facilitate data access and data sharing within Europe in strategic sectors of public interest.

At first glance, the strategy's main objective is laudable—the EU should "become a leading role model for a society empowered by data to make better decisions—in business and the public sector." The strategy rightly emphasizes that "more accessible data" is critical to the creation of new products and services.[3] The Commission is right to recognize the role of data in empowering society, and to aim to address long-lasting EU handicaps that stand on the way, such as interoperability issues, the fragmentation of the digital single market, and the digital skills gap.

In addition, the Commission has indicated that it recognizes the dynamic nature of the data economy and will not pursue heavy-handed regulations. The strategy states: "the Commission deliberately abstains from overly detailed, heavy-handed ex ante regulation, and will prefer an agile approach to governance that favors experimentation (such as regulatory sandboxes), iteration, and differentiation." This is a welcome starting point.

Unfortunately, mistrust towards foreign companies and fears that technological dependency on foreign solutions could harm the EU's future prosperity and sovereignty is manifest across the EU's recent tech and digital policies. This may be what the Commission implies by mentioning the vulnerability of the EU by "external data threats" in the strategy—but merits clarification.[4] Similarly, where the data strategy mentions that European rules should ensure "there is an open, but assertive approach to international data flows, based on European values," the Commission should clarify what being "open but assertive" means in practice. Regarding "European values," except from the "protection of privacy" and data protection, the EU data strategy fails to provide more examples. In addition, the definition of European values should make clear that Europe stands against

authoritarian values demonstrated in non-democratic states like China. But to define European values so narrowly that it means exclusion of other democratic, allied nations such as the Commonwealth nations, Japan, and the United States would only further isolate the EU and splinter what should be a common alliance against non-democratic, authoritarian states.

This is important, considering that a number of dubious proposals for a "European Cloud" or a "European Internet" are circulating across EU institutions, trumpeting intentions to discriminate against foreign providers and boost European firms—while using China as an example to follow. One of them explains that "Foreign web services could become part" of a European "digital ecosystem but must adhere to the rules and standards of the EU—such as democratic values, data protection, data accessibility, transparency and user friendliness."[5] It further suggests that this European cloud would require "a top-level infrastructure, high-speed 5G or a 6G data network and a firewall. Setting up such a network would promote many European companies and therefore … drive innovation. Like the Chinese firewall, this European internet would block off services that condone or support unlawful conduct from third party countries."[6]

The EU data strategy's ambitions merit that the Commission takes another look and update it where it lacks precision, before proposing legislative rules through the Data Act expected for 2021. In other words, rather than seeking an EU data and cloud system, the strategy should work to exclude non-democratic systems and embrace digital free trade with allied, rule-or-law, democratic nations outside of the EU.

THE EU DATA STRATEGY IS BASED ON THE WRONG PREMISES

While some of the stated goals of the EU data strategy are worthwhile, it is also clear that the EU data strategy is a blatant attempt by the Commission to strengthen the block's "technological sovereignty" and shape data governance rules by rolling out Europe's own cloud infrastructures on EU territory.[7] With these plans, the EU rightly seeks to generate and process more data to spur EU growth and innovation. But it also claims that it is the only one fit to defend and promote core principles, such as privacy.[8] This is a pretext to ultimately enforce protectionist policies propping up its SMEs, exclude foreign providers, and grow as a "regulatory superpower" in an attempt to position the EU as a referee between China and the United States. As such it fundamentally misses the real adversary: China. China does not protect Internet freedom; the United States does. China does not prevent government surveillance of citizen data; the United States does. China protects Internet firms from competition, including from the EU; the United States makes U.S. firms compete on market terms.

More specifically and beyond discursive strategies, the data strategy is based on premises and notions that are fundamentally flawed. First, it assumes that consumers want their own data spaces; that the EU needs European cloud providers, and capabilities based in Europe. Second, it assumes that Europe's cloud providers should be given preference over U.S. cloud providers who are neither secure nor trustworthy. Third, it assumes that private sector providers are incapable of creating shared sectoral data spaces themselves. Finally, it concludes that forced data sharing is the right solution, particularly to benefit European SMEs and penalize large foreign companies. The charges are that by hoarding all the data where they possibly can, large companies would indeed not be playing fairly and prevent the development of EU homegrown data-driven business models which could otherwise rely on consumer data.

1. No Evidence That Consumers Need EU to Create Their Own Data Spaces

The EU data strategy calls for expanding data portability requirements provided by the GDPR and establishing "personal data spaces" to give consumers closer control over their data.
The idea behind such "spaces," or personal information management services is to deploy a "once only principle" based on which individuals would not have to give their digital information anew to every organization they interact. Individuals would be in control to decide who has access, how the data can be used, and under which conditions.

The Commission provides no evidence that consumers want these personal data spaces, or that if they do want them, that the private sector is unable to provide them. Indeed, private sector efforts to create these have failed to take off, because of a lack of consumer interest. Presumably if consumers value them in Europe, private sector companies would jump at the opportunity to provide this service. Calls for personal data spaces are also problematic in that they assume individuals would "allow the use of the data they generate for the public good, if they wish to do so"—out of (undefined) motivations based on "data altruism."[9]

These calls are clouded by the overall narrative in EU policy circles about data sovereignty and data ownership, which have become part of the EU's overall strategy for digital policies. When debating policy and rules for data, the EU volubly obsesses over "data ownership," assumes "portability will happen" and that customers "will ask for [it]," and that there should be "EU single market for data storage and processing services."[10] Commissioner for Internal Market Thierry Breton declared that "Europeans should be owners of their data."[11] And according to the data strategy, which he

spearheaded, "individuals … can be empowered to be in control of their data through tools and means to decide at a granular level about what is done with their data."[12]

Cries for data ownership are simplistic at best. Clearly, there are many kinds of personal data that an individual does not, cannot, and should not own.[13] One reason is that rather than one type of data, there are many millions of different datasets covering different and unrelated things, with different applications. The pooling, overlap, or cross-application of these datasets do not always make sense, just like pooling cow fertility data with power utility loading metrics, gas turbine telemetry, and Fortnite cohort analysis may not necessarily be useful.

The types of data consumers could access is unclear, and could be widely different: Would it be power consumption, purchase history, or transportation used? If a consumer turns the heating on, does that single data point belong to him, to the electricity or gas company, or to both? And what would individuals do with this data? That the data strategy throws in the idea of "personal data spaces" without laying out the specifics is problematic. In addition, there can be legitimate concerns as to whether these spaces would be built on protocols that are sufficiently cybersecure.

Amend Data Portability Rights

The EU data strategy fails to account for the cost and feasibility of expanding data portability rights. The right to data portability is one of the few provisions in the GDPR that could have a positive impact on the use of AI in the EU. Indeed, data portability can make it easier for consumers to share their data with companies that leverage AI, thereby fueling competition. However, in some cases this requirement means companies must provide users access to extremely large, complex, and disparate data sets accumulated over many years in a reusable format. Imposing more obligations for data portability could weaken incentives for companies to collect and store that much data in the first place. In addition, where personal data begins and ends is not always clear. To give more control to users, the EU should instead focus on simplifying its existing rules to ensure legal certainty for both users and companies, and amend data portability rights to account for reasonable costs and technical difficulties in providing data to data subjects.[14]

Avoid Overlap of Existing Data Policies and Regulatory Doublethink

Another roadblock is that the GDPR restricts the collection, processing, and sharing of personal data, which makes the viability of "personal data spaces" even more contestable. To overcome the limitations set by the GDPR, companies can use anonymization methods where possible. But this is problematic for various reasons. First, the GDPR has not clarified anonymization processes in

sufficient technical detail yet for companies to know they are compliant when doing so. To make sure they are compliant, companies may have to anonymize datasets to a point that it may no longer be useful for consumers or other businesses. But in the digital economy, competitive businesses do not simply owe their success to having data—that also depends on their ability to use data. Second, purpose limitation in the GDPR is an obstacle to data sharing and re-use. Third, even anonymized, using and sharing data could still require consent from data subjects, a bureaucratic cost and risk which would disincentivize organizations to even take part into personal data spaces as so-called "neutral brokers."

As a general rule, the Commission should identify, analyze, and compare the existing national and EU-level data policies to identify gaps or overlaps that create unnecessary challenges to Europe's digital transformation in the current regulatory framework. The Commission should uphold its recent commitment to the "one in, one out" principle when creating new laws or regulatory frameworks, and proceed with creating new rules at a reasonable pace, while also striving to cut unnecessary and outdated regulations.[15] The EU should also realize that adding regulatory layers to existing rules, such as the GDPR, would be premature. Changing expectations around privacy and data protection mean that companies already had to re-evaluate their approach to collecting, managing, and sharing data. The EU should first address the legal uncertainty caused by the diversity of data protection of authorities across member states and the diverging interpretations of the law across national jurisdictions.

Fortunately, the EU data strategy calls for public policy to update "regulation and sectoral policies to reflect the opportunities provided by data and ensure that they do not maintain disincentives for productive data use."[16]

To ensure the proposed infrastructure incentivizes data sharing while ensuring more legal certainty, the future Data Act should take a sector-specific approach: Nine European common data spaces entail nine specific frameworks, specific challenges, and specific data sharing mechanisms. For some individual data spaces, companies will already be subject to existing sectoral data governance frameworks such as codes of conduct, licenses, access rights, and usage rights—as is the case in the agricultural, the financial, or the healthcare industry. Duplicating these rules would add a layer of bureaucracy and legal uncertainty which companies do not need. The Data Act should also clarify roles and responsibilities.[17] The reason why data sharing standards are inconsistent and prove unsuccessful is often because it is unclear to companies which regulator is in charge of supervising the rules. They may feel exposed to non-compliance risks with regard to data protection and privacy.

Generally, to ensure companies can compete in the global digital economy, EU policymakers should avoid adopting more regulations that make it difficult for firms to gain scale, and that raise the costs and legal difficulty of developing and using technologies like AI.[18] In particular, EU policymakers should amend the GDPR, which they developed before fully understanding AI and which has put unnecessary constraints on how European businesses collect and use data. There is mounting evidence that some of its requirements negatively affect the amount of data available to organizations to train and use AI systems.[19] For instance, companies can be required to delete data that could better train their algorithms, or prevented from collecting and storing certain types of data, while this data could enable the creation of economically impactful products and enhance the performance and accuracy of their algorithms. Regulations like the GDPR can furthermore impact the willingness of companies to enter into data sharing collaborations.[20]

Specifically, the EU data strategy is likely to stumble on the roadblocks laid out by existing EU data protection laws.

The creation of common, sector-specific European data spaces, and freely accessible, open for all data are likely to conflict with existing EU rules such as the GDPR and the ePrivacy Directive which restrict the collection, use, and processing of personal data. Those rules would not allow a big system for industrial data sharing, and may not allow tracing data back to individuals. In the data strategy, the Commission laments that "there is currently not enough private sector data available for use by the public sector to improve evidence-driven policy-making," while ignoring that data minimization—a requirement of the GDPR— is an obvious obstacle to B2G data sharing: Some companies are not likely to be prioritizing the collection of data that could be useful to governments if this data is not useful to their business.

Making it easier for organizations, researchers, and other stakeholders to share industrial data is a welcome objective, but these datasets often include both personal and non-personal data, particularly in the case of the financial and healthcare sectors, and separating the two is costly and not always feasible.[21] As a result, companies will have to deal with greater legal complexity and uncertainty as to whether they are compliant.[22] Case-by-case arbitrations when sharing industrial datasets will lead to delays and higher costs.[23]

2. The EU Does Not Need Homegrown Cloud Providers

The EU data strategy aims to create domestic cloud providers to support the European data economy. A series of Commission-led workshops about the digital economy held in 2019 led to "calls to further reinforce the governance of data use in society and the economy."[24] The report produced

from these workshops mentions that “data storage and processing cloud based infrastructures and services are essential to host the common European data spaces and to operate European AI. European investments are needed for building European Cloud Federations … aiming at both federating the existing cloud infrastructures scattered across the member states and at offering a set of pan-European cloud based-services including a European cloud marketplace. Cloud federations will ultimately equip Europe with trusted, secure, competitive and sustainable cloud-based infrastructures and services, widen users’ choices and enhance European technological sovereignty.”[25]

Privacy as a Pretext to Disguise Mistrust Towards Foreign Providers

Let alone that the notion of “European AI” is nonsensical as AI has no geographical attribute, the idea that “trusted, secure” European data spaces can only be hosted in Europe by European cloud services misses the mark. First is the mistaken belief that data is more private and secure when it is stored within a country’s borders—data privacy and security depend primarily on how it is stored and transmitted.[26] Local data storage requirements are not necessary to increase commercial privacy or data security.

Perhaps worse, the goal of the data strategy to invest in a “European federation of … trustworthy cloud infrastructures and related services” seems to imply that existing, non-European providers such as Microsoft’s Azure or Amazon Web Services are not trustworthy, and that they should not host European data.[27]

Part of the motivation to restrict the location of data indeed holds to the EU’s privacy and data protection concerns, and a lack of trust towards foreign solutions—while many European businesses rely on those. There are multiple examples of how such mistrust towards foreign providers have materialized as decisions by member states to lock them out of their domestic markets or restrict the use of their technology to process public data. For instance, in 2019, the German federal state of Hesse banned Microsoft’s Office 365 software from its schools.[28] According to the Swedish government, outsourcing data to U.S. cloud providers subject to the CLOUD Act violates Sweden’s law on public access to information and secrecy.[29] Commissioner Breton also declared, clearly targeting U.S. large tech companies: “We cannot continue to live in a world where five or six big actors hold 80 percent of the data on the planet while not accepting responsibility for how the data are used.”[30] The EU data strategy goes as far as to mention the "uncertainty about compliance of cloud service providers with … data protection” and specifies: "The aim is to create a single European data space … where EU law can be enforced effectively."[31] The EU sees that as all large U.S.-based companies are subject to U.S. laws, this makes the block vulnerable to foreign interference.

Yet there is no reason to fear that storing data with U.S. cloud providers, either in Europe or abroad, somehow exposes Europeans to lower standards of data protection. Firms that do business in a EU member country are subject to laws of that country (including the GDPR), regardless of where they store or process the data.[32] The EU-U.S. Privacy Shield provides additional measures to safeguard EU citizens' personal data when processed by U.S. firms, and the CLOUD Act guarantees that U.S. cloud providers can challenge U.S. government requests for extraterritorial access to data.[33] Moreover, cloud service providers often offer their customers the option to encrypt their data, so in many cases the providers do not even have access to their customers' information.[34]

The EU data strategy aims to invest in a "European federation of energy-efficient … cloud infrastructures and related services."[35] But there is no evidence supporting the assumption that EU cloud providers will be as energy efficient, or more energy efficient, than foreign ones who may have more experience building energy-efficient data centers. In fact, a counterproductive effect of the EU's protectionist policies could be that by not using foreign providers' solutions, or by making those artificially more expensive, Europeans will end up having to use others that will perform poorly in terms of energy efficiency. Researchers from the Lawrence Berkeley National Laboratory found that, as of 2014, U.S. data centers accounted for only 1.8 percent of U.S. electricity consumption—a figure that has remained essentially flat since 2008 despite strong growth in data center services.[36] Additionally, tech companies are often at the forefront of commitments to purchase clean energy. In 2017, Microsoft worked out a deal with its local electricity utility and Washington state regulators to withdraw from the utility's service territory so that it could purchase cleaner electricity directly from open power markets.[37] Greenpeace has identified 20 Internet companies—including Facebook, Apple, and Google—that have made 100-percent-renewableenergy commitments. In fact, Google announced in 2017 that it had already met its goal of purchasing enough renewable energy to meet 100 percent of its global annual electricity use.[38] EU policymakers should consider how data protection rules that require data to be stored or processed in-country may negatively impact emissions by preventing companies from building data centers in locations where there are more clean energy sources or where cooling costs are lower because of a colder climate.[39] Data localization policies are not environmentally-friendly and should be abandoned as part of the Green Deal, if this is indeed an important priority for the EU.

Data Localization

Second, the EU data strategy's objective to store more data in the EU (or even have it matter where it is processed) is misguided. More data does not mean more competitiveness, the type and quality of data matter, as well as having the tools to leverage it. This would be like assuming that the banking system with the most Excel files is strongest.

Yet the strategy, firmly based on the idea that the geography of the data stored in the cloud matters to exercise control over data and its distribution, pushes for data localization, which would force companies to store and process data within EU borders, and cut off foreign cloud providers out of fear (or for the pretext) that they might encroach on Europe's autonomy, values, and principles.

Furthermore, Commissioner Breton declared that Europeans' "data should be handled in Europe."[40] But in the data economy, there is no such thing as a "Vegas rule"—data is not just a European affair.

Even regardless of the rationale, there is no reasonable justification for data localization of any kind, for personal or non-personal data. Data localization and other unilateral trade restrictions are counterproductive in a globalized economy, and lead to considerable costs and losses in terms of welfare and output in the general economy.[41] By breaking global supply rules, data localization not only makes it harder and costlier, if not illegal, for firms to transfer data across borders—it also can raise the cost of cloud computing services. Just as economic nationalism can lead to lower productivity for firms and higher costs for consumers, particularly when it is focused on capital goods, "data nationalism" policies will reduce economic growth by limiting a country's ability to benefit from data-driven innovation and by increasing the cost of ICT goods and services, which will lead to lower innovation and slower productivity growth. Data localization raises costs and reduces opportunities for both large and small firms that rely on these services, and these costs are further exacerbated when they have to invest in data storage in multiple countries. That in turn inflates their prices, limits their product innovation, and makes it costlier for them to enter new markets. The overall effect is a less competitive and less innovative economy with inflated prices and diminished choices for consumers.[42]

Cloud Federation Means Cloud Mercantilism

Third, building a European cloud is nothing less than a mercantilist, protectionist project, which aims to make it increasingly harder, even more than with the GDPR, for non-EU companies to sell to the EU without regulatory alignment.

Indeed, the EU data strategy and the project of a European cloud federation are based on the anticipation of a "favorable context" that "will lead to more data being stored and processed in the EU," and that more core business processes would be run on cloud-based services.[43] Indeed, the EU expects that between 2018 and 2025, the global volume of data will have grown from 33 zettabytes to 175 zettabytes in 2025, and that the value of the EU data economy will have grown from €301 billion to €829 billion. It also anticipates that the distribution of data processing will shift from 80

percent in centralized computing facilities and 20 percent through smart connected objects, to 20 percent in the former, and 80 percent through the latter.

The EU has been forcefully arguing for a need to nurture "European champions" to compete with foreign counterparts.[44] For instance, one of the suggestions of the EU data strategy to encourage data sharing across the bloc is to give public subsidies to the so-called European cloud federation. In addition, the strategy seems to be calling for preferential purchasing from EU service providers only: "In coherence with the cloud rulebook, the Commission will facilitate the development of common European standards and requirements for the public procurement of data processing services. This will enable the EU's public sector at European, national, regional and local level to also become a driver of new EU data processing capacities, rather than just a beneficiary of such European infrastructures."[45] But by propping up local firms, the EU may inadvertently set them to fail as they will be less prepared to face global competition when pushed out of the nest.

The EU data strategy aims to invest in the EU's capabilities and infrastructures for hosting, processing, and using data—in order words, to create an Amazon Web Services with an EU stamp on it, that gives more bargaining power to European industry players vis-à-vis tech giants. But the EU should stop obsessing over Europe having to develop its own cloud storage providers.[46] EU policymakers should reject a project that is likely to end up like the ludicrous European "Google killer" Quaero, the ill-fated search engine Theseus, and failed cloud initiatives such as Numergy and Cloudwatt which taxpayers won't recall as profitable public money investments.[47] In a context of a looming recession, companies are more likely to use trusted, secure, and reliable services they already use rather than to engage in new projects that are bound to fail. The EU data strategy's plans to "foster synergies" between the European cloud federation and member states' initiatives such as Gaia-X, are likely to become another case in point.[48] Combined with an unfortunate legacy, the lack of technical details and specifics will not be ideal when it comes to persuading potential users of the credibility and security of the project.

The EU Should Work With Its Allies

Overall, the EU should clarify that it is determined to work with its allies to implement its data strategy. The EU should also seek parity with its trading partners on data issues, for instance through common international legal standards for government access to data and transparency.

The successful implementation of the EU data strategy will require the participation of more stakeholders to the project, including foreign providers, to ensure rules and standards adhere to

global norms and the project attracts sufficient private investment. But by giving in protectionist impulses and emphasizing European "technology sovereignty" as its goal—and flimsy mantra—the EU has been building its data strategy as a fortress.

This is short-sighted: in the digital economy, the success of EU firms will depend on cross-border data sharing and secure infrastructure which, in many respects, U.S. cloud providers remain best equipped to provide. Moreover, calls for digital sovereignty could backfire. Currently the United States has no 5G telecom equipment provider and relies largely on EU firms Ericsson and Nokia.[49] There is nothing justifying that the EU gets to decide that it should put up barriers to U.S. cloud providers in Europe, while expecting the United States to be "dependent" on European providers of critical telecommunications equipment. If the EU goes down that road, it may become harder for U.S. policymakers to resist calls to create a U.S. domestic 5G industry, based on Open RAN (radio access network).[50] Again, the EU's data strategy should start with Europe, but ultimately extend to allies. Failure to do that will only hasten the day of reckoning when Chinese IT and tech firms dominate world markets.

As any mandates governing data sharing and cloud computing in the EU will have implications on non-EU jurisdictions and on foreign companies which heavily invest in Europe, the Commission should take these implications seriously when crafting the Data Act. To ensure transatlantic relations remain efficient in the data economy, the EU and the United States should engage in joint reflections, for instance to decide where to draw the line between public and proprietary data.

Finally, to work in practice, common European data spaces will require capabilities and resources which foreign providers are better positioned to provide, such as technical tools for data pooling and sharing, as well as IT capacity, including cloud storage, processing, and services. The Commission laments that "EU-based cloud providers have only a small share of the cloud market, which makes the EU highly dependent on external providers, vulnerable to external data threats and subject to a loss of investment potential for the European digital industry in the data processing market."[51] But more than market share, what should matter is the ability to leverage these capabilities with the right tools and capabilities.

This is also key to ensure cybersecurity. The data strategy mentions that European data pools "may be organized" in "a distributed way," and specifies that in this case, "the analytical tools come to the data" which "makes it easier to keep the data secure and to ensure control over who accesses what data for what purposes."[52] This is not entirely accurate, as there could be data leaked, or challenges related to poor access control even in a distributed environment.

An example of ongoing, mutually beneficial collaboration lies in the development of cloud services and data centers. Finland's largest telecom company Nokia just announced its collaboration with Microsoft in an open-source operating system used in large cloud service providers' data centers.[53] Recently, Microsoft and Amazon Web Services created new data centers in Italy and Poland—both countries currently have none, and such large-scale investments will be welcome in today's difficult economic context.[54] Microsoft's Azure was granted certification for their compliance with the French Health Data Hosting (HSD) standard and hosts French healthcare providers' data, and is the main provider of France's platform Health Data Hub.[55]

Invest in Technologies of the Future, Not the Past

In the words of Commissioner Breton, the EU's battle to win is that of industrial data, as it has lost the first—the battle of personal data—to U.S. and Chinese companies.[56] Europe's information technology firms have indeed largely missed the last technology wave (e.g., computing, Internet, mobile, cloud), in part because there was no real EU digital single market for EU firms, especially startups to access to quickly gain critical economies of scale and network effects.[57] But the EU will not catch the next wave if it persists in wanting to build the next Azure or replicate Amazon Web Services, which started over a decade ago: The EU is likely too late to the cloud game to vault into the lead. Instead, it should be investing in efforts to commercialize emerging technologies like AI and continuing its efforts to support industrial data innovation, including adoption by EU industrial firms and development of related applications by EU technology firms.[58] The EU should direct investments to support digital innovation in the industries and technologies where it can build on core competencies, such as robotics, autonomous systems, high-performance computing, the Internet of Things and in key application areas, for instance health IT, smart grids, smart cities and e-government.[59]

The Commission's commitment to sustaining a robust ecosystem for high-performance computing (HPC) capabilities as part of the EU data strategy is a wise direction to take.[60] The technology has become an indispensable resource for enterprises, scientific researchers, and government agencies to generate new discoveries and innovate breakthrough products and services. As such, HPC represents a strategic, game-changing technology with tremendous implications for economic competitiveness, scientific leadership, and national security. As EU allies such as Japan and the United States have articulated strategies and have significantly invested in the technology, the data strategy could specify how they could work together to enhance their HPC resources.

3. EU Provides No Evidence That Private Sector Is Failing To Sufficiently Share Data

One key assumption of the data strategy is that the private sector needs regulators to intervene to enable industry participants to share data between companies. In some sectors this may be true. For example, in financial services, the government identified specific data sharing limitations related to consumer financial data and played a key role in establishing requirements for how banks should share payment data.[61] Similarly, in highly regulated sectors such as healthcare, where organizations may be constrained on how they collect and share data based on government regulation, it likely makes sense to consider where data sharing requirements can enable greater data sharing. However, in other areas of the economy, such as pharmaceutical research, companies have begun sharing historical clinical trial data with outside researchers, including competitors, rather than hoarding this information for competitive advantage. The government may have a role to play in encouraging more of this type of collaboration, such as acting as a convener or identifying specific industries where there are barriers to data sharing, but it should avoid a top-down approach to mandating data hubs.

The U.S. approach of building regional data hubs, funded by the National Science Foundation, may be a useful model. In this approach, the government provided initial funding to help universities, civil society, and industry establish regional data hubs that chose their own priorities for developing shared infrastructure, research goals, and industry sectors to focus on.

4. Forced Data Sharing Is Not the Way Forward

The EU's belief is that the block, and its SMEs in particular, deserve to reap the value that the data created, stored, processed, and used in the EU will produce.

The way the EU plans to achieve its data grab seems to be the temptation to mandate access to data and data sharing. The EU data strategy should clarify more strongly the voluntary nature of data sharing when it is mutually beneficial, and as long as data sharing does not present competition concerns, the EU should preserve and protect freedom of contract for B2B data sharing.

But in the EU data strategy, the Commission suggests that for business-to-business (B2B) and business-to-government (B2G) data sharing, "only where specific circumstances so dictate, access to data should be made compulsory, where appropriate under fair, transparent, reasonable, proportionate and/or nondiscriminatory conditions."[62]

One problem is that these "specific circumstances" could be based on misguided accusations. The Commission seems to consider that large foreign companies are the cause behind European SMEs' inability to access data, digitalize, and scale. These "big companies" treat small European firms unfairly: "Micro-enterprises and SMEs suffer economic detriment because of contract-related problems, e.g., non-conformity with the contract or unfair contract terms."[63] In addition, they keep "control over large quantities of data. Common data spaces should allow more data to be shared with all types of European actors (including SMEs) and across sectors, allowing new market dynamics to be created."[64] But forcing companies to give up valuable data they have invested in to competitors makes no more sense than forcing them to give up valuable patents, trade secrets, employees, or property. It would certainly boost competitors, but it would also degrade the incentive for businesses to make future investments in these areas.

Unlocking the potential of industrial data sharing is an important objective which the Commission is right to strive for, but it should not lead to broad mandates for data sharing, especially not for the proprietary information companies produced with this data, as a means to indirectly target large U.S. platforms.[65] Mandating the sharing of data assets between companies can inhibit the commercial incentive to innovate inside the EU and raise cybersecurity risks. As the reuse of data by many actors as possible is beneficial, policies should support it through proper guidelines, but not force it with regulations that close down mutually beneficial contractual agreements on the use of data.[66] The Commission's preference seems to bend towards voluntary data sharing for businesses, but various EU-appointed bodies and EU policymakers such as Miapetra Kumpula-Natri, the MEP Rapporteur in charge of the EU data strategy's initiative draft report for the Industrial Committee, declared that "harder tools" to force companies to share data may be necessary, and have raised the PSD2 Directive as an inspiring example which may be right for banking but not for the broader economy.[67]

As a general rule, governments should avoid unnecessarily restrictive regulations on the collection and sharing of data. When restrictions on use are necessary, they should be implemented with restraint. Legal rules preventing the use of data can lead to a situation known as the "tragedy of the anticommons." This occurs when the existence of too many legal and bureaucratic barriers create high transaction costs that restrict the use and exchange of data. For example, uncertainty over data ownership may prevent a company from creating a useful data-driven application. In order not to undermine beneficial applications of data, policy discussions should focus on resolving how data can be used, rather than on deciding whether it can be collected and exchanged. Uses that result in specific harm should of course be prohibited, but we should have open-ended policies acknowledging the unpredictable breadth of future data-driven applications, particularly in the health and education sectors.[68]

The Right Framework for Intervention

However, in some industries and markets, a small number of firms have exclusive access to particular datasets, and they exploit their market power to limit access to that data through both technical and administrative means without any legitimate business justification. This type of anti-competitive behavior limits innovation and hurts consumers, and when these problematic practices occur, policymakers should intervene.[69]

Businesses, and their associated industry associations, in the real estate, financial services, and air travel industries, have taken steps to limit third party access to their data in ways that restrict competition, reduce market transparency, and harm consumers. These restrictions have no legitimate business justification but do undercut the business models of online services that could allow customers to gain better insights into their buying process or to rely on more than just one platform.

For instance, in the air travel industry, some airlines, such as Air France or Lufthansa, block certain third-party sites from posting flight availability and pricing information on their sites. Airlines have also targeted both specific online travel agencies (OTAs), such as Booking.com and Expedia, and metasearch engines, such as TripAdvisor and Trivago, which let consumers easily compare fares across multiple airlines. Again, these actions have no legitimate business justification, and without these online comparison shopping tools, many consumers might pay higher prices for airline tickets.

EU policymakers have expressed a growing interest in regulating antitrust issues related to data, arguing that as businesses, particularly social media companies and U.S. technology firms, possess large quantities of data, they present inherent competition concerns and have too much market power. The EU data strategy specifies the problem: "A small number of Big Tech firms hold a large part of the world's data" and would prevent other companies to emerge.[70] But these are misplaced concerns. In many markets, platforms do not harm competition, but rather encourage it by reducing the costs of entry on markets that were not previously data-driven.[71] Moreover, these companies rely on data, and far from a monopolistic resource data is widely available, cheap to collect, can be processed by many companies, and loses value rapidly.[72] Data is non-rivalrous: Multiple companies can collect, share, and use the same data simultaneously.[73] As a result, competitors of these platforms can often obtain similar data from other sources, but the opposite isn't always true. Policymakers all too often focus on large tech companies, such as Facebook, Amazon, 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—including from the Commission, in their proposals—should correct this oversight, and instead, consider the following framework to evaluate whether to intervene: First, does the company have exclusive access to data? Second, is the company limiting access to this data in ways that harm consumers? Third, does the company operate in the absence of a legitimate business justification? Ideally, policymakers should promote the use of this framework through industry led-initiatives, whereby stakeholders representing different business models—for instance banks and third-party personal finance apps—would oversee the decision-making process.

Uphold IP Rights

The EU data strategy and the future Data Act should ensure to balance data sharing with the EU's privacy rules—and privacy expectations, while respecting and upholding intellectual property rights, and factor in the safety and security risks data sharing can represent for companies. In the data strategy, where the document mentions that enforcement mechanisms should ensure that "European rules and values, in particular personal data protection, consumer protection legislation and competition law, are fully respected," the Commission should add "intellectual property," to emphasize that the idea is not to force companies to give up proprietary data and trade secrets.

According to a 2018 report by Everis, 60 percent of companies do not engage in B2B data sharing. Most respondents cited privacy concerns, trade secrets, and the fear of misappropriation by others as main concerns. Other common reasons include considerations of commercial strategy, the lack of demand for their company's data, the uncertainty about safety, security, and liability conditions related to the technical process of sharing data, and the lack of incentives.[74]

The emergence of the data economy has led to a growing debate about data rights, related to both IP and privacy. Getting this debate right is critical because regimes that tilt too far toward granting data rights run the risk of limiting 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, governments 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.[75]

Experiment With Data Sharing Mechanisms

Many businesses are still struggling to see the value of sharing data. Issues include commercial and legal risks around sharing data, and a lack of clarity around the benefits of sharing data. To address this obstacle, the EU data strategy can do more to lay out clear specifics on how the various proposals would look like in practice, and how they could be operationalized. Given the wide uncertainty on both strategic and operational issues, the forthcoming Data Act should articulate the business benefits of sharing data, and come up with better frameworks, clear mechanisms and rules to support the safe and legal sharing of data between companies.

The EU data strategy and the Data Act are opportunities to develop guidance that could help build confidence around approaches to sharing data across private sector companies. Important principles should include transparency, shared value creation, and respect for commercial interests.

The EU should consult industry about the conditions under which proprietary and sensitive data should be shared with third parties, as well as the most effective mechanisms to safeguard this data. For example, the EU should develop repeatable terms for sharing data between companies, under mutually beneficial agreements. The EU may work with industry to develop experiments with "harbors" such as sector-specific data trusts to encourage businesses to collect and share data responsibly.[76]

Data trusts are a type of data access and stewarding model inspired by legal trusts. These are institutions that enable companies to share data with each other, with data governance decisions made by "trustees" with fiduciary responsibilities.[77]

These mechanisms can help address the issue of data quality. As government data is only a fraction of the data that could be useful for AI development, policymakers should use them to encourage private and non-profit sectors to provide voluntary access to high-quality data.[78] The EU data strategy does create an expectation that a single European data space will enable businesses to "have easy access to an almost infinite amount of high-quality industrial data."[79] But to see high-quality data as an infinite resource is a misconception—investing in high-quality data will always require financial resources. Unfortunately, the data strategy does not focus enough on the importance of government investment in data quality, and only mentions it in passing in relation to data standards. But data quality is a major factor in determining the value that can be generated from data and as such should be a primary focus of the data strategy.

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. Policymakers in the United Kingdom have recognized this as a key barrier to AI development and they are attempting to overcome it by developing a model for data trusts, defined as "not a legal entity or institution, but rather a set of relationships underpinned by a repeatable framework, compliant with parties' obligations to share data in a fair, safe, and equitable way."[80] 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. EU policymakers should experiment 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 companies developing and deploying systems powered by technologies such as AI.[81]

ADDITIONAL RECOMMENDATIONS TO IMPROVE THE EU DATA STRATEGY

To strengthen the EU data strategy's proposed framework, the Commission proposes to address contextual aspects and challenges, including the lack of interoperability and common standards for better data sharing, the use of public sector data information by businesses, as well as the transformation of the labor market, the lack of digital literacy, and the lack of human capital supply in Europe. This section offers recommendations for these three challenges. As the EU should not lose sight of other priorities, the section also focuses on areas which merit further emphasis in the data strategy, namely: the data strategy's funding approach, the digitalization of businesses, the completion of the digital single market, and commitment to digital free trade.

1. Address Interoperability

The EU data strategy recognizes the "significant interoperability issues which impede the combination of data from different sources within sectors, and even more so between sectors."[82] Just as in the area of cybersecurity—another priority area the strategy includes—there is an urgent need to leverage existing instruments such as the European Interoperability Framework and roll out plans for ICT standardization consistently across EU countries, in order streamline the adoption of common standards by all member states to accelerate data access and maximize the use and reuse of data between government authorities, researchers, and companies. Various EU information systems currently lack the common standards that allow for even basic interoperability, technical or semantic. For instance, the ability to access and share medical data across the EU varies greatly,

limiting the ability to train AI systems on cross-border data.[83] In addition, high resolution geospatial data is very useful to the development of technologies, such as AI systems enabling autonomous vehicles or precision farming for land management—but only a handful of EU countries currently provide open and free access to datasets.[84] Those that do exist are often either outdated or cannot be assembled because they are not available in similar quality and resolution. Incomplete repositories make information difficult to analyze and compare. Fragmentation of data access and quality prevents the availability of high-value datasets under the same conditions for companies and research purposes, or with the same degree of legal certainty by lack of appropriate mechanisms.

To solve this critical issue and advance its framework, the Commission should propose concrete steps.

While standardization is not directly the job of policymakers, the EU could use standards organizations such as oneM2M (IoT) and 3GPP (5G telecoms) as arenas to promote interoperability and common standards for data sharing and software development, but also shape these norms with its allies.[85]

The EU can also promote standardization by facilitating discussions among industry players where interoperability is known to be viable. For that, the EU should build on existing use cases showing where interoperability can solve specific problems, how it can benefit all players in a given market, what the estimated costs and benefits are for providers, and how to share best practices, for instance commercial agreements.[86]

In addition, the EU can encourage interoperable or multiple access systems for instance in the procurement of financial services, via government payments systems. This can increase the scale, number, and volume of transactions, and in turn, companies can offer services at a lower cost—which then justifies then the costs of interoperability more easily. The EU and governments' public sector can further help by digitizing their own services and making public data more available to companies as a result.[87]

The EU should incentivize providers to work out technical and commercial agreements by supporting early investment, but should not mandate interoperability as it could prevent new players from entering a market, discourage first movers' innovations or pioneering investments, or paralyze a market around poor standards.[88]

It is important to note that the EU data strategy does not address data interoperability and data quality separately.[89] Data quality is just as critical, and it is in itself one of the main challenges holding the EU back from realizing its potential in the data economy.[90]

2. Leverage Public Sector Data

The EU data strategy should aim to improve and leverage existing public data, and increase the quantity, but also the quality, of datasets available to the public.[91] The strategy does underline that "governments can do more" to further open public sector information and facilitate government-to-business data sharing, "to make more of the data it produces easily available for use."[92]

The private sector will of course invest in data quality, but EU policymakers should view increasing the amount of high-quality data as a valuable opportunity, for instance to accelerate AI development and adoption, as well as reduce the potential economic and social harms of AI built with bad data. To increase the amount of high-quality data available, the EU should encourage governments to provide high-quality data; promote the voluntary provision of high-quality data from the private and non-profit sectors; and accelerate efforts to digitize all sectors of the economy to support more comprehensive data collection.[93]

To this end, the EU should accelerate digitization efforts and work with member states' 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, healthcare, public safety, and transportation. For example, as public health authorities provide most of the healthcare in Europe, the EU has an opportunity to amass extensive datasets on patients and outcomes that can fuel the development of health-related AI. The EU should foster the further development of open data policies and tools, such as the European Data Portal, which has a wide variance of participation from member states.[94] More comprehensive data collection and higher quality public sector datasets will lead to more opportunities for companies, non-profits, and individuals to create innovative applications.

In the EU data strategy, the Commission pledges that it will make "more high-quality public sector data available for re-use."[95] But making high value datasets available is not enough, and as it aims to be "leading by example," the Commission should go a step further by committing investment into actual data creation, such as geospatial data, beyond simply mentioning that the EU "will continue to facilitate discovery" of data.[96]

Finally, to further improve public sector data governance, the EU data strategy should include a proposal for all member states to appoint a chief data officer (CDO).[97] The EU should then establish a new, independent, EU-wide advisory panel, made up of each member state's CDO, charged with counseling the EU on how to maximize opportunities to innovate with data, including with AI and the Internet of Things.

3. Close the Digital Skills Gap and Invest in Data Literacy

The EU data strategy's objective to invest in skill development and general data literacy is paramount.[98] 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.[99] Rather than outright job destruction, automation will lead more to job redefinitions and, rather than mass unemployment, to mass redeployment—of occupations. For every job lost in the future as a result of digitization, 3.7 new jobs will be created.[100] The new applications of AI combined with human collaboration could boost employment by 10 percent through 2022.[101] Tasks such as scheduling or credential validation, which could be performed by automated systems, already appear less prominently in job listings. These increasingly require soft skills such as creativity, common sense, judgement, and critical thinking.[102]

Many sectors will increasingly rely on data intelligence and digital infrastructure. To create competitive advantages, one of the primary differentiators for organizations in data-intensive sectors will be access to talented, data-literate workers. 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, and EU countries are facing a considerable skills gap. Demand for workers is set to exceed supply, and the gap between both will continue to widen until at least 2030—in other words, unfilled vacancies will increase. More than half of EU companies find it hard to hire IT specialists.[103] While 90 percent of jobs already require at least basic digital skills, the EU data strategy acknowledges that only 57 percent of Europe's workforce has basic digital skills—which is far from enough to boost EU competitiveness and productivity—and aims to increase this share to 65 percent by 2025.[104]

Employment in data-intensive industries is geographically concentrated in certain countries and regions, putting others at a disadvantage. The concentration of data skills is becoming common—for instance, most AI talent is found in Western Europe and urban areas.[105] This makes it difficult for firms outside of geographic data skills clusters to recruit the right talent. The ability to train, attract, and retain AI workers is likely to become a new differentiator between EU member states. Countries and territories with a low presence of data-skilled workers are likely to face innovation and competitiveness challenges, widening the gap within the European society and leaving parts of the European population behind.

While education is a competence that rests on member states, there are several avenues the EU can take to best deliver its data strategy's ambitious objectives by enhancing digital literacy and closing the skills gap.

The EU should develop a data skills framework with objective insights about the needed data skills, how they are acquired across the EU. The lack of benchmarks between member states prevents a thorough evaluation of the importance and the type of data skills for employment in today's EU economy.

Addressing the skills gap will require anticipating skills needs, but also prompting reskilling and upskilling schemes, and working out new funding formulas to help companies devise specific training and lifelong learning programs. The workforce transition in the digital economy will involve revisiting social protection institutions and systems to ensure they align with the move away from full-time employment, towards alternative forms of work, part-time work, and self-employment.

The EU should address the digital skill gap by encouraging member states to integrate digital skills into their education curricula. While the economy is being rewired, the EU is not rewiring training and education programs in depth. It will be important for EU countries to reform their educational programs, and help workers make transitions between jobs and occupations. All too often, Science, Technology, Engineering and Mathematics (STEM) subjects are not sufficiently integrated in curriculums across the various levels of education.[106]

Improving digital skills will also likely require improving online education. Through its newly-adopted Digital Education Action Plan and its forthcoming update, the EU should invest in the use of digital technologies in education, including remote teaching and training.[107] The EU data strategy should address the insufficiencies that the COVID-19 crisis has exposed in this respect, such as the limited capacity of schools for digital teaching and learning.[108]

The proliferation of e-readers, online courses, MOOCs, podcasts, conferences, and professional development programs can help workers take charge of their own personal development by making digital lifelong learning a habit rather than a chore. Finland has been leading by example with "Elements of AI," an online course that is now accessible for all, for free, in every EU language.[109] This could be expanded to include more such educational programs, and hone Europeans' data literacy.[110] This will be key to ensure they understand the data environment and become empowered actors—their use of personal data spaces would entail greater user responsibility.

The scarcity of tech talent required for businesses to compete in the data economy, and the necessity to leave no one behind in the workforce require policies to monitor and address both the lack of data skills and the concentration of data skills across Europe, to mobilize significant investment in education and skills supply for technology careers, and to enable all sectors to invest more easily in talent recruitment, retention, upskilling and reskilling.

4. Secure and Clarify Funding

One of the Commission's key priority will be to ensure the financial sustainability of the data strategy. The Commission says that its plans need funding—€4 to 6 billion, including from EU member states and industry—but obtaining this funding will prove challenging in the context of the economic recession, and as countries are dragging their feet to approve the new EU budget.[111] Companies need to believe the project is viable before they participate in it, so the data strategy should clarify the EU's plans to mobilize sufficient funding, how it will divide funds across the nine data spaces and for what purposes, and whether it plans to cover ongoing maintenance costs. To ensure companies trust the project and participate in common data spaces, the Data Act should clarify the EU's plans to mobilize sufficient funding, and should provide companies with the guidance they need to understand the mechanisms and rules of data sharing for each data space. Here as well, the data strategy should be more constructive than assertive towards foreign providers and investors when referring to international cooperation on data as a priority. Indeed, the strategy underlines that "the EU has a strong interest in leading and supporting international cooperation with regard to data, shaping global standards and creating an environment in which economic and technological development can thrive"—while always waving conditions such as "full compliance with EU law" and "fundamental values" in a way that suggests non-EU companies do not.[112]

5. Digitalize EU Businesses

A key priority should be investing in digitalization of European businesses and governments.[113] This transformation is especially essential to EU competitiveness as companies that embrace digital transformation are the most productive, spur growth, and provide higher paying jobs.[114] Unfortunately, adoption of digital technologies among EU companies remains low. Less than a fifth of EU companies are highly digitized and only 12 percent of them use big data analytics.[115] The average cloud adoption rate across the EU is only 21 percent.[116] Industries such as healthcare—where only half of general practitioners have used electronic networks to transfer prescriptions to pharmacists and only 40 percent exchange medical data with other healthcare professionals—are ripe for digital transformation.[117] One reason Europe lags in digital adoption is that larger firms tend to adopt technology faster, but Europe's long legacy of giving preference to smaller enterprises means that Europe has a larger share of these businesses.[118]

6. Deliver the Digital Single Market and Prioritize Digital Free Trade

The EU data strategy suggests "building upon the strength of the single market's regulatory environment" and aims to give businesses in the EU the possibility to build on the scale of the single market."[119] Although the EU has made substantial progress in creating a digital single market, this environment should be more strongly integrated to give thrust to these objectives. European firms still face challenges in scaling up and developing emerging technologies, and full cross-border access to online content and services for all users is not yet a reality.[120] For example, European citizens cannot securely access and exchange their electronic health records when seeking treatments in multiple EU countries.[121] Data-driven business models need scale to achieve their full potential and that depends in large part on a harmonized EU market. Conflicting national laws will make achieving this harder and thus make it harder for firms in the EU to compete with their U.S. and Chinese counterparts.[122] As a result, any EU-wide strategy is unlikely to be successful if the EU and member states do not fix existing inconsistencies and fragmentation. The Commission appears to recognize the risk of creating excessively prescriptive rules for technologies such as AI that could place significant administrative burdens on the private sector or allowing member states to create rules that fracture the single market.
Unfortunately, there are still a number of proposals under consideration that would undermine businesses by expanding liability across the value chain of technologies, and the EU should avoid the data strategy to add to this pile.[123]

But an integrated digital single market will not be enough. EU firms will need global reach and scale, which will be difficult if the bloc limits cross-border data flows to its allied trade partners. The EU

should also prioritize digital free trade and the free flow of data both across its borders and globally, with its allies.[124] Where the data strategy mentions "Common European rules and efficient enforcement mechanisms should ensure that," first, data can flow within the EU and across sectors:" Here the Commission should specify that it should flow "globally" as well—in line with the EU's commitment to free flow of data, and to show that the EU understands the global nature of data flows.[125] The strategy does mention that its "single market for data" will be "open to data from across the world," but this suggests a limitation to data inflows.[126]

ANNEX — DRIVERS AND CHALLENGES TO DATA SHARING

Businesses across a range of sectors are facing a number of common challenges that are driving them to explore the value of sharing data. This Annex recalls the motivations behind data sharing for organizations, and explores three case studies for areas where the EU could help stakeholders leverage the benefits of data sharing.

Why Companies Share Data

Sharing data is indeed not a zero-sum game: Businesses and consumers choose to share data because it is mutually beneficial.

Platform business models, complex supply chains and service delivery models, and opportunities to deliver complementary products and services, are leading businesses to share more information, business intelligence and insight. With cloud computing, sharing data 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. Researchers can use this data to accelerate drug development, better understand diseases, and design more efficient clinical trials.[127] Sharing and using data internally can help to drive innovation within existing business processes and services, and can help to reduce costs; as can sharing data across supply chains, for example. Without sharing data, businesses face the cost of collecting and labelling data. By engaging in pre-competitive collaboration with others in their sector to collect necessary data, companies may be able to share costs and reduce time to market. The ability to access more competitive intelligence on market size is leading to organizations sharing data with analytics firms. In addition, new technologies such as AI and machine learning require access to large volumes of data, which companies can leverage to innovate in existing sectors and grow in emerging sectors, for example autonomous vehicles.

Smart Cities

Many European cities are striving to become “smart cities”—cities capable of collecting and analyzing vast quantities of data to automate processes, optimize resource allocation, improve services, and enable better decision making.

Under the Horizon 2020 research program, the Commission selected a number of cities, including Vienna, Munich, and Lyon, to experiment with innovative smart city technologies.[128] Together, they created new services, developed standards for data sharing, and replicated solutions in other cities.

These initiatives, co-financed by private sector companies, have led to successful projects such as the first e-mobility stations in Munich and the organization of a data platform for smart services in Vienna.[129]

But in many cases, the systems used to collect, analyze, and aggregate this data differ from one city to another. As a result, cities work in silos, do not make use of all available data, and miss out on important smart city opportunities.[130] Cities have legitimate interests in using insights from mobility data to inform traffic management and city planning, but they can meet that goal without compelling mobility providers to disclose individual location information and trip data. Other objectives, such as enforcing traffic rules by using data on people's movements, would not be legitimate, and it is doubtful that EU data protection rules would allow the data collection necessary.

Healthcare

Data is critical to the health and well-being of individuals, and its use can improve virtually every aspect of healthcare, from developing new drugs to delivering care to patients, supporting effective treatment and accelerating diagnostics. Increased use of data in healthcare and sharing data between health providers and others offers a broad range of benefits, including more personalized and coordinated care, better quality, faster treatment development, and lower costs. For example, the OpenActive initiative uses open data to share opportunities for physical activities to help people be more active, particularly catering to an aging population.[131]

Most major pharmaceutical companies have begun sharing historical clinical trial data with outside researchers, including competitors, rather than hoarding this information for competitive advantage.[132] Researchers can use this data to accelerate drug development, better understand diseases, and design more efficient clinical trials. Hospitals send medical images—such as x-rays, ultrasounds, or magnetic resonance imaging (MRI) images—to other countries for interpretation and diagnosis. This service reduces wait times and improves the expediency of diagnoses.[133]

Government agencies, universities, and pharmaceutical companies may all have their own rich datasets that could generate substantial benefits for data-driven innovation if widely shared, but these stakeholders lack the mechanisms to do so while ensuring that this proprietary and sensitive data is protected.

Public Sector

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. 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. 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. Many of these advancements are made possible by technologies and mechanisms that make it easier to collect, share, and disseminate data.

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 bear 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.

REFERENCES

1 European Commission, "Online consultation – A European Strategy for data" (European Commission's website), https://ec.europa.eu/digital-single-market/en/news/online-consultation-european-strategy-data; Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, "A European Strategy for Data" (European Commission, February 19, 2020), https://ec.europa.eu/info/sites/info/files/communication-european-strategy-data-19feb2020_en.pdf.

2 Nigel Cory, "The Global Rise of 'Data Localism'" (BRINK, January 31, 2018), https://www.brinknews.com/the-global-rise-of-data-localism/.

3 "A European Strategy for Data" (European Commission, February 19, 2020), p.5.

4 "A European Strategy for Data" (European Commission, February 19, 2020), p.9.

5 Nick Sohnemann and al., "New Developments in Digital Services," Study for the committee on the Internal Market and Consumer Protection, Policy Department for Economic, Scientific and Quality of Life Policies (European Parliament, May 2020), https://www.europarl.europa.eu/RegData/etudes/STUD/2020/648784/IPOL_STU(2020)648784_EN.pdf.

6 Ibid.

7 "A European Strategy for Data" (European Commission, February 19, 2020), p.16 and p.5. European Parliament, Answer to a written question given by Ms Simson on behalf of the European Commission, "EU data centres and cloud solutions in the context of the so-called energy transition and the Green Deal," P-000288/2020(ASW) (European Parliament, May 18, 2020), https://www.europarl.europa.eu/doceo/document/P-9-2020-000288-ASW_EN.pdf.

8 Seedtable, "This Week in Europe: The European strategy for data, explained" (February 21, 2020), https://us8.campaign-archive.com/?u=32b602d9ab9d238ceb45e3f05&id=30c9f0f425; "A European Strategy for Data" (European Commission, February 19, 2020), p.23: "The Commission is convinced that international cooperation must be based on an approach that promotes the EU's fundamental values, including protection of privacy."

9 "A European Strategy for Data" (European Commission, February 19, 2020), p.13.

10 Natalie Bannerman, "Europe Unveils Plans To Invest In 6G" (Data-Economy.com, March 10, 2020), https://data-economy.com/europe-unveils-plans-to-invest-in-6g/; Natasha Lomas, "Europe to Facebook: Pay taxes and respect our values — or we'll regulate" (TechCrunch, May 19, 2020), https://techcrunch.com/2020/05/19/europe-to-facebook-pay-taxes-and-respect-our-values-or-well-regulate/; European Commission, "Commission Staff Working Document - Impact Assessment - Accompanying the

document Proposal for a Regulation of the European Parliament and of the Council on a framework for the free flow of non-personal data in the European Union" (European Commission, September 13, 2017), https://ec.europa.eu/transparency/regdoc/rep/10102/2017/EN/SWD-2017-304-F1-EN-MAIN-PART-1.PDF.

11 EurActiv and Reuters, "Europeans should control their B-to-B data, says EU commissioner" (EurActiv.com, January 8, 2020), https://www.euractiv.com/section/data-protection/news/europeans-should-control-their-b-to-b-data-says-eu-commissioner/.

12 "A European Strategy for Data" (European Commission, February 19, 2020), p.20.

13 Robert D. Atkinson, "IP Protection in the Data Economy: Getting the Balance Right on 13 Critical Issues" (ITIF, January 22, 2019), https://itif.org/publications/2019/01/22/ip-protection-data-economy-getting-balance-right-13-critical-issues.

14 Nick Wallace and Daniel Castro, "The Impact of the EU's New Data Protection Regulation on AI" (Center for Data Innovation, March 27, 2018), http://www2.datainnovation.org/2018-impact-gdpr-ai.pdf.

15 European Commission, "The von der Leyen Commission: For a Union that strives for more" (European Commission, September 9, 2019), https://europa.eu/rapid/press-release_IP19-5542_en.htm; SITRA, "35 proposals to make the European data strategy work" (May 18, 2020), https://www.sitra.fi/en/publications/35-proposals-to-make-the-european-data-strategy-work/#introduction.

16 "A European Strategy for Data" (European Commission, February 19, 2020), p.5.

17 Eline Chivot and Nigel Cory, "Response to European Commission Consultation on Transfers of Personal Data to Third Countries and Cooperation Between Data Protection Authorities (ITIF, April 29, 2020), https://itif.org/publications/2020/04/29/response-european-commission-consultation-transfers-personal-data-third.

18 Eline Chivot, "The EU's post-coronavirus Marshall Plan must have a focus on improving its digital economy" (Euronews, May 14, 2020), https://www.euronews.com/2020/05/14/the-eu-post-coronavirus-marshall-plan-must-focus-on-improving-its-digital-economy-view; Eline Chivot, "Does Europe's Competition Policy Work Against EU Firms Getting Needed Scale?" (Center for Data Innovation, April 3, 2019), https://www.datainnovation.org/2019/04/does-europes-competition-policy-work-against-eu-firms-getting-needed-scale/; Eline Chivot, "How the Next European Commission Should Tackle AI" (Center for Data Innovation, September 4, 2019), https://www.datainnovation.org/2019/09/how-the-next-european-commission-should-tackle-ai/.

19 Eline Chivot and Daniel Castro, "The EU Needs to Reform the GDPR To Remain Competitive in the Algorithmic Economy" (Center for Data Innovation, May 13, 2019), https://www.datainnovation.org/2019/05/the-eu-needs-to-reform-the-gdpr-to-remain-competitive-in-the-algorithmic-economy/.

[20] James E. Bessen, Stephen Impink, Lydia Reichensperger, and Robert Seamans, “GDPR and the Importance of Data to AI Startups” (Boston University School of Law, Law & Economics Series, Paper No. 20-13, April 1, 2020), http://sites.bu.edu/tpri/2020/04/22/gdpr-and-the-importance-of-data-to-ai-startups/, p.3, p.16, and p.18.

[21] Francesca Casalini and Javier Lopez-Gonzalez, "Trade and Cross-Border Data Flows," OECD Trade Policy Papers, No. 220 (OECD Publishing, January 2019), https://www.researchgate.net/publication/330555597_Trade_and_Cross-Border_Data_Flows.

[22] Jennifer Baker, "Fuzzy Anonymity Rules Could Stymie EU’s Big Data Sharing Ideas," (CPO Magazine, May 1, 2020), https://www.cpomagazine.com/data-privacy/fuzzy-anonymity-rules-could-stymie-eus-big-data-sharing-ideas/.

[23] Nicolas Jaimes, "Etienne Drouard (Hogan Lovells): "Les propositions de Thierry Breton sont peu compatibles avec la directive eprivacy"" (Journal du Net, February 19, 2020), https://www.journaldunet.com/ebusiness/crm-marketing/1489177-etienne-drouard-hogan-lovells/.

[24] “A European Strategy for Data” (European Commission, February 19, 2020), p.8, see footnote.

[25] European Commission, "Report on the European Commission's Workshops on Common European Data Spaces" (European Commission, December 17, 2019), https://ec.europa.eu/digital-single-market/en/news/report-european-commissions-workshops-common-european-data-spaces.

[26] Tim Maurer and Isabel Skierka, "Technological Sovereignty: Missing the Point?" (New America, November 24, 2014), https://www.newamerica.org/cybersecurity-initiative/press-releases/technological-sovereignty-missing-the-point/.

[27] “A European Strategy for Data” (European Commission, February 19, 2020), p.10.

[28] Eline Chivot, "How Hesse's privacy ban on school software hurts students" (The Local, July 31, 2019), https://www.thelocal.de/20190731/opinion-hesse-privacy-ban-on-school-software-hurts-students.

[29] Kenneth Propp, New Atlanticist, “Waving the flag of digital sovereignty” (The Atlantic Council, December 11, 2019), https://www.atlanticcouncil.org/blogs/new-atlanticist/waving-the-flag-of-digital-sovereignty/.

[30] Wojciech Wiewiórowski, "Speech: Data Protection Day 2020: Facing New Challenges," Croatian Presidency of the EU Council Conference (EDPS, January 16, 2020), https://edps.europa.eu/sites/edp/files/publication/20-01-16_speech_zagreb_en.pdf.

[31] “A European Strategy for Data” (European Commission, February 19, 2020), p.9 and p.5.

[32] Daniel Castro, “The False Promise of Data Nationalism” (ITIF, December 2013), http://www2.itif.org/2013-false-promise-data-nationalism.pdf; Nigel Cory, "The False Appeal of Data Nationalism: Why the Value of Data Comes From How It’s Used, Not Where It’s Stored" (ITIF, April 1, 2019), https://itif.org/publications/2019/04/01/false-appeal-data-nationalism-why-value-data-comes-how-its-used-not-where; Nigel Cory, "EU digital trade policy proposal opens a loophole for data protectionism" (Euronews, July 16, 2018), https://www.euronews.com/2018/07/16/eu-digital-trade-policy-proposal-opens-a-loophole-for-data-protectionism-view.

[33] European Commission, "EU-US data transfers, Commercial Sector: EU-U.S. Privacy Shield" (European Commission's website), https://ec.europa.eu/info/law/law-topic/data-protection/international-dimension-data-protection/eu-us-data-transfers_en; Marcus Evans, David Kessler, Jim Lennon, and Susan Ross "Data Protection Report: US CLOUD Act and International Privacy" (Norton Rose Fulbright, August 1, 2019), https://www.dataprotectionreport.com/2019/08/u-s-cloud-act-and-international-privacy/; Michael Punke, “Get Off Of My Cloud” (Law Society, July 16, 2019), https://www.lawsociety.ie/gazette/in-depth/get-off-my-cloud/; Éanna Kelly, "France and Germany draw up plan for European rival to US cloud firms" (Science|Business, October 31, 2019), https://sciencebusiness.net/news/france-and-germany-draw-plan-european-rival-us-cloud-firms.

[34] Eline Chivot, "How Hesse's privacy ban on school software hurts students" (The Local, July 31, 2019), https://www.thelocal.de/20190731/opinion-hesse-privacy-ban-on-school-software-hurts-students.

[35] “A European Strategy for Data” (European Commission, February 19, 2020), p.10.

[36] Arman Shehabi et al., United States Data Center Energy Usage Report (Lawrence Berkeley National Laboratory, 2016) https://eta.lbl.gov/publications/united-states-data-center-energy.

[37] Robert Walton, “Washington regulators approve Microsoft deal to buy clean energy on open power markets,” Utility Dive (July 19, 2017), accessed September 11, 2019, https://www.utilitydive.com/news/washington-regulators-approve-microsoft-deal-to-buy-clean-energyon-open-po/447406/.

[38] Robert D. Atkinson, Doug Brake, Daniel Castro, Colin Cunliff, Joe Kennedy, Michael McLaughlin, Alan McQuinn, and Joshua New, "A Policymaker’s Guide to the “Techlash”—What It Is and Why It’s a Threat to Growth and Progress" (ITIF, October 28, 2019), https://itif.org/sites/default/files/2019-policymakers-guide-techlash.pdf.

[39] Charlotte Trueman, "Why data centres are the new frontier in the fight against climate change" (Computerworld, August 9, 2019), https://www.computerworld.com/article/3431148/why-data-centres-are-the-new-frontier-in-the-fight-against-climate-change.html.

[40] EurActiv and Reuters, "Europeans should control their B-to-B data, says EU commissioner" (EurActiv.com, January 8, 2020), https://www.euractiv.com/section/data-protection/news/europeans-should-control-their-b-to-b-data-says-eu-commissioner/.

[41] Erik van der Marel, Hosuk Lee-Makiyama and Matthias Bauer, "The Costs of Data Localisation: A Friendly Fire on Economic Recovery" (ECIPE, May 2014), https://ecipe.org/publications/dataloc/.

[42] Daniel Castro and Nicholas Wallace, "Response to the European Commission Questionnaire on Building the European Data Economy" (Center for Data Innovation, April 26, 2017), http://www2.datainnovation.org/2017-ec-building-european-data-economy.pdf; Vincent Manancourt, "Europe's data grab" (Politico, February 2, 2020), https://www.politico.eu/article/europe-data-grab-protection-privacy/.

[43] "A European Strategy for Data" (European Commission, February 19, 2020), p.5.

[44] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, "A New Industrial Strategy for Europe" (European Commission, March 10, 2020), https://ec.europa.eu/info/sites/info/files/communication-eu-industrial-strategy-march-2020_en.pdf; France24, Reuters, and Agence France Presse, "Covid-19: France and Germany propose €500 billion EU recovery fund" (France24, May 18, 2020), https://www.france24.com/en/20200518-live-macron-and-merkel-present-joint-covid-19-recovery-plan-for-eu; Kirk Samson, "Fortress Europe? Protectionism and populism raise political risk in the European Union" (Global Risk Insights, February 26, 2019), https://globalriskinsights.com/2019/02/fortress-europe-protectionism-and-populism-raise-political-risk-in-the-european-union/

[45] "A European Strategy for Data" (European Commission, February 19, 2020), p.18.

[46] Tweet by MEP Angelika Niebler, "Cloud storage providers are among the winners of the crisis as with lockdowns we have shifted a lot to online. All major cloud providers are US tech companies. EU urgently needs to follow suit: COM data strategy from Feb 2020 must now be implemented as a priority" (Twitter, April 29, 2020), https://twitter.com/ANiebler/status/1255411540443922438?s=20.

[47] Jack Schofield, "Europe's Quaero to challenge Google" (The Guardian, January 23, 2006), https://www.theguardian.com/technology/blog/2006/jan/23/europesquaero; Victoria Shannon, "Quaero gets off the ground to challenge Google" (The New York Times, March 21, 2008), https://www.nytimes.com/2008/03/21/technology/21iht-quaero24.html; Emmanuel Paquette, "Le cloud à la française en plein orage" (L'Express, June 15, 2016), https://lexpansion.lexpress.fr/high-tech/le-cloud-a-la-francaise-en-plein-orage_1802232.html; DW Staff, "Germany to Fund Rival to Google Search Engine" (DW, June 28, 2006), https://www.dw.com/en/germany-to-fund-rival-to-google-search-engine/a-2698176.

[48] "A European Strategy for Data" (European Commission, February 19, 2020), p.18.

[49] Antonio Villas-Boas, "The US is making its own 5G technology with American and European companies, and without Huawei" (Business Insider, February 4, 2020), https://www.businessinsider.com/5g-huawei-white-house-kudlow-dell-microsoft-att-nokia-ericsson-2020-2?r=US&IR=T.

[50] The Open RAN (radio access network) alliance "is an initiative to define and build 2G, 3G, and 4G RAN solutions based on a general-purpose vendor-neutral hardware and software-defined technology." See more:

Telecom Infra Project, "OpenRAN", https://telecominfraproject.com/openran/; https://www.fiercewireless.com/regulatory/Bevin Fletcher, "Nokia VP: Open RAN not a "binary choice"" (FierceWireless, May 27, 2020), https://www.fiercewireless.com/regulatory/nokia-vp-open-ran-not-a-binary-choice.

51 "A European Strategy for Data" (European Commission, February 19, 2020), p.9.

52 "A European Strategy for Data" (European Commission, February 19, 2020), p.5, see footnote.

53 Tarmo Virki, "Nokia to collaborate with Microsoft in data centre software" (Reuters, May 12, 2020), https://www.reuters.com/article/us-nokia-microsoft-datacentres/nokia-to-collaborate-with-microsoft-in-data-centre-software-idUSKBN2201R6; Nokia, Press Release, "Nokia extends commitment to datacenter networks with contributions to SONiC ecosystem led by Microsoft" (Nokia's website, May 12, 2020), https://www.nokia.com/about-us/news/releases/2020/05/12/nokia-extends-commitment-to-datacenter-networks-with-contributions-to-sonic-ecosystem-led-by-microsoft/.

54 Elvira Pollina, "Microsoft to invest $1.5 billion in Italian cloud business" (Reuters, May 8, 2020), https://www.reuters.com/article/us-microsoft-italy/microsoft-to-invest-15-billion-in-italian-cloud-business-idUSKBN22K211; Mike Robuck, "In face of COVID-19, AWS launches new cloud region in Milan, Italy" (FierceTelecom, April 28, 2020), https://www.fiercetelecom.com/telecom/face-covid-19-aws-launches-new-cloud-region-milan-italy

55 David Burt, "Microsoft Azure is now certified to host sensitive health data in France" (Microsoft's website, November 12, 2018), https://azure.microsoft.com/en-us/blog/microsoft-azure-is-now-certified-to-host-sensitive-health-data-in-france/; Health Data Hub, https://en.health-data-hub.fr/.

56 EurActiv and Reuters, "Europe can win global battle for industrial data, Breton says" (EurActiv.com, February 17, 2020), https://www.euractiv.com/section/digital/news/europe-can-win-global-battle-for-industrial-data-breton-says/.

57 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), https://itif.org/publications/2019/03/26/promoting-european-growth-productivity-and-competitiveness-taking-advantage.

58 Eline Chivot, "EU Is More Than A Decade Late In Its Plan To Be A Global Cloud Superpower" (Center for Data Innovation, December 12, 2019), https://www.datainnovation.org/2019/12/eu-is-more-than-a-decade-late-in-its-plan-to-be-a-global-cloud-superpower/.

59 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.

[60] "A European Strategy for Data" (European Commission, February 19, 2020), p.17.

[61] Daniel Castro, "Blocked: Why Some Companies Restrict Data Access to Reduce Competition and How Open APIs Can Help" (Center for Data Innovation, November 6, 2017), https://www.datainnovation.org/2017/11/blocked-why-some-companies-restrict-data-access-to-reduce-competition-and-how-open-apis-can-help/.

[62] "A European Strategy for Data" (European Commission, February 19, 2020), p.13. See also: High-Level Expert Group on Business-to-Government Data Sharing, "Towards a European strategy on business-to-government data sharing for the public interest" (European Commission, February 19, 2020), https://www.euractiv.com/wp-content/uploads/sites/2/2020/02/B2GDataSharingExpertGroupReport-1.pdf (pages 20 and 44).

[63] "A European Strategy for Data" (European Commission, February 19, 2020), p.9.

[64] European Commission, "Report on the European Commission's Workshops on Common European Data Spaces" (European Commission, December 17, 2019), https://ec.europa.eu/digital-single-market/en/news/report-european-commissions-workshops-common-european-data-spaces.

[65] Jennifer Baker, "Fuzzy Anonymity Rules Could Stymie EU's Big Data Sharing Ideas," (CPO Magazine, May 1, 2020), https://www.cpomagazine.com/data-privacy/fuzzy-anonymity-rules-could-stymie-eus-big-data-sharing-ideas/.

[66] Daniel Castro and Nicholas Wallace, "Response to the European Commission Questionnaire on Building the European Data Economy" (Center for Data Innovation, April 26, 2017), http://www2.datainnovation.org/2017-ec-building-european-data-economy.pdf.

[67] "Politico Morning Tech" (Politico, May 19, 2020), https://pro.politico.eu/news/politico-pro-morning-tech-zuckerberg-on-chinas-internet-model-data-strategy-french-hate-speech-laws-plot-twist.

[68] Daniel Castro and Travis Korte, "Data Innovation 101: An Introduction to the Technologies and Policies Supporting Data-Driven Innovation" (Center for Data Innovation, November 4, 2013), http://www2.datainnovation.org/2013-data-innovation-101.pdf.

[69] Daniel Castro, "Blocked: Why Some Companies Restrict Data Access to Reduce Competition and How Open APIs Can Help" (Center for Data Innovation, November 6, 2017), https://www.datainnovation.org/2017/11/blocked-why-some-companies-restrict-data-access-to-reduce-competition-and-how-open-apis-can-help/.

[70] "A European Strategy for Data" (European Commission, February 19, 2020), p.3.

[71] Matthias Bauer, "Online Platforms, Economic Integration and Europe's Rent-Seeking Society: Why Online Platforms Deliver on What EU Governments Fail to Achieve" (ECIPE, October 2018), https://ecipe.org/publications/online-platforms-economic-integration-europes-rent-seeking-society/.

[72] Eline Chivot, "Does Europe's Competition Policy Work Against EU Firms Getting Needed Scale?" (Center for Data Innovation, April 3, 2019), https://www.datainnovation.org/2019/04/does-europes-competition-policy-work-against-eu-firms-getting-needed-scale/; Anja Lambrecht and Catherine E. Tucker, "Can Big Data Protect a Firm from Competition?" (Competition Policy International, January 17, 2017), https://ec.europa.eu/information_society/newsroom/image/document/2016-6/computer_and_communications_industry_association_-_can_big_data_protect_a_firm_from_competition_13846.pdf.

[73] Joshua New, "Why Do People Still Think Data Is the New Oil?" (Center for Data Innovation, January 16, 2018), https://www.datainnovation.org/2018/01/why-do-people-still-think-data-is-the-new-oil/.

[74] Everis, "Study on data sharing between companies in Europe," prepared for the European Commission DG Communications Networks, Content & Technology (2018), https://publications.europa.eu/en/publication-detail/-/publication/8b8776ff-4834-11e8-be1d-01aa75ed71a1/language-en.

[75] Eline Chivot, "Response to the UK Government's Open Call for Evidence on its National Data Strategy" (Center for Data Innovation, July 18, 2019), http://www2.datainnovation.org/2019-UK-national-data-strategy.pdf.

[76] Eline Chivot, "Top Four Goals to Guide the EU's Data Strategy" (Center for Data Innovation, December 17, 2019), https://www.datainnovation.org/2019/12/top-four-goals-to-guide-the-eus-data-strategy/; https://cms.law/en/gbr/publication/data-trusts-increasing-access-to-data-while-retaining-trust.

[77] Open Data Institute, "Data Access Map: Mapping the wide world of data sharing" (Open Data Institute, 2019), https://theodi.org/project/the-data-access-map/. Open Data Institute, "Data trusts: lessons from three pilots" (Open Data Institute, April 15, 2019), https://theodi.org/article/odi-data-trusts-report/.

[78] Joshua New, "AI Needs Better Data, Not Just More Data" (Center for Data Innovation, March 20, 2019), https://www.datainnovation.org/2019/03/ai-needs-better-data-not-just-more-data/.

[79] "A European Strategy for Data" (European Commission, February 19, 2020), p.5.

[80] Professor Dame Wendy Hall and Jérôme Pesenti, "Growing the artificial intelligence industry in the UK" (UK Government, Department for Digital, Culture, Media & Sport and Department for Business, Energy & Industrial Strategy, October 15, 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf.

[81] Joshua New, "AI Needs Better Data, Not Just More Data" (Center for Data Innovation, March 20, 2019), https://www.datainnovation.org/2019/03/ai-needs-better-data-not-just-more-data/.

[82] "A European Strategy for Data" (European Commission, February 19, 2020), p.8.

[83] European Commission, Press Corner, "Commission makes it easier for citizens to access health data securely across borders" (European Commission, February 6, 2019), https://ec.europa.eu/commission/presscorner/detail/en/IP_19_842.

[84] Paul Hahn, "Three Trends Driving the Geospatial AI Revolution" (The European Business Review, September 23, 2019), https://www.europeanbusinessreview.com/three-trends-driving-the-geospatial-ai-revolution/; Miranda Sharp, "Reliable data will underpin safety of autonomous vehicles" (The Engineer, March 5, 2019), https://www.theengineer.co.uk/reliable-data-autonomous-vehicles/; USGS, "The 3D Elevation Program—Precision Agriculture and Other Farm Practices," Fact Sheet 2016-3088 (December 2016), https://pubs.usgs.gov/fs/2016/3088/fs20163088.pdf.

[85] Paul Timmers, "The Geopolitics of Standardisation" (Directions, April 9, 2020), https://directionsblog.eu/the-geopolitics-of-standardisation/.

[86] Center for Financial Inclusion, Roadmap to Financial Inclusion 2020, Technology-Enabled Business Models Working Group, "Technology Enables Full Financial Inclusion" (September 2013), https://centerforfinancialinclusionblog.files.wordpress.com/2013/10/technology1.pdf.

[87] Ibid.

[88] Ibid.

[89] "A European Strategy for Data" (European Commission, February 19, 2020), p.8.

[90] Joshua New, "AI Needs Better Data, Not Just More Data" (Center for Data Innovation, March 20, 2019), https://www.datainnovation.org/2019/03/ai-needs-better-data-not-just-more-data/.

[91] Eline Chivot, "Top Four Goals to Guide the EU's Data Strategy" (Center for Data Innovation, December 17, 2019), https://www.datainnovation.org/2019/12/top-four-goals-to-guide-the-eus-data-strategy/.

[92] "A European Strategy for Data" (European Commission, February 19, 2020), p.7.

[93] Joshua New, "AI Needs Better Data, Not Just More Data" (Center for Data Innovation, March 20, 2019), https://www.datainnovation.org/2019/03/ai-needs-better-data-not-just-more-data/.

[94] European Data Portal, https://www.europeandataportal.eu/data/datasets?locale=en.

[95] "A European Strategy for Data" (European Commission, February 19, 2020), p.13.

[96] "A European Strategy for Data" (European Commission, February 19, 2020), p.15.

[97] Daniel Castro and Eline Chivot, "To Promote Data Innovation, All EU Governments Should Appoint a National Chief Digital Officer" (Center for Data Innovation, October 10, 2019), https://www.datainnovation.org/2019/10/to-promote-data-innovation-all-eu-governments-should-appoint-a-national-chief-digital-officer/; Eline Chivot, "Top Four Goals to Guide the EU's Data Strategy" (Center for Data Innovation, December 17, 2019), https://www.datainnovation.org/2019/12/top-four-goals-to-guide-the-eus-data-strategy/.

[98] Eline Chivot, "The EU's post-coronavirus Marshall Plan must have a focus on improving its digital economy" (Euronews, May 14, 2020), https://www.euronews.com/2020/05/14/the-eu-post-coronavirus-marshall-plan-must-focus-on-improving-its-digital-economy-view.

[99] Eline Chivot, "Response to the UK Government's Open Call for Evidence on its National Data Strategy" (Center for Data Innovation, July 18, 2019), http://www2.datainnovation.org/2019-UK-national-data-strategy.pdf.

[100] Agoria, Without a suitable policy, there will be 584,000 unfilled vacancies in 2030" (Agoria, September 20, 2018), https://www.agoria.be/en/Agoria-Without-a-suitable-policy-there-will-be-584-000-unfilled-vacancies-in-2030.

[101] Ellyn Shook and Mark Knickrehm, "Reworking the Revolution - Future Workforce" (Accenture, 2018), https://www.accenture.com/be-en/company-reworking-the-revolution-future-workforce.

[102] IBM Newsroom, "MIT-IBM Watson AI Lab Releases Groundbreaking Research on AI and the Future of Work" (IBM, October 30, 2019), https://newsroom.ibm.com/2019-10-30-MIT-IBM-Watson-AI-Lab-Releases-Groundbreaking-Research-on-AI-and-the-Future-of-Work

[103] Eurostat, "ICT specialists - statistics on hard-to-fill vacancies in enterprises," https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_specialists_-_statistics_on_hard-to-fill_vacancies_in_enterprises.

[104] "A European Strategy for Data" (European Commission, February 19, 2020), p.20.

[105] Thomas Roca, LinkedIn Economic Graph, "AI Talent in the European Labour Market" (LinkedIn, November 2019), https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/reference-cards/research/2019/AI-Talent-in-the-European-Labour-Market.pdf.

[106] Eline Chivot, "A Roadmap for Europe to Succeed in the Digital Economy" (Center for Data Innovation, December 2, 2019), https://www.datainnovation.org/2019/12/a-roadmap-for-europe-to-succeed-in-the-digital-economy/.

[107] European Commission, "Digital Education Action Plan: Education and Training" (European Commission's website), https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en.

[108] Fernando M. Reimers and Andreas Schleicher, "A framework to guide an education response to the COVID-19 Pandemic of 2020" (OECD, March 2020), https://www.hm.ee/sites/default/files/framework_guide_v1_002_harward.pdf.

[109] James Vincent, "Finland is making its online AI crash course free to the world" (The Verge, December 18, 2019), https://www.theverge.com/2019/12/18/21027840/online-course-basics-of-ai-finland-free-elements

[110] SITRA, "35 proposals to make the European data strategy work" (May 18, 2020), https://www.sitra.fi/en/publications/35-proposals-to-make-the-european-data-strategy-work/#introduction.

[111] "A European Strategy for Data" (European Commission, February 19, 2020), p.16; Florin Zubaşcu, "EU budget delay leaves parts of Horizon Europe in limbo" (Science|Business, February 25, 2020), https://sciencebusiness.net/news/eu-budget-delay-leaves-parts-horizon-europe-limbo.

[112] "A European Strategy for Data" (European Commission, February 19, 2020), p.23.

[113] Eline Chivot, "The EU's post-coronavirus Marshall Plan must have a focus on improving its digital economy" (Euronews, May 14, 2020), https://www.euronews.com/2020/05/14/the-eu-post-coronavirus-marshall-plan-must-focus-on-improving-its-digital-economy-view.

[114] EIB, "Only four EU countries lead the US in digitalisation – EIB launches new report on digitalisation in the EU and US" (European Investment Bank, April 20, 2020), https://www.eib.org/en/press/all/2020-101-only-four-eu-countries-lead-the-us-in-digitalisation-eib-launches-new-report-on-digitalisation-in-the-eu-and-us.

[115] European Commission, "The Digital Economy and Society Index - DESI 2019" (European Commission's website), https://ec.europa.eu/digital-single-market/en/desi; see also: Digital Agenda: Key Indicators.

[116] CloudHealth Tech Staff, "Cloud Computing Statistics For Europe" (CloudHealth, August 2, 2019), https://www.cloudhealthtech.com/blog/cloud-computing-statistics-europe.

[117] European Commission, "The Digital Economy and Society Index - DESI 2019" (European Commission's website), https://ec.europa.eu/digital-single-market/en/desi.

[118] Bob Violino, "Large enterprises are adopting emerging tech at much higher rate than small companies" (ZDNet, October 10, 2018), https://www.zdnet.com/article/large-enterprises-are-adopting-emerging-tech-at-much-higher-rate-than-small-companies/.

[119] "A European Strategy for Data" (European Commission, February 19, 2020), p.22 and p.5.

[120] European Commission, Factsheet/Infographic, "Creating a Digital Single Market - European Commission actions since 2015" (European Commission, February 18, 2019), https://ec.europa.eu/digital-single-market/en/news/creating-digital-single-market-european-commission-actions-2015.

[121] European Commission, Policy, "Exchange of Electronic Health Records across the EU" (European Commission's website), https://ec.europa.eu/digital-single-market/en/exchange-electronic-health-records-across-eu.

[122] Eline Chivot, "If the DSM Disintegrates, the EU Will Fall Further Behind in AI" (Center for Data Innovation, January 22, 2020), https://www.datainnovation.org/2020/01/if-the-dsm-disintegrates-the-eu-will-fall-further-behind-in-ai/.

[123] Daniel Castro and Eline Chivot, "How the EU Should Revise its AI White Paper Before it is Published" (Center for Data Innovation, February 1, 2020), https://www.datainnovation.org/2020/02/how-the-eu-should-revise-its-ai-white-paper-before-it-is-published/.

[124] Eline Chivot, "The EU's post-coronavirus Marshall Plan must have a focus on improving its digital economy" (Euronews, May 14, 2020), https://www.euronews.com/2020/05/14/the-eu-post-coronavirus-marshall-plan-must-focus-on-improving-its-digital-economy-view.

[125] "A European Strategy for Data" (European Commission, February 19, 2020), p.5.

[126] "A European Strategy for Data" (European Commission, February 19, 2020), p.4.

[127] Joshua New, "Why Do People Still Think Data Is the New Oil?" (Center for Data Innovation, January 16, 2018), https://www.datainnovation.org/2018/01/why-do-people-still-think-data-is-the-new-oil/.

[128] "Cities light the way with new manifesto" (Smarter Together, April 23, 2018), https://www.smarter-together.eu/press-releases/cities-light-way-new-manifesto.

[129] "Munich Introduces First Smart E-mobility Station" (Smarter Together, August 31, 2018), https://www.smarter-together.eu/news/munich-introduces-first-smart-e-mobility-station; "Gathering Outputs from Smart Data in Vienna" (Smarter Together, September 4, 2018), https://www.smarter-together.eu/news/gathering-outputs-smart-data-vienna.

[130] Eline Chivot "How the EU Could Accelerate Its Smart City Initiatives" (Center for Data Innovation, April 10, 2019), https://www.datainnovation.org/2019/04/how-the-eu-could-accelerate-its-smart-city-initiatives/.

[131] OpenActive, https://www.openactive.io/.

[132] 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-CancerResearch-Platform-Achieves.

[133] Daniel Castro and Alan McQuinn, "Cross-Border Data Flows Enable Growth in All Industries" (ITIF, February 2015), http://www2.itif.org/2015-cross-border-data-flows.pdf.