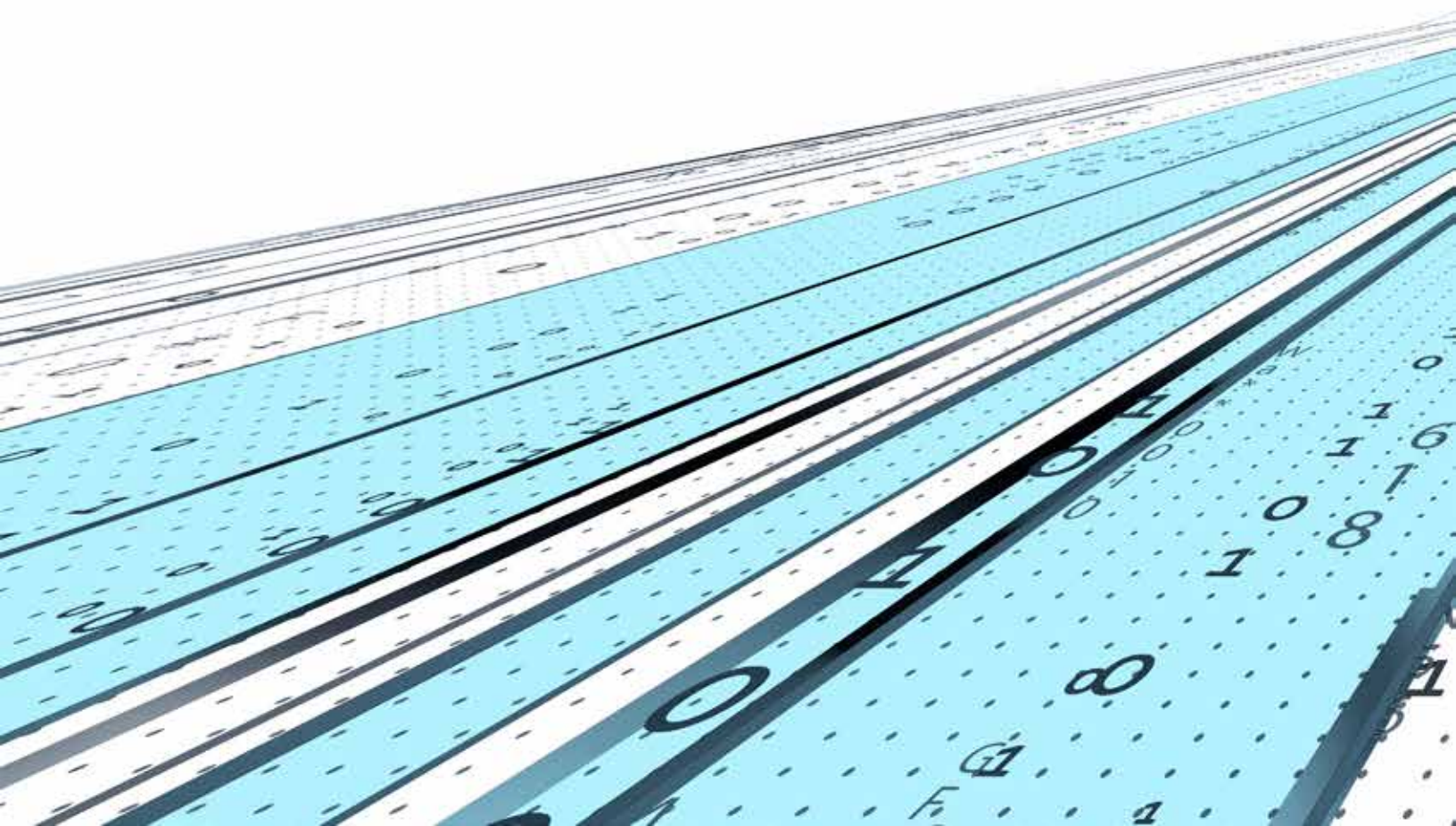


CIGI Papers No. 266 – June 2022

A Future Built on Data

Data Strategies, Competitive Advantage and Trust

Susan Ariel Aaronson



CIGI Papers No. 266 – June 2022

A Future Built on Data

Data Strategies, Competitive Advantage and Trust

Susan Ariel Aaronson

About CIGI

The Centre for International Governance Innovation (CIGI) is an independent, non-partisan think tank whose peer-reviewed research and trusted analysis influence policy makers to innovate. Our global network of multidisciplinary researchers and strategic partnerships provide policy solutions for the digital era with one goal: to improve people's lives everywhere. Headquartered in Waterloo, Canada, CIGI has received support from the Government of Canada, the Government of Ontario and founder Jim Balsillie.

À propos du CIGI

Le Centre pour l'innovation dans la gouvernance internationale (CIGI) est un groupe de réflexion indépendant et non partisan dont les recherches évaluées par des pairs et les analyses fiables incitent les décideurs à innover. Grâce à son réseau mondial de chercheurs pluridisciplinaires et de partenariats stratégiques, le CIGI offre des solutions politiques adaptées à l'ère numérique dans le seul but d'améliorer la vie des gens du monde entier. Le CIGI, dont le siège se trouve à Waterloo, au Canada, bénéficie du soutien du gouvernement du Canada, du gouvernement de l'Ontario et de son fondateur, Jim Balsillie.

Credits

Managing Director of Digital Economy **Robert Fay**

Senior Publications Editor **Jennifer Goyder**

Publications Editor **Susan Bubak**

Graphic Designer **Brooklyn Schwartz**

Copyright © 2022 by the Centre for International Governance Innovation

The opinions expressed in this publication are those of the author and do not necessarily reflect the views of the Centre for International Governance Innovation or its Board of Directors.

For publications enquiries, please contact publications@cigionline.org.



This work is licensed under a Creative Commons Attribution — Non-commercial — No Derivatives License. To view this license, visit (www.creativecommons.org/licenses/by-nc-nd/3.0/). For re-use or distribution, please include this copyright notice.

Printed in Canada on Forest Stewardship Council® certified paper containing 100% post-consumer fibre.

Centre for International Governance Innovation and CIGI are registered trademarks.

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
www.cigionline.org

Table of Contents

vi	About the Author
vi	Acronyms and Abbreviations
1	Executive Summary
1	Introduction: Data, Data, Data!
3	What Do We Know about Data?
4	Data Strategies and Competitive Advantage
7	The Data on Data Strategies
9	Conclusion: The Meaning of National Data Strategies
13	Annex: Country-Specific Analysis
20	Works Cited

About the Author

Susan Ariel Aaronson is a CIGI senior fellow. She is an expert in international trade, digital trade, good governance and human rights. Susan is particularly interested in and writes on how the digital economy is changing governance and human rights. She is currently writing on comparative advantage in data, comparing how nations govern data, and how virtual reality will challenge our existing approach to governance.

Susan is also research professor of international affairs and cross-disciplinary fellow at George Washington University's Elliott School of International Affairs, where she directs the Digital Trade and Data Governance Hub. The Hub educates policy makers and the public on domestic and international data governance. The Hub also maps the governance of personal, public and proprietary data around the world to illuminate the state of data governance.

Susan is the former Minerva Chair at the National War College. She is the author of six books and more than 60 scholarly articles. Her work has been funded by major international foundations including the MacArthur, Hewlett, Ford, Koch and Rockefeller Foundations; governments such as the Netherlands, the United States and Canada; international organizations such as the United Nations, International Labour Organization and the World Bank; and US corporations including Google, Ford Motor and Levi Strauss. She loves to do triathlons and study ballet.

Acronyms and Abbreviations

AI	artificial intelligence
CCP	Chinese Communist Party
CIGI	Centre for International Governance Innovation
CSET	Center for Security and Emerging Technology
G20	Group of Twenty
IoT	Internet of Things
IP	intellectual property
NIST	National Institute of Standards and Technology
OECD	Organisation for Economic Co-operation and Development
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Executive Summary

In the twenty-first century, data became the subject of national strategy. This paper examines these visions and strategies to better understand what policy makers hope to achieve.

Policy makers in many countries have long drafted strategies for economic growth or to govern various technologies. Some of these strategies may be designed to achieve comparative or competitive advantage. But data is different from other inputs: it is plentiful, easy to use and can be utilized and shared by many different people without being used up. Moreover, data can be simultaneously a commercial asset and a public good. Various types of data can be analyzed to create new products and services or to mitigate complex “wicked” problems that transcend generations and nations (a public good function). However, an economy built on data analysis also brings problems — firms and governments can manipulate or misuse personal data, and in so doing undermine human autonomy and human rights. Given the complicated nature of data and its various types (for example, personal, proprietary, public, and so on), a growing number of governments have decided to outline how they see data’s role in the economy and polity.

The author based this study on a sample of 51 nations plus the European Union from various regions, income levels and digital prowess. There is a correlation between income, democracy, levels of digital prowess and data governance. Approximately one-fifth, or 10 governments, issued national data strategies, delineating how various types of data could contribute to their nation’s social and economic development. All of these nations are characterized as high income by the World Bank, except for China, which is an upper-middle-income country. Two are authoritarian. All have high levels of digital prowess. Despite these differences, all of the plans aim to expand the scale and variety of data, increase skill endowments, build data infrastructure, and use governance (encourage network effects, expand free flow of data, and so on) to enhance the digital economy in their nation. Some of these plans make it quite clear that these nations hope to achieve competitive advantage in data-driven sectors. Very few policy makers see data as a public good. Sixty percent of these nations want to build comparative advantage in data-

driven sectors, while 70 percent use these data governance strategies to build trust in their policies. While it is too early to evaluate the effectiveness of these strategies, policy makers increasingly recognize that if they want to build their country’s future on data, they must also focus on trust.

Introduction: Data, Data, Data!

Few readers will find common ground between a nineteenth-century detective story and the Chinese government’s 14th Five-Year Plan. Yet both writings focus on the import of data. In *The Adventures of Sherlock Holmes*,¹ Arthur Conan Doyle’s fictional characters argue that the best way to solve a mystery is to *collect and analyze* data related to the crime. In the Five-Year Plan, Chinese officials argue that the Chinese government must *control* vast swaths of data so the government can “activate the potential of data factors of production” (Center for Security and Emerging Technology [CSET] 2021, 38).²

Clearly, data’s role in the world has evolved since the time of Sherlock Holmes. Researchers now use large troves of data and new analytic techniques to generate insights and make predictions. Firms have also taken advantage of increased computing power and speed, which allowed them to process data faster (Veldkamp and Chung 2019). Data has become essential to all sectors of society. Today, data is both plentiful and precious. According to Statista, “the total amount of data created, captured, copied, and consumed globally” reached 64.2 zettabytes in 2020. By 2025, “global data creation is projected to grow to more than 180 zettabytes.”³ (A zettabyte is a measure of storage capacity equal to 1,000,000,000,000,000,000,000 or one sextillion bytes.) *The Economist* (2017) and the World Economic Forum (2021a) have both argued that large troves of data are the world’s most valuable resource.

1 Holmes exclaims, “Data! Data! Data!....I can’t make bricks without clay” (Doyle 1892).

2 The Five-Year Plan focuses on data and digitalization, mentioning data 69 times (CSET 2021).

3 See www.statista.com/statistics/871513/worldwide-data-created/.

Not surprisingly, China is not the only nation to articulate how data might serve its economy and society. For example, in 2017, the Government of Japan issued a “Declaration to Be the World’s Most Advanced IT Nation: Basic Plan for the Advancement of Public and Private Sector Data Utilization.” The declaration was a promise that Japan would build a model of a society in which people are enriched by data” (Government of Japan 2017, 4). The government followed the declaration with a data strategy in December 2021.⁴

Why are government officials writing such tomes? Data plays multiple roles in the economy and polity; as an input to various forms of data analysis, it can facilitate scientific discovery, help mitigate complex problems such as climate change and drive innovation. But data is not just a commercial asset — it can also be a public good. Policy makers cannot effectively ensure that data meets its commercial and public good potential without data governance (Organisation for Economic Co-operation and Development [OECD] 2021).

The World Bank (2021) notes that data governance consists of four main tasks: strategic planning; developing rules and standards; developing mechanisms of compliance and enforcement; and generating the learning and evidence needed to gain insights and address emerging challenges. This paper focuses on the first task: strategic planning.

In 2010, the OECD recommended that governments develop innovation strategies, which would increase productivity and strengthen economic growth and development. The OECD (2010) noted that innovation — the introduction of a new or significantly improved product (good or service), process or method — has long been viewed as central to economic performance and social welfare. It has identified five policy priorities for government action: empowering people to innovate; unleashing innovation in firms; creating and applying knowledge; applying innovation to address global and social challenges; and improving the governance of policies for innovation.⁵

National data strategies are innovation strategies, given that data is essential to innovation today.

But data strategies, as noted above, are also a key component of data governance (OECD 2021; World Bank 2021; Aaronson, Struett and Zable 2021). The OECD (2021) defines data governance as principles and policy guidance on how governments can maximize the cross-sectoral benefits of all types of data — personal, non-personal, open, proprietary, public and private — while protecting the rights of individuals and organizations. The OECD defines a national data strategy as a plan or vision that aims to increase the provision, use and reuse of various types of data held by public and private entities in adherence with national norms and laws. According to the OECD, governments use these national strategies to focus attention and resources at a national level, describe how societal entities can work together to benefit from data, and to put forward a vision on how to manage both the opportunities and risks that may arise for individuals and the nation as a whole.⁶ Data strategies can address a single type of data and multiple aspects of the data value chain, including data collection, analysis and sharing among different societal entities.

In this paper, the author focuses only on those national data strategies that articulate the country’s vision for data in the economy and polity. The author does not discuss strategies for specific types of data (such as public data). Moreover, the paper does not assess if these strategies are effective because many, but not all, of these strategies are relatively new. Instead, the paper seeks to answer the following questions, which can provide greater insight into the importance of these strategies:

- Which nations have developed data strategies?
- What types of data does the data strategy discuss? This question is answered by examining every strategy and comparing what the plans say.
- Does the nation seek to build trust in its governance of data and data-driven sectors? To ascertain trust, a content analysis of every plan was done to see if the plan mentions trust (also trustworthy, trusted) as an objective. However,

4 See Government of Japan (2021a).

5 See www.oecd.org/site/innovationstrategy/deliveringnewapproachtinnovation.htm. The OECD updated its innovation strategy work in 2015, but these components remained the same.

6 See https://oecd.ai/en/dashboards/policy-instruments/National_strategies_agendas_and_plans. An example of such a plan is Smart Nation Singapore’s National Artificial Intelligence Strategy (www.smartnation.gov.sg/files/publications/national-ai-strategy.pdf), which, in turn, is part of Singapore’s Smart Nation strategy.

it was noted that trust is contextual — citizens have different perceptions of what trust entails.

- What are the country's policy priorities for data? Do they conform to the policy principles delineated by the OECD (2010, 3) for innovation strategies? This question is answered by comparing what policy makers claim are their policy priorities with the OECD's innovation strategies.
- Which nations use their data strategies to try to achieve competitive advantage in data and/or data-driven services? What do policy makers say about the rationale for such strategies?

To answer these questions, the author relied on a data set produced by the Digital Trade & Data Governance Hub at The George Washington University (Aaronson, Struett and Zable 2021). In 2021, the Hub designed a new primary-source-based metric to characterize a comprehensive approach to data governance at both the national and international levels.⁷ The metric includes six attributes or key categories of data governance (Benfeldt Nielsen 2017; OECD 2021). These attributes (strategic, regulatory, responsible, structural, participatory and international) can be thought of as the different dimensions of action a nation takes to govern data. The strategic attribute describes national strategies to govern various types of data and data-driven services.

The Hub's data set includes a sample of 51 countries and the European Union. The 52 cases represent a diverse set of countries from different regions and at different income levels based on the World Bank's categorization of countries.⁸ To develop this data set, the Hub relied on the countries under evaluation (and, ultimately, their web presence). While this could create an endogeneity problem, countries have little incentive to hide these strategies. Governments use these strategies to signal to their citizens and foreign investors that they are

moving to encourage and govern a data-driven economy (Aaronson, Struett and Zable 2021, 9).

As of January 2022, only 10 (or one-fifth) of the countries in the sample have produced a national data strategy. These data strategies have several shared attributes: all of the plans aim to expand the scale and variety of data; increase skill endowments; build data infrastructure; and use governance (encourage network effects, expand free flow of data and so on) to enhance the digital economy in their nation. Six of these plans explicitly state that these nations hope to achieve competitive advantage in data-driven sectors. Seven of these countries said they will use these data strategies to build trust in their policies. However, very few of these strategies are focused on creating shared value — such as digital public goods (for example, shared artificial intelligence [AI] to solve wicked problems).

This paper proceeds as follows: First, it delineates the state of knowledge about data's role in the economy and then reviews the role of governance strategies. Next, the paper briefly examines why policy makers might want to seek competitive advantage in data strategies and discusses the importance of trust. Building on the four questions outlined above, the author then compares the national data strategies and draws conclusions. The final section is an annex that describes each of the 10 national data strategies in greater detail.

What Do We Know about Data?

Data is defined as raw unanalyzed figures or facts that can be encoded as zeros and ones. It may include personal or sensitive information about people, things and systems (for example, online buyers, satellite images and health-care systems [Veldkamp and Chung 2019]).

Researchers understand that data acts differently than other inputs. Data is hard to value and the value of data to society as a whole is different from the commercial value for private firms collecting and exploiting data: some types of data, including troves of private data, can have public

⁷ See <https://datagovhub.elliott.gwu.edu/research/>.

⁸ The World Bank assigns the world's economies to four income groups: low, lower-middle, upper-middle and high-income countries. The classifications are updated each year on July 1 and are based on gross national income per capita in current US dollars. A representative sample of regions and income was sought. See <https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2021-2022> and <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.

good characteristics (United Nations Conference on Trade and Development [UNCTAD] 2021, 71).

Firms that use data can benefit from a “data feedback loop” (Farboodi et al. 2019) or direct network externalities (Goldfarb and Treffler 2018), in which a firm’s success attracts more users and user data, which improves the quality of products through AI and leads to more users and data. But this feedback loop also means that firms are likely collecting too much data (Acemoglu 2021; Acemoglu et al. 2019; Carrière-Swallow and Haksar 2019; Jones and Tonetti 2020).

Moreover, such privileged access to data (economies of scale) provides a competitive advantage, which gives rise to other economic concerns, including income inequality, market concentration and even global monopoly power, and the absence of a level playing field for countries (UNCTAD 2019, 137; Liu 2021). According to UNCTAD, such control gave some countries with such firms both “power and competitive advantages...in digital technologies such as data analytics, artificial intelligence, blockchain, the Internet of things, cloud computing and all Internet based services” (UNCTAD 2021, 3). If UNCTAD analysis is right, countries that have access to a diverse and large supply of high-quality data are likely to have an advantage if they also have the funds and skills to analyze and monetize data (Sheehan 2019). Several high-income countries and China are the biggest beneficiaries of the ubiquitous availability of data on customer preferences (Mayer 2020). These countries have lots of firms with intangible assets, which can include not only large troves of data, but also goodwill, brand recognition, skills and intellectual property (IP) such as trademarks or trade secrets (Tambe et al. 2020).

While scholars have some understanding of data’s role in the economy, they are not yet at a place where they can effectively guide policy makers as to how best to govern data. No one yet really knows how to:

- balance innovation, growth and competition with the need to protect the data of individuals and firms from cybertheft, hacking, manipulation and privacy violations;
- ensure that all of the world’s people benefit from the production and analysis of data, given differences in infrastructure (cloud capacity)

and skills as to how to collect, analyze and monetize data as well as infrastructure;

- mitigate the negative spillovers of data collection and analysis such as disinformation, discrimination, self-censorship and so on (markets alone cannot ensure that society receives benefits from data);
- retool policies that may be effective in the wealthiest countries to meet conditions in the developing world where informed consent and personal data protection may not be viable strategies (Medine and Murthy 2020); and
- incentivize data sharing while simultaneously protecting data from hacking, violations of privacy and manipulation.

Despite these gaps in knowledge, some officials are determined to put forward a vision of how their country will govern data.

Data Strategies and Competitive Advantage

Although strategizing is an essential organizational task, there is no one shared definition for strategy or strategizing (Rumelt 1993). John M. Bryson, Frances S. Berry and Kaifeng Yang (2010) and Bryson, Lauren Hamilton Edwards and David M. Van Slyke (2018) generally define governmental strategic planning as a deliberative, disciplined effort to produce fundamental decisions and actions that define what an organization (or other entity) does, and why it does it. “Public-sector planning is strategic when given the context participants have a clear recognition of, and desire to stabilize, what should be stabilized, while maintaining appropriate flexibility in terms of goals, policies, strategies, and processes to manage complexity, take advantage of important opportunities, and advance resilience and sustainability in the face of an uncertain future” (Bryson, Edwards and Van Slyke 2018, 321).

Most nations issue strategy documents for various government objectives and organizations. Some, such as the United States, require all federal agencies to perform annual strategic planning (Bryson, Berry and Yang 2010; Tama 2017).

“Public organizations likely formulate strategy at multiple levels and are statutorily obligated to carry out strategy developed by oversight or legislative bodies that control policy and agency budgets” (Bryson, Berry and Yang 2010, 510). Hence, governmental strategies are multidimensional and reflect compromise among a wide range of actors in and outside government (Osborne and Plastrik 1997).

There are several reasons why governments may issue broad plans for data in the economy and polity. First, policy makers may want to encourage the responsible collection, use, sharing or analysis of various types of data to promote sustainable development (World Economic Forum 2021b; UNCTAD 2019; World Bank 2021). Second, given the import of data, policy makers may want to signal to investors, lenders and their citizens that officials will encourage data-driven innovation, while protecting individuals, groups of individuals or even the nation from potential harms (including national security risks) (UNCTAD 2019, 2021; World Bank 2021). For example, the data-driven economy may bring privacy concerns, faulty information and inadequate data security, among other potential harms.⁹ Finally, policy makers may want to signal that they aim to achieve competitive advantage in data — that they want to create an environment where national firms specialize in exporting data-driven services.¹⁰

According to Harvard Business School professor Michael E. Porter (1990), competitive advantage is based on four national attributes: factor conditions (human resources, physical resources, knowledge resources, capital resources and infrastructure); demand conditions (the size of the home demand and the sophistication of home country buyers as determinants of the international competitiveness of countries); firm strategy, structure and rivalry (systematic differences in the national environment determining strategies

and structures of firms across countries); and related and support industries (clustering of competitors in the country or region).

Porter made two other key points. First, he showed that like comparative advantage, competitive advantage is a systemic process, which will change over time as consumer demand, technology, society and the polity evolve. Second, he cited the importance of government policies. “National prosperity is created, not inherited.... Government’s proper role is as a catalyst and challenger; it is to encourage — or even push — companies’ competitive advantage” (ibid., 3, 17).

The author could find no analysis of competitive advantage in data, but several researchers have examined comparative advantage in data-driven services such as AI.¹¹ These studies often find that comparative advantage in these services depends on access to and sharing of large pools of high-quality data, which tend to be collected by giant firms in the United States and China. For example, the World Trade Organization (WTO) noted, “data are essential to determine firms’ competitiveness and a country’s comparative advantage...raising an important challenge of structural inequality within and across countries” (WTO 2020, 92). UNCTAD says that major digital platform companies consider their data pools and data-processing capacities to be a key competitive advantage (UNCTAD 2019), suggesting that comparative advantage in data is all about economies of scale and scope of data.

Many of these studies argue that comparative advantage in data can facilitate comparative advantage in data-driven services. According to UNCTAD (2021, xv-xvi), China and the United States “account for half the world’s hyperscale data centers, the highest rates of 5G adoption in the world, 94 per cent of all funding of AI start-ups in the past five years, 70 per cent of the world’s top AI researchers, and almost 90 per cent of the

9 See https://odimpact.org/periodic-table.html?utm_source=Data+Stewards+Network&utm_campaign=206e6e94c8-EMAIL_CAMPAIGN_2019_05_17_08_37_COPY_01&utm_medium=email&utm_term=0_bc6d09925f206e6e94c8-87828353.

10 In 1787, David Ricardo presented his theory of comparative advantage to describe why countries specialized in exporting one good over another. He highlighted the role of factor endowments (resources) and costs of production. However, the theory of comparative advantage does not work well to explain trade behaviour for services. Scholars have found that for trade in services, skill endowments, infrastructure and regulatory institutions are more important than factor endowments such as the supply of resources (Van der Marel 2012; Hoekman 2020).

11 In 2017, economist Simon Evenett asked his colleagues to examine whether Ricardo’s theory of comparative advantage remains valid for new sectors and economic activities. Evenett recruited University of Michigan trade economist Alan Deardorff to write about a relatively new kind of trade based on cross-border data flows — digital trade. After examining several examples of digitally traded services, Deardorff concluded that data storage and computer applications accessible in the cloud did not fit the theory. Deardorff noted that platforms are the key actors in digital trade and their success depends on network effects. Hence, he noted that it was hard to tell if country success was due to country size (for example, its large pool of data) rather than inherent comparative advantage (Deardorff 2017). In this regard, Deardorff was citing demand conditions.

market capitalization of the world's largest digital platforms." These firms invest "in all parts of the global data value chain: data collection through the user-facing platform services; data transmissions through submarine cables and satellites; data storage and data analysis, processing and use, for instance through AI" (ibid., xvi). But the two nations have different advantages. While China may have advantages in its large pool of personal data from more than 800 million mobile internet users, the United States has access to global data pools from consumers, firms, satellites and machines. The United States also has greater cloud storage capacity, widespread use of business analytics software and access to business-specific data, which can be valuable for training machine-learning systems (Imbrie, Kania and Laskai 2020, 8–9). America's cloud providers "control the terms of access to, and administration of, infrastructure [and] are in a position to dominate those who depend on that infrastructure" (Rahman 2018, 237). Moreover, cloud providers that utilize their own software have a built-in advantage. Their customers must rely on their software (UNCTAD 2019, 115) because the internet began in the United States and US firms were among the first to commercialize the internet. These firms began to serve international markets early on (in contrast with those in China). These firms have had more than 20 years of data and experience providing data-driven services internationally (UNCTAD 2019, 126). Finally, American companies have developed the dominant primary tool kits and software frameworks — such as TensorFlow, PyTorch and Caffe — generally employed in AI research (Imbrie, Kania and Laskai 2020, 9, 11).

However, the supply of data is only one element that can contribute to comparative advantage in data-driven services such as AI. Competitiveness in AI will reflect the "dynamism of national innovation ecosystems, which we consider in terms of educational opportunities, access to global talent through immigration, and networks of research collaboration" (ibid., 3). AI techniques are evolving and over time will likely rely less on large pools of data. Some argue that the quality (accuracy), diversity (many different sources) and depth (different aspects of user experiences) of data are also important to competitive advantage in data (Sheehan 2019). One way to achieve greater data quality, accuracy and depth is to share data among different sectors of society (World Economic Forum 2021b, 5).

Data governance is also an essential component of competitive advantage in data-driven sectors (European Commission 2020a). CSET noted that although the United States and China lead the world in AI, "neither the US nor the PRC possesses a definite or generalized advantage in data. The availability of data may be less important than policy and bureaucratic initiatives that make data more available and facilitate its integration" (Imbrie, Kania and Laskai 2020, 3–4).

In light of this situation, it is not surprising that many governments want to spell out that they understand the import of creating an environment conducive to data-driven innovation. But they may also want to signal that they will create a data-driven economy built on trust.

Many policy makers believe trust is essential to the digital economy (The White House 2022). The Group of Twenty (G20) nations (the world's 20 largest economies) agreed that "Cross-border flow of data, information, ideas and knowledge generates higher productivity, greater innovation, and improved sustainable development" (G20 Leaders 2019). However, these flows could also undermine trust if data is not protected from theft, misuse or privacy violations.

The Importance of Online Trust

Trust is a mechanism to reduce complexity that developed as humans and civilizations evolved; humans use trust and distrust to manage risk (Stanton and Jensen 2021).

Trust is particularly important to online services. The Federal Government of Germany (2021, 8) notes, "Trust...is the basis on which data is shared....If you do not trust the source of the data, you won't trust the data itself either....This trust is fragile,...It can be permanently broken, especially if personal data is misused or its security is not guaranteed. It can also be broken when data is not used for the common good." When individuals go online, they do not know who they are interacting with (Artz and Gil 2007). Users must trust that the content is legitimate each time they go to a web page, and know that the providers of online services such as Twitter or e-commerce websites and the people they interact with on social networking or gaming sites are legitimate and trustworthy (Golbeck 2006; 2009).

However, there is no one definition of trust online or “digital trust.”¹² Online trust may evolve as data-driven services change over time (Centre for Data Ethics and Innovation 2021).

Unfortunately, several polls show declining trust in providers of online services and in how these firms use personal data. In 2019, researchers at the Pew Research Center found that many people fear that their data is being used without their consent and are concerned that firms might use their clients’ personal data to discriminate and manipulate them (Auxier et al. 2019). The Centre for International Governance Innovation (CIGI) and Ipsos have conducted large international user surveys since 2014 and, in 2019, reported that 75 percent of users who distrust the internet agreed that social media platforms contribute to their lack of trust (CIGI and Ipsos 2019, 116).

The UK Centre for Data Ethics and Innovation surveyed British citizens in 2021 about data. It found people associate data with “‘personal data.’ This means that many think of data primarily in terms of privacy and security,” rather than as an opportunity to use various types of data to solve complex problems. The centre concluded that the United Kingdom can only realize the benefits of data if it can build “public trust in its use” (Centre for Data Ethics and Innovation 2021).

The next section analyzes 10 national data strategies in depth, allowing us to see whether policy makers made online trust a priority.

The Data on Data Strategies

Which Nations Are Issuing Data Strategies?

Nine of the 51 countries and the European Union issued a data strategy, outlining a vision of data’s role in the economy and polity. Table 1 illuminates that a greater number of countries in the sample (some 28) issued strategies regarding public data (data collected,

held and/or funded by governmental entities, as well as data in the public domain). In contrast, only eight have issued strategies or guidelines for private sector data sharing.

At first glance, the 10 nations issuing such broad data strategies share certain characteristics. All of the countries are high- or middle-income nations according to World Bank groupings. But there are some key differences. Most of these countries are located in Asia or Europe. Only two, Saudi Arabia and China, are authoritarian nations; the others are democracies, with Singapore a flawed democracy (The Economist Intelligence Unit 2021). With the prominent exception of Saudi Arabia, all nine countries are known for their digital prowess.¹³ Hence, there is some correlation among income, levels of digital prowess and this aspect of data governance.

What Kind of Data Does the Plan Cover?

All of the plans cover public data and personal data held by the private sector. None in the sample covered proprietary data or satellite data. Many of the national strategies distinguish between personal and non-personal data, but as the World Bank (2021, 191) notes, data can blend personal and non-personal sources and characteristics. Over time, this distinction between personal and non-personal data that characterizes data governance today may be no longer useful.

Many of the plans focus on the need to build shared or interoperable rules to govern cross-border data flows. But many countries in the developing world lack digital capacity and national officials may lack the expertise to govern data-driven sectors. Only the United Kingdom and Switzerland addressed this dilemma in their data strategies, noting that it was in their interest to help other countries build, sustain and govern data-driven economies. The policy makers drafting these plans generally looked inward, despite the global nature of the internet and the data-driven economy.

12 See Chakrovorthi (2018) and Hoffmann (2017).

13 The Fletcher School plots digital momentum (a measure of changing digital prowess). With the exception of Saudi Arabia, these nations rank highly on the y-axis (Tufts Fletcher School Digital Intelligence Index, <https://digitalintelligence.fletcher.tufts.edu/trajectory>).

Table 1: 51 Countries and EU Plans/Visions for Data (August 2021)

	Data Strategy	Governmental Data Strategy	Strategic Plan for Private Sector or Data Sharing
Sampled countries with the strategy or guidelines	Australia, China, European Union, Germany, Japan, Saudi Arabia, Singapore, South Korea, Switzerland, United Kingdom	Australia, Brazil, Canada, China, Estonia, European Union, Finland, France, Germany, Indonesia, Ireland, Israel, Japan, Netherlands, New Zealand, Norway, Russia, Saudi Arabia, Singapore, South Korea, Sweden, Taiwan, Thailand, United Arab Emirates, United Kingdom, United States, Uruguay, Vietnam	European Union, Japan, Netherlands, New Zealand, Norway, Philippines, Singapore, United Kingdom

Source: Table by Andrew Kraskewicz.

Does the Nation Seek to Build Trust with this Vision?

The author used a simple content analysis strategy (searching for the words trust, trusted, trustworthy, reliable) to answer this question. Seven of the 10 data strategies mentioned trust or similar words as a strategic objective of the data strategy. The Australian, EU, German, Japanese, Singaporean, Swiss and UK plans highlight how these governments plan to remain trusted and trustworthy as they use and share data to serve commercial interests and society.

However, the author may have missed a focus on trust in some countries due to translation problems. Trust is contextual and notions of trust in one country may be different from that in another (Ferrin and Gillespie 2009; Fukuyama 1996). China, for example, seems more concerned with online safety than building trust. Yet according to the US National Institute of Standards and Technology (NIST) (2021), the essential building blocks of AI trustworthiness include privacy, reliability, safety and security, some of the same objectives of the Chinese data strategies.

What Are Each Nation's Policy Priorities for Data?

Table 2 provides an overview of the objectives and types of policies articulated in the data strategies reviewed.

Table 3 summarizes what each nation said it wanted to do in its national data strategy. The table reveals lots of commonality on the desire to build skills, encourage open data sharing, encourage economies of scope on data and, to a lesser extent, favour domestic producers of data-driven services. Countries diverged on a desire to build economies of scale (large pools of data) and to disseminate data public goods internationally.

Do These Strategies Conform to the Policy Principles Delineated by the OECD for Innovation Strategies?

This question is answered by comparing what nations say as their policy priorities with the OECD's innovation strategies (OECD 2010, 3) in Table 4.

Table 2: Objectives and Policies Delineated in Data Strategies

Objective	Examples of Policies Articulated in Data Strategies
Skill endowment	<ul style="list-style-type: none"> → Encourage research and training → Invest in and subsidize research and education → Ensure broadband and internet access
Data scale: make and grow large pools of data	<ul style="list-style-type: none"> → Make it easy to collect data → Free flow of data provisions in trade agreements but also make it harder for foreign actors to get access to data
Data diversity	<ul style="list-style-type: none"> → Data-sharing policies and platforms
Build infrastructure	<ul style="list-style-type: none"> → Invest in cloud and other forms of infrastructure
Use regulatory policy to promote advantage	<ul style="list-style-type: none"> → Lax competition policies, rigorous IP protections
Use trade policies to promote comparative advantage	<ul style="list-style-type: none"> → Strong protection and enforcement of IP, including trade secrets → Encourage data free flow and access to government data → Ban performance requirements (or use them) → Ban data localization (or require it) → Ban requirements to share source code
Build trust	<ul style="list-style-type: none"> → Link to personal data protection, consumer welfare, accountability initiatives → Limit disinformation and discrimination → Promote public participation in decision making → Commit to human rights online

Source: Author analysis of national data strategies.

In general, these plans follow the rubric outlined by the OECD for innovation strategies. However, Saudi Arabia, Singapore and South Korea did not discuss whether troves of data held by governments or firms can be considered a global public good.

Which Nations Use Their Data Strategies to Try to Achieve Competitive Advantage in Data and/or Data-driven Services?

Six nations discussed how their strategies for data could yield competitive advantage in data-driven services such as the cloud or AI. For example, the European Union wants to build capacity in smart objects and the Internet of Things (IoT), while Saudi Arabia and Singapore focus on AI.

Not one nation discussed immersive technologies such as augmented reality or virtual reality.

Conclusion: The Meaning of National Data Strategies

Data strategies are an important component of data governance, although such strategies are not essential. For example, Brazil, Canada, Russia and the United States, all important players in data-

Table 3: Data Strategy Comparison

Countries' Data Strategies	Achieve Economies of Scale	Data Diversity (Economies of Scope/ Data Sharing)	Trust Model	Disseminating Data Public Goods Internationally	Build Infrastructure	Increase Skills	Policies to Favour Domestic Producers	Focus on Competitive Advantage?	Encourage Open Public Data
Australia (2021)		Yes	Yes			Yes			Yes
China (2006–2020 National Informatization Development Strategy and 2021–2025 14th Five-Year Plan for National Informatization)	Yes	Yes			Yes	Yes		Yes	
European Union (2014, 2017 and 2020)	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Germany (2021)		Yes	Yes		Yes	Yes	Yes		Yes
Japan (2017 and 2021)		Yes	Yes		Yes	Yes	Yes	Yes	Yes
Saudi Arabia (2020)					Yes	Yes	Yes	Yes	Goal but vague on how
Singapore (2018, 2021)			Yes			Yes		Yes	Yes
South Korea (2021)		Yes			Yes	Yes		Yes	Yes
Switzerland (2020)		Yes	Yes	Yes	Yes	Yes	Yes		Yes
United Kingdom (2020)			Yes	Yes		Yes			Yes
Totals	2	7	7	2	7	10	5	6	8

Data sources: Australian Government (2021a); Chinese Communist Party (CCP) Central Committee General Office and State Council General Office (2006); State Council (2021); <https://digital-strategy.ec.europa.eu/en/policies/strategy-data>; Federal Government of Germany (2021); Government of Japan (2017; 2021b); Kingdom of Saudi Arabia (2020); www.smartnation.gov.sg/about-smart-nation/transforming-singapore; Smart Nation and the Digital Government Office (2018); <https://digital.go.kr/front/main/eng.do>; The Federal Council (2020); Department for Digital, Culture, Media & Sport (2020).

Table 4: Elements of Innovation Strategy and National Data Strategy

Countries' Data Strategies	Empower People to Innovate (Capacity Building)	Unleashing Innovation in Firms	Creating and Applying Knowledge	Applying Innovation to Address Global and Social Challenges	Improving the Governance of Policies for Innovation (in Particular Data Governance)
Australia (2021)	Yes	Yes	Yes	Yes	Yes
China (2006–2020 National Informatization Development Strategy and 2021–2025 14th Five-Year Plan for National Informatization)	Yes	Yes	Yes	Yes	Yes
European Union (2014, 2017 and 2020)	Yes	Yes	Yes	Yes	Yes
Germany (2021)	Yes	Yes	Yes	Yes	Yes
Japan (2017 and 2021)	Yes	Yes	Yes	Yes	Yes
Saudi Arabia (2020)	Yes	Yes	Yes	No	Yes but vague
Singapore (2018 and 2021)	Yes	Yes	Yes	No	Yes
South Korea (2021)	Yes	Yes	Yes	No	Yes
Switzerland (2020)	Yes	Yes	Yes	Yes	Yes
United Kingdom (2020)	Yes	Yes	Yes	Yes	Yes
Totals	10	10	10	7	10

Data sources: Ibid.

Note: In cases where countries issued two plans, the table summarizes both (as in China, Japan and Singapore).

driven sectors with significant digital prowess, have not put forward a broad vision of data's role in the economy and polity.¹⁴ This paper cannot solve “the case of the missing data strategies.” But it can illuminate what the 10 nations in the sample seek to achieve with their data strategies.

These nations present complementary yet distinct visions of their data-driven future. Policy makers want to ensure that their nation's economy and polity can use data effectively and prosper. Some, such as Singapore and Saudi Arabia, have a regional growth focus, while others, such as

the United Kingdom, are more focused on the global digital economy. Still others want to create cutting-edge data economies. For example, while South Korea aims to build a “leading edge digital economy,”¹⁵ and the United Kingdom will be “world leading,”¹⁶ Saudi Arabia plans to use its money and its position in the Middle East as a means of building a future with data.

These data strategies are innovation strategies as they present priorities for government action

¹⁴ Meanwhile, other nations such as Vietnam and South Africa are debating such vision statements. See, for example, Republic of South Africa (2021).

¹⁵ See <https://digital.go.kr/front/main/eng.do#news> and <https://digital.go.kr/resources/UPLOAD//2021/07/09/125/cbc29d4f-f3a6-43fb-834b-9c55517c310b.jpeg>.

¹⁶ See www.gov.uk/guidance/national-data-strategy.

on data-driven innovation. They also fit Porter's conception of how nations sought to achieve competitive advantage fits these plans. Porter argued that competitive advantage is a moving target, and policy makers must take a systemic approach. At the same time, governments must act as a catalyst and challenger. These visions show that 10 nations clearly take that role of catalyst seriously. Some plans are essentially a road map (here is where we will go and when we will arrive), while others are a promise that government officials will both empower their citizens with data and protect their personal data (for example, the European Union). Yet, as Table 3 reveals, some governments promise to favour specific firms or sectors rather than adopt a systemic approach. Policy makers may want to delineate those sectors where they plan to make a mark.

Data strategies are a form of signalling to constituents, firms and foreign investors that policy makers have a vision for where they should direct resources, energy and public attention regarding the data-driven economy. Yet these visions also underscore that these policy makers do not completely understand the complicated role of data in the economy. Every one of the 10 plans highlights data's potential as a commercial asset rather than as a global public good. The German and Swiss plans are a notable exception. To ensure that the public good nature of data can be realized, policy makers, especially those who work on development, should encourage a greater focus on capacity building, open source and data sharing among nations. The United Nations (2020, para. 22) notes "the utilization of big data and artificial intelligence to create 'digital public goods in the form of actionable real-time and predictive insights' is critical for all stakeholders, including the United Nations, as they can serve to identify new disease outbreaks, counter xenophobia and disinformation and measure impacts on vulnerable populations, among other relevant challenges." While it is understandable that a national strategy on data would focus on national needs, national needs are

also served by viewing data as a public good and by creating shared open-source information.¹⁷

Many of the policy makers strategizing about data understand that they cannot succeed in building a data-driven economy without facilitating trust among online actors (World Bank 2021; Aaronson 2021). Policy makers and users make decisions under conditions of uncertainty and incomplete information (Asquer and Krachkovskaya 2020). For this reason, the data-driven future may be hard to predict. Nonetheless, fortune may favour those nations that frequently rethink their strategies in light of data-driven change. As former US President Dwight D. Eisenhower (1957, 818) noted, "Plans are worthless, but planning is everything."

Author's Note

The author is grateful to attendees at the Ostrom Workshop, Indiana University; Marc Froese, Burman University; anonymous peer reviewers at CIGI; and colleagues at the Digital Trade & Data Governance Hub for helpful comments.

17 For example, open-source code may be easier to hack than proprietary codes. But groups have worked to help software developers disclose vulnerabilities and coordinate with organizations that depend on their code, a scorecard that can automatically assess a software project's security posture, a framework for building anti-tampering protections into code and a service that issues security certificates to help developers prove their software updates are authentic. See Bertucio, Robinson and Wheeler (2021) and Geller (2022).

Annex: Country-Specific Analysis

Australia: Trust, Data Sharing and Enhancing Human Welfare

Australia's data strategy is designed to create trust and empower business to use and share data.¹⁸ The strategy notes that "data is critically important to building a modern digital economy and delivering better outcomes for Australians.... The Data Strategy will outline a clear vision for maximising data-driven innovation across the economy by improving access to data, data sharing arrangements, data asset management and strengthening collaboration between government and business." (Australian Government 2021b). To meet these goals, the government plans to improve access to data, create data-sharing arrangements, illuminate how to best manage data and strengthen collaboration between government and business.

Australia provides a helpful example of how democracies use consultation to build trust.¹⁹ The draft strategy notes that "Australians must feel comfortable their Government respects and secures their data appropriately" (Australian Government 2021a). To build trust, the government could "identify how the Consumer Data Right and supporting institutions could be further leveraged to build a data-driven economy" (Australian Government 2021b, 1). The government stresses that because the data economy and many platforms are global, the government's efforts to build the data-driven economy must be global; hence, Australia plans to "expand international engagement to export Australia's leading data portability framework, and promote an interoperable and rules-based approach to international consumer data portability frameworks and provide offshore opportunities for Australian technology companies to scale globally" (ibid., 2). In sum, Australia's focus is on building a trust environment for data, encouraging data sharing and enhancing human welfare by empowering users.

18 See <https://digitaleconomy.pmc.gov.au/fact-sheets/data-and-digital-economy>.

19 See Australian Government (2021a).

China: Data as a Factor of Production, Linking Digital and Real-World Economies, Ensuring Government Control over Most Data

China is a nation of planners, and Chinese officials have issued several strategies for and about data in recent years. Data is a key component in China's most recent five-year plan, issued in 2021. The five-year plans describe how the CCP sees China's future.²⁰

The five-year plan is not the only venue where Chinese officials focused on data's role in the economy and polity. In 2006, the government issued an informatization strategy where it promised to "accelerate the process of constructing a legal system for informatization" (CCP Central Committee and State Council 2006), including revising laws and regulations for information infrastructure, IP, information security, open government innovation and the protection of personal data. The government also promised to "vigorously participate in the research and formulation of related international norms" (ibid.). More recently, officials described data as a factor of production.²¹ In addition, China put forward a major data strategy in 2015.²² In its 13th Five-Year Plan (2016–2021), the government promised to "accelerate the integration of digital and real economies" (State Council 2021). This plan was designed to: expand the cyber-economic space; establish a widely efficient information network; develop the modern internet industrial system; implement the national big data strategy; and strengthen information security (US-China Business Council 2016).

China's most recent Five-Year Plan (2021) provides important insights into the government's complicated views about the data-driven economy. It states, "We will welcome the digital age, activate the potential of data factors of production, promote the construction of a cyber powerhouse, accelerate the construction of a digital economy, digital society, and digital government, and leverage digital transformations to drive overall changes in production methods, lifestyles, and governance."

20 See US-China Business Council (2020).

21 See CCP Central Committee (2019).

22 See State Council (2015) and (2016a). Also see State Council (2016b).

We will give full play to the advantages of massive data” (CSET 2021, 26). The plan then delineates key digital sectors that the government will focus on such as cloud computing and virtual reality.

The plan reflects lessons officials learned from other governments regarding data sharing and data protection. China will “deepen the sharing and utilization of basic information resources such as national demographic, legal person, and geospatial information. We will expand the safe and orderly opening of basic public information and data,...build a unified national public data open platform and development and utilization ports and prioritize and promote the opening to society of high-value data sets” (ibid., art. 17, sec. 1). The plan mentions the import of building infrastructure, noting that the government will “accelerate the construction of a national integrated big data center system, strengthen the overall smart scheduling of computing power, build several national hub nodes and big data center clusters,” and build large supercomputing centres (ibid., art. 6, sec. 2).

But it also reveals that Chinese policy makers seem threatened by the power of China’s giant data firms.²³ China’s huge platforms have global reach, huge financial resources, massive amounts of consumer data and dominance in a growing range of business activities. Moreover, these firms likely know more about Chinese consumers than the CCP. Finally, because these firms control that data, the Party has potentially less control over these consumers/citizens unless it can demand that the platforms share it with the government (Wei 2021; Bloomberg News 2021). The plan states: “We will strengthen the economic supervision of internet platforms in accordance with laws and regulations, clarify platform enterprise positioning and regulatory rules, improve the laws and regulations concerning the identification of monopolies, and crack down on monopolies and unfair competition” (ibid., art. 8, sec. 2, 43–44).

The plan frequently mentions China’s future ambition to be a science and technology powerhouse. “We will deeply implement the strategy of reinvigorating China through science and education, the talent powerhouse strategy, and the innovation-driven development strategy, refine the national innovation system,

and speed up the effort to make China into an S&T powerhouse” (ibid., art. 4, sec. 1, 11–12).

Although China’s approach has much in common with other countries, the author’s analysis found three areas where the Chinese approach differed from Western data strategies. Chinese documents never mention the global economy, global markets or the need for shared rules. These strategies do not bring up ethical issues associated with data, despite the establishment of data protection laws and regulations. Finally, these plans do not mention trust.²⁴

Some analysts have argued that China’s vision does not mention trust because trust plays a different function in China. According to one analysis, in China, the primary function of trust is to protect and establish feelings of safety. In Western democracies, individuals use trust to test where there is ground for future opportunities (De Cremer 2015). Yet levels of trust in the government have declined significantly in China over the previous year (Edelman 2021, 11, 44). Moreover, while the translations do not mention trust, China’s focus on establishing laws to limit misuse of personal data by firms (the government is exempt) may give its citizens the perception that the government is a trustworthy controller of both personal and public data.²⁵

The European Union: Trust and Building Competitive Advantage

The European Union has put forward a data strategy designed to both build trust among data sources, users and controllers and facilitate competitive advantage in data. As early as 2014, EU officials recognized that they needed to find ways to allow data to flow freely among the many states of Europe, with their different levels of digital prowess, different languages and different economic cultures.²⁶ The European Commission adopted communications on the data-driven economy in 2014 and in 2017. These were strategy documents, addressing issues such as the free flow of data across borders and data localization restrictions, as well as emerging legal

23 For a timeline, see <https://supchina.com/big-tech-crackdown-timeline/>.

24 Author’s review of the plans and a discussion email with Henry Gao, January 4, 2022.

25 See, for example, the China Law Translate (2022) translation of China’s regulations on the use of algorithmic recommendations.

26 See European Commission (n.d.).

issues in the context of new data technologies (for example, access, liability, portability), including access to and transfer of non-personal machine-generated data; data liability; and portability of non-personal data, interoperability and standards (European Commission 2018).

In 2020, the commission issued a fuller data strategy focused on data sharing and trust. The strategy highlights Europe's history as a centre of human-rights-oriented governance. The European Union describes it as putting people first when developing technology and states that the plan is designed to facilitate a transformation built on data, "that works for all, reflecting the best of Europe: open, fair, diverse, democratic and confident. It... put(s) people first, opens up new opportunities for businesses, and boosts the development of trustworthy technology to foster an open and democratic society and a vibrant and sustainable economy" (European Commission 2020a). The European Union stresses that the strategy will create "a single market for data [that] will make the EU more competitive globally and will enable more innovative process, products and services...while keeping those who generate the data in control" (European Commission 2020b). European rules for privacy and data protection, as well as competition law, are fully respected and "the rules for access and use of data are fair, practical and clear" (ibid.).

The European Union is especially focused on the industrial IoT, noting that European firms will be processing and sourcing more data from smart connected objects. The strategy also discusses the need to train data professionals and equip the EU citizenry with basic digital skills (ibid.).

The European Union coupled the strategy with a proposed regulation on data sharing among business and governmental entities. It plans to create a "personal data-sharing intermediary," that can help individuals exercise their rights under the General Data Protection Regulation, while allowing data use on altruistic grounds (European Commission 2020c). In so doing, the European Union promises to facilitate data sharing of many different types of data, while protecting data that might be subject to data protection legislation, IP, or contain trade secrets or other commercially sensitive information. The regulation will empower users to stay in control of

their data and encourage the creation of common European data spaces in crucial sectors.²⁷

Germany: Trust, Data Sharing, Data Competency and Leadership in Data Use

Germany put forward a data strategy in 2021 that is people, commerce and good governance oriented. The architects of the strategy hoped to "ensure that we...can both [add] value...[and] improve the lives of everyone."²⁸ Germany's data strategy has four key components: it focuses on data infrastructure such as cloud, quantum and high-performance computing; articulates a framework to ensure that more data can be used and shared responsibly while also preventing any misuse of data; builds digital skills and establishes a data culture (data competency); and, finally, makes Germany a world leader in data use. To achieve that last goal, the government admits it will have to adapt — and build new institutional structures (Federal Government of Germany 2021). German policy makers also aim to empower users: "We want to support informed and sovereign handling of data by citizens of all age groups through various formal and informal educational opportunities. We also want to... train citizens to become experts" (ibid., 39).

Germany's data strategy is easy for both citizens and experts to understand. Each chapter of the strategy considers three questions: where do we stand; what do we want to achieve; and how do we want to achieve this (how will efforts be measured).

Germany's plan is not only unusual because it is easy to understand. First, it discusses openness, cooperation and digital protectionism: "we will also work to ensure that the European Union remains the world's most open region for trade and investment in the digital age, supporting international cooperation on ambitious obligations relating to the free movement of data and countering digital protectionism" (ibid., 25). Second, it focuses on data as a global public good: "We will treat data sharing as a global public good and common good with Africa and Asia" (ibid., 34, 53). Third, the vision examines the role of one kind of IP protection, trade secrets, in preventing data

²⁷ See <https://digital-strategy.ec.europa.eu/en/policies/strategy-data>.

²⁸ See www.bundesregierung.de/breg-en/news/data-strategy-adapted-1845882.

sharing, reducing competition and potentially favouring the creation of monopolies (ibid., 21). Firms can use trade secrets to protect their algorithms and then they obtain control of any data they analyze with such algorithms. Hence, Germany is arguing for greater amounts of data to be viewed as a digital public good that should be shared openly while protecting privacy. Finally, the vision states that governance must change: “we need to create new processes, standards, roles and institutions that facilitate data-based and evidence-based governance for the good of society” (ibid., 47, 54). For example, “we will gradually equip all legislative experts with the ability to enact digital-compatible laws. In the meantime, we will perform digital feasibility checks on new draft laws” (ibid., 55). In so doing, German officials hope to model responsible use of data.

Japan: Data to Enrich People, Data Sharing and Performance Requirements

Japan has put forward several visions for its future built on data beginning in 2013.²⁹ In 2013, it promised it would become the world’s most advanced IT nation. In that declaration, Japan said it would build a model of a society in which people are enriched by data (Government of Japan 2013b). The government stated that to achieve that goal, it would facilitate public and private sector data utilization, open data and data sharing. The plan also talked about building skills, ensuring consistency in governance, and improving governance so that as the Japanese population aged, and with low birthrates, it could continue to flourish (ibid., 10–12, 13).

In December 2020, Japan issued its first data strategy. Like its digital trade strategy, it is focused on trust: “We aim to realize a sustainable human society. It is the human-centric society that creates new value by achieving both economic development and solving social issues....Our society values trust and safety” (Government of Japan 2021a). The planners believe that trust would be fostered by open data, open government, trust-based systems, evidence-based policy making, and diverse and high-quality data (ibid., 3, 6, 10). The plan is designed to shape the common rules necessary for data coordination; develop norms that facilitate data flows and eliminate

barriers to those flows; construct data platforms and create data markets. The plan noted that the government would set an example: “The Government is the largest data holder in Japan, and its systems and actions will have a significant impact on Japan’s society, economy and industries. The Government plays a role as ‘a platform of platforms’ in the digital society” (ibid., 6).

Like the other plans discussed herein, Japanese policy makers are also focused on infrastructure and digital capacity building (ibid., 21–22). But its approach is confusing. On one hand, the government pledged to build a shared approach to data free flow with trust — as suggested by Prime Minister Shinzo Abe in 2019. He proposed no barriers to the flow of medical, industrial, traffic and non-personal, anonymous data (ibid., 22).³⁰ However, in June 2021, the government issued its Strategy for Semiconductors and the Digital Industry. The strategy reflects Japanese concerns about being caught between China and the United States. “In order to ensure Japan remains strategically essential and strategically independent amid the conflict for technological hegemony between the U.S. and China” (Government of Japan 2021b), the government consolidated Japanese digital business. The strategy also called for encouraging “data centers to be located in Japan and aim to make it Asia’s core data center base,” and to foster cloud players that are based in Japan (ibid.). Hence, Japan wants to promote free flow with trust but simultaneously practise server localization, and nurture local cloud players. In short, Japan wants to achieve competitive advantage through both openness and protectionism.

Saudi Arabia: Competitive Advantage through “Testbeds”

The Kingdom of Saudi Arabia’s vision for data and AI was issued in 2020; it seems drafted to reassure Saudi citizens that the government understands its future will not be built on oil alone. The government admits it issued the strategy “to capitalize on Data & AI for the Kingdom economically and socially through national combined efforts by all stakeholders” (Kingdom of Saudi Arabia 2020). The plan asserts that the

29 See Government of Japan (2013a).

30 Abe invited leaders to develop shared norms and rules to govern the free flow of non-personal data across borders in a speech on January 19, 2019, in Davos, Switzerland. See Abe (2019).

kingdom is a young and vibrant country and it has smart cities that can serve as testbeds. It also notes the kingdom's centrality to the Arabic-speaking populace and countries that surround it (ibid.). With these arguments, the data strategy seems centred on seeking competitive advantage.

The kingdom plans “one single source of truth for all government data, centrally managed cloud platform for all government entities and whole-government analytics and AI platform” (ibid., 12). The government plans to upgrade skills, be a friendly environment for foreign investors, fund AI projects, and open government data by default by 2025. The plan notes that this will require legislative changes but is vague about what that entails. “In policies and regulations, NDMO [National Data Management Office] is developing a number of regulatory frameworks including topics such as data privacy and freedom of information” (ibid., 14). While the plan is vague about how the country will protect these human rights associated with data, the plan has a timetable for what the Saudi government hopes to achieve with data: “By 2030, we aim to achieve: ~40% of the total workforce trained on basic Data & AI literacy skills’ ~5K Data & AI experts; Top 10 countries in Open data index; Top 20 countries in peer reviewed Data & AI publications; and ~300 Data & AI startups” (ibid., 28). The plan never states how the kingdom can achieve these metrics. Finally, the plan is silent about how the Saudis will create trust in data and AI.

Singapore: Smart Nation Is Focused on Skills, Infrastructure and Competitive Advantage

Singapore was one of the first nations to put forward a vision of how data would drive its economy and society. In 2014, then Prime Minister Lee Hsien Loong announced the Smart Nation plan, “where people will be more empowered to live meaningful and fulfilled lives, enabled seamlessly by technology, offering exciting opportunities for all. It is where businesses can be more productive and seize new opportunities in the digital economy” (Smart Nation and the Digital Government Office 2018, 1). “Singapore is pursuing its smart nation strategy to protect its technology and growth prospects in the region.”³¹ Thus, it can be described as a vision focused on

achieving competitive advantage with a regional growth focus. The government updated the plan in 2018 and data governance is a key component. The country aims to “continually up-skill, re-skill and raise the digital capabilities of the workforce”; encourage “firms to innovate and leverage intellectual property for competitive advantage, harnessing the capabilities in...[the] research and innovation community”; update policy and regulations, to ensure that the environment for data innovation “is globally competitive in a digital world”; and update infrastructure (ibid., 12).

The Smart Nation plan addresses the need for new approaches to governing and using data: “Data is a key resource in Smart Nation. It will enable our businesses to grow and create new business opportunities, and allow Government to have more informed policymaking, service delivery and operations” (ibid., 18). The government plans to “maximize the value of data in a trusted environment” by encouraging data sharing among government institutions; it will scale up data collaboration efforts, which allow companies to share data securely and access data analytics tools.” In so doing, the government believes it can foster trust among users and providers (ibid., 18–19).

The plan also focused on infrastructure and skill training by promoting an innovation culture. Singapore wants to encourage various means of citizen engagement in the Smart Nation plan. Government officials emphasize that a smart nation is not built by government, but by everyone — citizens, companies and agencies — and they have established several portals to do so.³²

South Korea: Jump-starting Digitalization, Promoting Data Sharing through a Data Dam

South Korean President Moon Jae-in saw opportunity in the pandemic. In June 2020, the Moon administration took a page from Depression-era US President Franklin Roosevelt and announced the Digital New Deal. Moon (2020a) stated, “We are pursuing the Digital New Deal to spearhead a forward-looking innovative economy. We will push ahead with the accelerated transition to a digital economy by extensively digitalizing the national infrastructure while fostering the

31 See <https://aiforgood.itu.int/singapores-data-strategy-targets-regional-growth/>.

32 Ibid.; on portals, see Smart Nation and Digital Government Office (2018, 33).

D.N.A (data, network and AI) ecosystem and non-face-to-face industries.” The Digital New Deal has four components: accelerating the digitalization of industries; expanding digital infrastructure and capacity; making people’s lives safer through smart cities/logistics; and actively nurturing contactless services.³³ Specifically, the plan will promote the collection, sharing and use of data; establish a digital education infrastructure and smart caregiving and health infrastructure; and encourage digital innovation and smart logistics, among other goals.³⁴

The Digital New Deal includes a new platform called a “data dam.” According to President Moon (2020b), “This data dam will amass data generated through our public and private networks. Currently, raw data collected in this way cannot be utilized as it is; we need to standardize and combine the data in order to process it. In addition, we have to generate de-identified data — with personal information sorted out as a safeguard. The more this data is utilized through such a process, the smarter artificial intelligence will become.” So the data dam is designed to standardize and de-identify data, creating a trustworthy process and platform. But the translations of the plan never mention building trust. Nonetheless, the Korean government states that because of its approach to data sharing and anonymization with the data dam, its projects “will become the global golden standard” (PR Newswire 2021).

Switzerland: An International and Trust Focus

The Digital Switzerland strategy provides the guidelines for government action on digitalization and is binding on the federal administration. It is based on four principles and objectives. It is focused on empowering people, providing room for development, enabling structural change, and working domestically and internationally. The plan is designed to guarantee security, trust and transparency while continuing to strengthen people’s digital empowerment and self-determination.³⁵ Like other plans, the strategy aims to build skills and infrastructure,

improve online security and increase political participation in decisions about data.³⁶

The plan notes that Switzerland will constantly monitor whether its legislation and the international agreements for the data economy are optimally designed: “Switzerland is developing an internationally coordinated data policy, which among other things covers issues of data sovereignty, access to government data, international data traffic, regulation of competition intellectual property, data protection and handling localization guidelines.”³⁷ In this regard, the government is updating its personal data protection laws and examining how to facilitate data portability and creating trustworthy data spaces.³⁸ Finally, the country is examining whether “data sovereignty can be improved and dependence on the large international public cloud service providers can be minimised in the medium to long term.”³⁹

United Kingdom: A Domestic and International Focus

According to the UK government, the aim of the National Data Strategy (NDS) is “to drive the UK in building a world-leading data economy while ensuring public trust in data use.”⁴⁰ The government wants to build trust, ensure easy data access, increase data capability and promote effective cooperation (Department for Digital, Culture, Media & Sport 2020).

The United Kingdom hopes that data can help transform the country in five ways: by boosting productivity and trade; supporting new business and jobs; improving scientific

33 See <https://digital.go.kr/resources/UPLOAD//2021/07/09/125/cbc29d4f3a6-43fb-834b-9c55517c310b.jpeg>.

34 Ibid.

35 See www.digitaldialog.swiss/en/.

36 See www.digitaldialog.swiss/en/objectives/the-public-service-in-the-media-sphere-promotes-political-participation-and-strengthens-democracy; www.digitaldialog.swiss/en/objectives/the-opportunities-of-digitalisation-will-be-used-to-increase-security and www.digitaldialog.swiss/en/objectives/new-technologies-are-used-to-strengthen-political-participation-by-the-population-and-businesses.

37 See www.digitaldialog.swiss/en/objectives/switzerland-has-a-modern-coherent-legal-foundation-in-terms-of-the-rights-to-data-and-its-use.

38 See www.digitaldialog.swiss/en/objectives/switzerland-has-a-modern-coherent-legal-foundation-in-terms-of-the-rights-to-data-and-its-use and www.digitaldialog.swiss/en/objectives/switzerland-has-trustworthy-data-spaces-in-which-residents-can-exercise-control-over-their-own-data.

39 See www.digitaldialog.swiss/en/objectives/access-to-digital-content-is-improved and www.digitaldialog.swiss/en/objectives/the-need-for-a-swiss-cloud-and-its-feasibility-have-been-examined.

40 See www.gov.uk/government/publications/uk-national-data-strategy.

research; delivering better policy and public services; and creating a fairer society for all. Business people should be empowered to choose whether and how to share data in both the public and private sectors, including where the use of their data can help others.

The plan is unique in its focus on helping civil society as well as individual citizens to benefit: “Powered by better data, civil society organizations can be better equipped to reach the people most in need, at the time they most need it. Better data use could also significantly decrease operating costs, allowing charities to focus resources on protecting the most vulnerable parts of our society” (ibid., sec. 2.5).

The government established four pillars to realize the data economy: improving the quality of data; improving education in data skills; ensuring data is available, shared and appropriately protected across borders; and ensuring that data is used responsibly, in a way that is lawful, secure, fair and ethical, sustainable and accountable, while supporting innovation and research (ibid., sec. 2.6).

The United Kingdom is determined to create a flexible data regime that provides both regulatory certainty and high data protection standards: “We will seek EU ‘data adequacy’ to maintain the free flow of personal data from the EEA, and we will pursue UK ‘data adequacy’ with global partners to promote the free flow of data to and from the UK and ensure that it will be properly protected” (ibid., mission 2). The government seems committed to interoperable solutions to data governance internationally (ibid., sec. 4.2).

Like the Swiss plan, the UK Data Strategy has a strong international focus. The United Kingdom pledges to support open data; use big data to help in development; and work with international agencies such as the Red Cross and the United Nations to ensure data on crisis affected areas is handled safely, legally and ethically (ibid., sec. 6.3.3).

Works Cited

- Aaronson, Susan, Thomas Struett and Adam Zable. 2021. *DataGovHub Paradigm for a Comprehensive Approach to Data Governance*. October. Washington, DC: Digital Trade & Data Governance Hub, The George Washington University. <https://datagovhub.letsnod.com/images/comprehensive-approach-to-data-governance-02-02-22.pdf>.
- Aaronson, Susan Ariel. 2021. *Listening to Users and Other Ideas for Building Trust in Digital Trade*. CIGI Paper No. 258. Waterloo, ON: CIGI. www.cigionline.org/publications/listening-to-users-and-other-ideas-for-building-trust-in-digital-trade/.
- Abe, Shinzo. 2019. "Toward a New Era of 'Hope-Driven Economy.'" Speech by Prime Minister Abe at the World Economic Forum Annual Meeting, January 23. www.mofa.go.jp/ecm/ec/page4e_000973.html.
- Acemoglu, Daron. 2021. "Harms of AI." NBER Working Paper 29247, September. www.nber.org/papers/w29247.
- Acemoglu, Daron, Ali Makhdomi, Azarakhsh Malekian and Asu Ozdaglar. 2019. "Too Much Data: Prices and Inefficiencies in Data Markets." NBER Working Paper 26296, September. www.nber.org/papers/w26296.
- Artz, Donovan and Yolanda Gil. 2007. "A survey of trust in computer science and the Semantic Web." *Journal of Web Semantics* 5 (2): 58–71.
- Asquer, Alberto and Inna Krachkovskaya. 2020. "Uncertainty, institutions and regulatory responses to emerging technologies: CRISPR Gene editing in the US and the EU (2012–2019)." *Regulation and Governance* 15 (4): 1111–27.
- Australian Government. 2021a. "Australian Data Strategy." Discussion Paper. July. www.sydney.edu.au/content/dam/corporate/documents/about-us/governance-and-structure/university-policies/2021/australian-data-strategy-discussion-paper-july-2021.pdf.
- . 2021b. "Data and the Digital Economy." Fact Sheet. May 6. <https://digitaleconomy.pmc.gov.au/sites/default/files/2021-05/digital-economy-strategy-fact-sheet-data-and-the-digital-economy.pdf>.
- Auxier, Brooke, Lee Rainie, Monica Anderson, Andrew Perrin, Madhu Kumar and Erica Turner. 2019. *Americans and Privacy: Concerned, Confused and Feeling Lack of Control Over Their Personal Information*. Pew Research Center, November 15. www.pewresearch.org/internet/2019/11/15/americans-and-privacy-concerned-confused-and-feelinglack-of-control-over-their-personal-information/.
- Benfeldt Nielsen, Olivia. 2017. "A Comprehensive Review of Data Governance Literature." *Selected Papers of the IRIS* 8 (3): 120–33. <https://aisel.aisnet.org/iris2017/3>.
- Bertucio, Anne, Christopher Robinson and David Wheeler. 2021. "Announcing the OpenSSF Vulnerability Disclosure WG guide to disclosure for OSS projects." *OpenSSF* (blog), September 27. <https://openssf.org/blog/2021/09/27/announcing-the-openssf-vulnerability-disclosure-wg-guide-to-disclosure-for-oss-projects/>.
- Bloomberg News. 2021. "China's Didi crackdown is all about controlling data." July 8. www.bloomberg.com/news/features/2021-07-08/-didi-crackdown-big-data-is-the-latest-u-s-china-battleground?sref=aK56ygyx.
- Bryson, John, Frances S. Berry and Kaifeng Yang. 2010. "The State of Public Strategic Management Research: A Selective Literature Review and Set of Future Directions." *American Review of Public Administration* 40 (3): 495–521.
- Bryson, John, Lauren Hamilton Edwards and David M. Van Slyke. 2018. "Getting strategic about strategic planning research." *Public Management Review* 20 (3): 317–39. doi:10.1080/14719037.2017.12851.
- Carrière-Swallow, Yan and Vikram Haksar. 2019. *The Economics and Implications of Data: An Integrated Perspective*. Washington, DC: International Monetary Fund. www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2019/09/20/The-Economics-and-Implications-of-Data-An-Integrated-Perspective-48596.
- CCP Central Committee. 2019. "Decision of the Central Committee of the Communist Party of China on Several Major Issues Concerning Adhering to and Improving the Socialist System with Chinese Characteristics and Promoting the Modernization of the National Governance System and Governance Capability." Fourth Plenary Session of the 19th Central Committee of the Communist Party of China, October 31. www.12371.cn/2019/11/05/ART11572948516253457.shtm.
- CCP Central Committee General Office and State Council General Office. 2006. "Notice concerning Printing and Issuing the '2006–2020 National Informatization Development Strategy.'" ZBF No. (2006)11. March 6. Translated by Rogier Creemers, University of Leiden. <https://digichina.stanford.edu/work/2006-2020-national-informatization-development-strategy/>.
- Centre for Data Ethics and Innovation. 2021. *Trust in Data*. December 15. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1049179/Trust_In_Data_-_Publishable_Report__1.pdf.

- Chakrovorthi, Bhaskar. 2018. "Trust in Digital Technology Will Be the Internet's Next Frontier, for 2018 and Beyond." *The Conversation*, January 3.
- China Law Translate. 2022. "Provisions on the Management of Algorithmic Recommendations in Internet Information Services." January 4. www.chinalawtranslate.com/en/algorithms/.
- CIGI and Ipsos. 2019. "2019 CIGI-Ipsos Global Survey on Internet Security and Trust: Part 1 & 2: Internet Security, Online Privacy & Trust." www.cigionline.org/internet-survey-2019.
- CSET. 2021. "Translation: Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035." May 13. https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf.
- Deardorff, Alan. 2017. "Comparative Advantage in Digital Trade." Discussion Paper No. 664. www.fordschool.umich.edu/rsie/workingpapers/Papers651-675/r664.pdf.
- De Cremer, David. 2015. "Understanding Trust, In China and the West." *Harvard Business Review*, February 11. <https://hbr.org/2015/02/understanding-trust-in-china-and-the-west>.
- Department for Digital, Culture, Media & Sport. 2020. "National Data Strategy." Policy Paper. December 9. www.gov.uk/government/publications/uk-national-data-strategy/national-data-strategy#about-the-national-data-strategy.
- Doyle, Arthur Conan. 1892. "The Adventure of the Copper Beeches." In *The Adventures of Sherlock Holmes*. London, UK: Edwards Publishing House.
- Edelman. 2021. "Edelman Trust Barometer 2021." www.edelman.com/sites/g/files/aatuss191/files/2021-03/2021%20Edelman%20Trust%20Barometer.pdf.
- Eisenhower, Dwight D. 1957. "Remarks at the National Defense Executive Reserve Conference." Washington, DC, November 14. In *Public Papers of the Presidents of the United States*. Washington, DC: National Archives and Records Service, Government Printing Office.
- European Commission. n.d. "A European strategy on the data value chain." www.mtitc.government.bg/upload/docs/2014-04/Data_value_chain_strategy.pdf.
- . 2018. "Elements of the European data economy strategy 2018." April 25. <https://digital-strategy.ec.europa.eu/en/library/elements-european-data-economy-strategy-2018>.
- . 2020a. "Shaping Europe's digital future: Commission presents strategies for data and Artificial Intelligence." Press Release, February 19. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_273.
- . 2020b. "The European Data Strategy." Fact Sheet, February 19. https://ec.europa.eu/commission/presscorner/detail/en/fs_20_283.
- . 2020c. "Proposal for a Regulation of the European Parliament and of the Council on European data governance (Data Governance Act)." COM(2020) 767 final 2020/0340 (COD).
- Farboodi, Maryam, Roxana Mihet, Thomas Philippon and Laura Veldkamp. 2019. "Big Data and Firm Dynamics." *American Economic Review* 109: 38–42.
- Federal Government of Germany. 2021. "Data Strategy of the Federal German Government." January 27. www.bundesregierung.de/resource/blob/998194/1950610/fb03f669401c3953fef8245c3cc2a5bf/datenstrategie-der-bundesregierung-englisch-download-bpa-data.pdf?download=1.
- Ferrin, Donald Lee and Nicole A. Gillespie. 2009. "Cultural Differences and Universals in the Development of Trust." 22nd Annual IACM Conference Paper. June 15. doi:10.2139/ssrn.1484885.
- Fukuyama, Frank. 1996. *Trust: The Social Virtues and The Creation of Prosperity*. New York, NY: Free Press.
- G20 Leaders. 2019. "G20 Osaka Leaders' Declaration." June. www.mofa.go.jp/policy/economy/g20_summit/osaka19/en/documents/final_g20_osaka_leaders_declaration.html.
- Geller, Eric. 2022. "Lesson from Log4j: Open-source software improvements need help from feds." Politico, January 6. www.politico.com/news/2022/01/06/open-source-software-help-526676.
- Golbeck, Jennifer. 2006. "Trust on the world wide web: a survey." In *Foundations and Trends in Web Science* 1 (2): 131–97. Hanover, MA: now Publishers Inc.
- . 2009. *Computing with Social Trust*. London, UK: Springer-Verlag.
- Goldfarb, Avi and Daniel Trefler. 2018. "AI and International Trade." NBER Working Paper No. w24254. January.
- Government of Japan. 2013a. "Japan Open Data Charter Action Plan." October 29. https://japan.kantei.go.jp/policy/it/2013/1029_fulltext.pdf.

- . 2013b. "Declaration to be the World's Most Advanced IT Nation." June 14. https://japan.kantei.go.jp/policy/it/2013/0614_declaration.pdf.
- . 2017. "Declaration to be the World's Most Advanced IT Nation: Basic Plan for the Advancement of Public and Private Sector Data Utilization." May 30. https://japan.kantei.go.jp/policy/it/2017/20170530_full.pdf.
- . 2021a. "National Data Strategy." Cabinet Secretariat, Office of IT. December 2. https://cio.go.jp/sites/default/files/uploads/documents/digital/20210901_en_05.pdf.
- . 2021b. "The Strategy for Semiconductors and the Digital Industry (Summary)." www.meti.go.jp/english/press/2021/pdf/0604_005a.pdf.
- Hoekman, Bernard. 2020. "Facilitating Trade in Services." Policy Research Working Paper No. 9228. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/33710> License.
- Hoffmann, Jeanette. 2017. "Constellations of Trust and Distrust in Internet Governance." In *Trust at Risk: Implications for EU Policies and Institutions*, 85–98. Brussels, Belgium: European Commission.
- Imbrie, Andrew, Elsa B. Kania and Lorand Laskai. 2020. "The Question of Comparative Advantage in Artificial Intelligence: Enduring Strengths and Emerging Challenges for the United States." CSET Policy Brief, January. cset.georgetown.edu/wp-content/uploads/CSET-The-Question-of-Comparative-Advantage-in-Artificial-Intelligence-1.pdf.
- Jones, Charles I. and Christopher Tonetti. 2020. "Nonrivalry and the Economics of Data." *American Economic Review* 110 (9): 2819–58. <https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.20191330>.
- Kingdom of Saudi Arabia. 2020. "National Strategy for Data and AI." https://ai.sa/Brochure_NSDAI_Summit%20version_EN.pdf.
- Liu, Lizhi. 2021. "The Rise of Data Politics: Digital China and the World." *Studies in Comparative International Development* 56: 45–67. doi:10.1007/s12116-021-09319-8.
- Mayer, Jörg. 2020. "Development strategies for middle-income countries in a digital world — impacts from trade costs, data and innovation policies." Working Paper. University of Oxford, Department of International Development. www.oxfordmcd.org/publication/development-strategies-middle-income-countries-digital-world-impacts-trade-costs-data.
- Medine, David and Gayatri Murthy. 2020. "Making Data Work for the Poor: New Approaches to Data Protection and Privacy." January. Washington, DC: Consultative Group to Assist the Poor.
- Moon, Jae-in. 2020a. "Opening Remarks by President Moon Jae-in at 6th Emergency Economic Council Meeting." June 1. <https://english1.president.go.kr/Briefingspeeches/Speeches/833>.
- . 2020b. "Remarks by President Moon Jae-in During Visit to Business in Digital Economy, Korean Version of New Deal." June 18. <https://english1.president.go.kr/Briefingspeeches/Speeches/840>.
- NIST. 2021. "Trustworthy and Responsible AI." www.nist.gov/programs-projects/trustworthy-and-responsible-ai.
- OECD. 2010. "Ministerial report on the OECD Innovation Strategy: Key Findings." May. www.oecd.org/sti/45326349.pdf.
- . 2021. "Data governance: Enhancing access to and sharing of data." December 10. www.oecd.org/sti/ieconomy/enhanced-data-access.htm.
- Osborne, David and Peter Plastrik. 1997. *Banishing Bureaucracy: The Five Strategies for Reinventing Government*. Reading, MA: Addison-Wesley.
- Porter, Michael E. 1990. "The Competitive Advantage of Nations." *Harvard Business Review*, March–April. <https://hbr.org/1990/03/the-competitive-advantage-of-nations>.
- PR Newswire. 2021. "Ministry of Science and ICT rolls out Digital New Deal to leap forward into a new economy beyond COVID-19." June 15. www.prnewswire.com/news-releases/ministry-of-science-and-ict-rolls-out-digital-new-deal-to-leap-forward-into-a-new-economy-beyond-covid-19-301312248.html.
- Rahman, K. Sabeel. 2018. "Regulating Informational Infrastructure: Internet Platforms as the New Public Utilities." *Georgetown Law Technology Review* 2 (2): 234–51.
- Republic of South Africa. 2021. "Draft National Policy on Data and Cloud." www.gov.za/sites/default/files/gcis_document/202104/44389gon206.pdf.
- Rumelt, Richard. 1993. "Evaluating Business Strategy." November 28. www.researchgate.net/profile/Alberto-Malpica/post/Is_there_a_method_or_a_tool_to_qualify_a_business_strategy/attachment/59d633b079197b80779915ac/AS%3A375784532398089%401466605422920/download/1993+Evaluating+Business_Rumelt.pdf.
- Sheehan, Matt. 2019. "Much Ado About Data: How America and China Stack Up." *MarcoPolo*, July 16. <https://macropolo.org/ai-data-us-china/?rp=m>.

- Smart Nation and the Digital Government Office. 2018. "Smart Nation: The Way Forward." www.smartnation.gov.sg/files/publications/smart-nation-strategy-nov2018.pdf.
- Stanton, Brian and Theodore Jensen. 2021. "Trust and Artificial Intelligence." National Institute of Standards and Technology NISTIR 8330. https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=931087.
- State Council. 2015. "Action Plan for Promoting Big Data Development." www.gov.cn/zhengce/content/2015-09/05/content_10137.htm.
- . 2016a. "Notice of the State Council on Issuing the 'Thirteenth Five-Year' National Informatization Plan." www.gov.cn/zhengce/content/2016-12/27/content_5153411.htm.
- . 2016b. "State Council releases five-year plan on informatization." News Release, December 27. http://english.www.gov.cn/policies/latest_releases/2016/12/27/content_281475526646686.htm.
- . 2021. "Five-year plan to speed up integration of digital, real economies." News Release, December 1. http://english.www.gov.cn/statecouncil/ministries/202112/01/content_WS61a6d009c6d0df57f98e5da0.html.
- Tama, Jordan. 2017. "The politics of strategy: Why government agencies conduct major strategic reviews." *Journal of Public Policy* 37 (1): 27–54. doi: 10.1017/S0143814X15000148.
- Tambe, Prasanna, Lorin Hitt, Daniel Rock and Erik Brynjolfsson. 2020. "Digital Capital and Superstar Firms." NBER Working Paper No. 28285, December.
- The Economist*. 2017. "The world's most valuable resource is no longer oil, but data." *The Economist*, May 6. www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data.
- The Economist Intelligence Unit. 2021. "Democracy Index 2021." www.eiu.com/n/campaigns/democracy-index-2021/?utm_source=eiw-website&utm_medium=blog&utm_campaign=democracy-index-2021.
- The Federal Council. 2020. "New priorities for digital Switzerland." Press Release, September 11. www.admin.ch/gov/en/start/documentation/media-releases.msg-id-80379.html.
- The White House. 2022. "FACT SHEET: United States and 60 Global Partners Launch Declaration for the Future of the Internet." April 22. www.whitehouse.gov/briefing-room/statements-releases/2022/04/28/fact-sheet-united-states-and-60-global-partners-launch-declaration-for-the-future-of-the-internet/.
- UNCTAD. 2019. *Value Creation and Capture: Implications for Developing Countries*. Digital Economy Report 2019. New York, NY: United Nations. https://unctad.org/system/files/official-document/der2019_en.pdf.
- . 2021. *Cross-border data flows and development: For whom the data flow*. Digital Economy Report 2021. New York, NY: United Nations. https://unctad.org/system/files/official-document/der2021_en.pdf.
- United Nations. 2020. "Road map for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation." Report of the Secretary-General. A/74/821. <https://undocs.org/A/74/821>.
- US-China Business Council. 2016. "Outline of the PRC 13th Five-Year Plan (FYP, 2016-2020) on National Economic and Social Development." www.uschina.org/sites/default/files/Outline%20of%20the%20PRC%2013th%20Five-Year%20Plan%20%28FYP%202016-2020%29.pdf.
- . 2020. "Chinese Government Agency 2020 Work Priorities and Plans." June. www.uschina.org/sites/default/files/chinese_government_agency_2020_work_priorities_and_plans.pdf.
- Van der Marel, Erik. 2012. "Determinants of Comparative Advantage in Services." FIW Working Paper No. 87.
- Veldkamp, Laura and Cindy Chung. 2019. "Data and the Aggregate Economy." Working Paper, Columbia University.
- Wei, Lingling. 2021. "Chinese regulators try to get Jack Ma's Ant Group to share consumer data." *The Wall Street Journal*, January 5. www.wsj.com/articles/chinese-regulators-try-to-get-jack-mas-ant-group-to-share-consumer-data-116f09878816?mod=article_inline/.
- World Bank. 2021. *World Development Report: Data for Better Lives*. Washington, DC: The World Bank Group. www.worldbank.org/en/publication/wdr2021.
- World Economic Forum. 2021a. "Articulating Value from Data." White Paper. November 16. https://www3.weforum.org/docs/WEF_Articulating_Value_from_Data_2021.pdf.
- . 2021b. "Data for Common Purpose: Leveraging Consent to Build Trust." White Paper. November. www3.weforum.org/docs/WEF_Data_for_Common_Purpose_Leveraging_Consent_to_Build_Trust_2021.pdf.
- WTO. 2020. *World Trade Report 2020: Government policies to promote innovation in the digital age*. www.wto.org/english/res_e/booksp_e/wtr20_e/wtr20_e.pdf.

**Centre for International
Governance Innovation**

67 Erb Street West
Waterloo, ON, Canada N2L 6C2
www.cigionline.org

🐦 @cigionline

