Global Data Governance Mapping Project

Year Two Report

By Thomas Struett, Adam Zable, and Susan Ariel Aaronson, Ph.D.

DIGITAL TRADE & DATA GOVERNANCE HUB

Executive Summary

Data – unanalyzed figures or facts that can be encoded as zeros and ones – powers almost everything humans do. Individuals and institutions alike rely on data to create new products and services, solve complex problems, and measure performance. But data is different from other inputs because it is simultaneously plentiful, precious, and vulnerable to theft and manipulation.[1] Moreover, many nations divide data into categories for governance and have specific rules for personal, proprietary, and public data. Thus, data is not easy to govern.

The Digital Trade and Data Governance Hub (the Hub) seeks to help policymakers and the public understand how governments around the world govern data. For many governments, governing various types of data has become an essential, albeit challenging, task, because government officials must justify and launch new strategies, structures, policies, and processes.

In 2021 researchers at the Hub designed a new evidence-based metric to characterize a comprehensive approach to data governance at both the national and international levels.[2] We hoped that by doing so, we could help create a broader understanding of data governance.

The OECD 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.[3] A comprehensive approach includes strategies, policies, processes, and organizational structure. A comprehensive approach also governs different types of data use and re-use.[4]

The Hub's metric includes 6 attributes of data governance (strategies; laws and regulations; structural changes; human rights and ethical guidelines; involving their public; and mechanisms for international cooperation). We then use 26 indicators which provide evidence of comprehensive governance.

This Report

- Covers 68 countries and the EU.
- Describes the methodology with which we developed the metric and how our indicators evolved in year 2.
- Discusses some of the broad findings revealed by the data.

Key Findings

01.

Consistent performance over the two year period

The UK, Germany, Australia, New Zealand, and France take the most comprehensive approach to data governance at the national and international levels. This finding is consistent with our first iteration, where these countries were also in the top five (See Chart 1).

02.

Income disparities in data governance

Taking our attributes in sum, what the World Bank terms high income nations do more to govern data and in particular do more on the international and responsible attributes. In contrast, lower and middle income countries tend to focus their data governance efforts on structural or regulatory actions to govern data rather than develop strategies or put forward human rights/ethical guidelines (Chart 2 and 3).

03. Shared evidence of key components of comprehensive data governance

Most of our case studies have enacted or created a freedom of information law, an open data portal, a public data protection law, and a public consultation related to data governance or data driven sectors (Chart 4).

04. Growing importance of digital trade agreements as a form of data governance

We noted an increase in the number of nations adhering to a trade agreement with the free flow of data (with exceptions) as the default.

05. Advice from experts

Most nations have created advisory committees to govern data and data driven technologies, but these committees are mainly composed of representatives of business, government, and academia rather than representatives of the broad public. By including such representatives, policymakers may be better able to anticipate and understand data driven issues that could affect public trust.[5]

06. Policymakers are generally not responsive to public concerns regarding data governance

Although most countries seek public comment on proposed laws and regulations related to data, we have little evidence that policymakers revise their data governance policies in response to public concerns. The Hub will provide additional detail in an upcoming report.

Overview

Where nations once grew rich on their resources and/or human capital, today nations also rely on their citizens' ability to collect, analyze, and create goods and services built on large pools of data. Data has become the essential input, but data is different from other economic inputs as it is plentiful, precious, and vulnerable to theft and manipulation.[6] Moreover, data can be multiple things at the same time: it can be both a commercial asset and a public good, which governments should provide and regulate effectively. There are many types of data which are governed by different sets of rules. Thus, data is not easy to govern and data governance is complicated. Nonetheless, many of the 192 countries in the world have begun to develop strategies, processes, and rules to govern data.

The Digital Trade and Data Governance Hub seeks to help policymakers and the public understand how governments are tackling this evolving responsibility. The OECD 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.[7] The World Bank notes that data governance consists of four main tasks: strategic planning, developing rules and standard, developing mechanisms of compliance and enforcement, and generating the learning and evidence needed to gain insights and address policy challenges.[8]

Because of the multifaceted nature of data, data governance often requires that government officials develop new strategies (such as AI strategies), structures (such as data protection bodies), policies (algorithmic transparency), and processes such as seeking public comment. Although data governance is an important component of 21st century governance, researchers and policymakers alike have little understanding of what a comprehensive approach to data governance looks like. Therefore, to help build this understanding, we decided to create the world's first metric of comprehensive data governance.

The metric helps answer the following questions
What strategies, policies, processes, and structural changes characterize a comprehensive approach to data governance?
What is the evidence that governments are acting at the national and international level?
How do nations differ in their approaches to data governance?
How is data governance evolving over time?

In its first iteration (which included data up to 2020), our analysis covered 51 countries and the EU. Our second iteration adds 17 new countries: Albania, Algeria, Botswana, Colombia, Costa Rica, Cuba, Ecuador, Egypt, Ghana, Italy, Mauritius, Panama, Peru, Poland, Spain, Tanzania, and Tunisia. Taken in sum, these countries represent approximately one third of the world's 192 nations and include a mix of regions and income levels.

Table 1: The Mix of Countries Analyzed by Hub Staff for the Second Iteration of the Metric

Income Category	North America	Europe & Central Asia	East Asia & Pacific	Latin America & Caribbean	Middle East & North Africa	Sub-Saharan Africa	South Asia
High Income	2	14	6	2	3	0	0
Upper middle income	0	5	3	9	1	3	0
Lower middle income	0	1	3	1	5	5	3
Low income	0	0	0	0	0	2	0

In 2022, Hub staff made some changes to the metric as follows:

01. Moved the indicator 'national guidelines for private sector data sharing' from the strategic attribute to the responsible attribute. We did so for two reasons: first, guidelines are not strategies. Second, studies show that countries that promote greater data sharing increase the additionality and public good nature of data.[9] Hence, governments that encourage greater data sharing among societal entities are essentially acting in a responsible manner.

02. Bolstered our attribute of data strategies to include other emerging data or digital economy strategies. The OECD has described such strategies as innovation strategies designed to improve both economic performance and social welfare.[10] We found that many nations are creating strategies to encourage other kinds of emerging digital ecosystems such as the Internet of Things, smart cities, digital economy, and advanced manufacturing.

03. Expanded our indicator on AI ethics to include responsible and trustworthy AI initiatives. This indicator now includes a wide range of guidance statements, principles, or frameworks to encourage responsible design and utilization of AI. We made these changes to better reflect the diversity of actions nations are taking to guide the design and use of AI.

04. Removed 'International data affairs body' from the structural attribute because we struggled to find such bodies

05. Redefined the participatory attribute to include a public consultation on data (as opposed to separate consultations for personal and public data), government response to a consultation, and creation of a diverse Multistakeholder Advisory Body. These components have been delineated by the IAP2 Federation (International Association for Political Participation).[11]

06. Narrowed an indicator in the international attribute referring to an international privacy convention, Convention 108+, to include only those nations that have ratified the treaty, as opposed to all that have signed it. Convention 108 opened for signature on 28 January 1981 and was the first legally binding international instrument in the data protection field. It required parties to protect the human rights of all individuals when personal data is processed. Convention 108+ in contrast updates the treaty in order to address the challenges for privacy resulting from the use of new information and communication technologies; and to strengthen the convention's follow-up mechanism. We focused on ratification because it signals that the country has approved membership through democratic procedures and is ready to put the treaty into effect.[12]

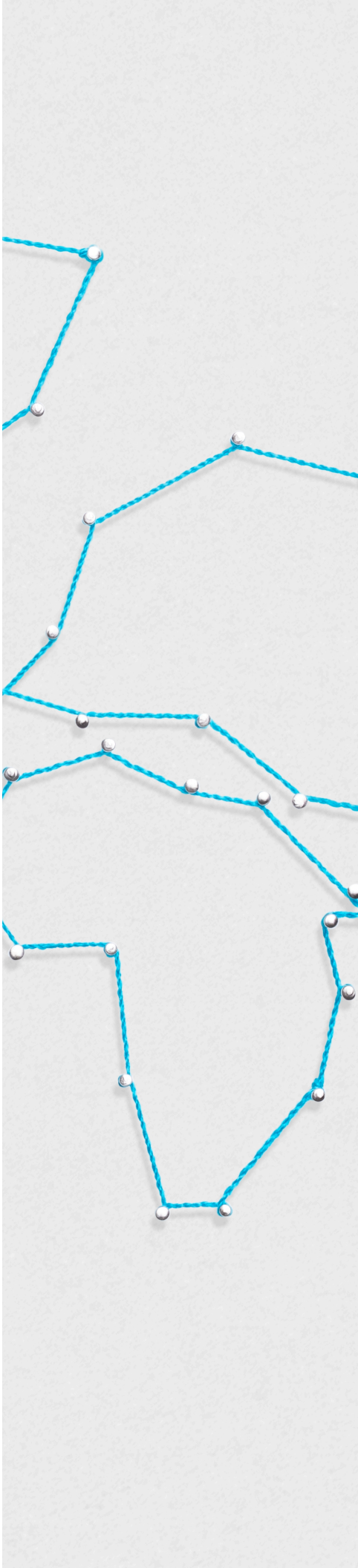
07. Added the Budapest Convention on cybercrime to the international attribute. We added it because it links data governance to cybersecurity. The Budapest Convention provides for the criminalization of illegal online conduct such as computer-related fraud and child pornography; procedural law tools to investigate cybercrime and secure electronic evidence in relation to any crime; and acts as a framework for cooperation.[13]

How We Developed Our Methodology

Data governance, like the data-driven economy, is constantly evolving, reflecting changes in technology, society, and policymakers' will and expertise. Consequently, data governance is a work in progress and a different experience for all nations. Nations adopting a comprehensive approach develop strategies, policies, and processes, adapt organizational structures and work to accommodate different types and contexts for data use and re-use.[14] Governments that can accommodate such change in a responsive, competent, and anticipatory manner are likely to build and maintain trust in their institutions.[15]

To create this metric, we first discussed how organizations respond to change and in particular how they formulate changes to organizational strategy and structure.[16] Next, we studied how others analyzing governance, including researchers at the Worldwide Governance Indicators and the Ibrahim Index of Governance, thought about how to define, measure, and compare it.[17] We then turned to metrics of data governance which helped us understand how to assess the impact of data governance policies on, for example, data availability, accessibility, and re-use.[18]

Building on our review, we divided data governance into what we see as its six primary attributes. These attributes, described below, can be thought of as the different dimensions of action a nation takes as it works to govern data in a comprehensive manner.



The Six Attributes of Data Governance	
Strategic	The government has a vision or plan for different types of data in the economy and polity.
Regulatory	The government constructs a legal regime around data's types and/or uses.
Responsible	The government thinks about the ethical, trust, and human rights implications of data use and re-use.
Structural	The government alters institutional structures in response to data-driven transformation.
Participatory	The government informs its constituents about its activities and asks for public comment, with the intention of incorporating their feedback.
International	The government joins with other nations in shared international efforts to establish data governance rules and norms.

Once we determined the attributes, we began searching for specific pieces of evidence that we could take as indicators of the broader attributes. We ended up with 26 indicators as delineated in **Table 2**. For additional information on the definition and purpose of each indicator, as well as guidelines on how we made decisions, please see the Year Two Report Background and Guidelines on our website.

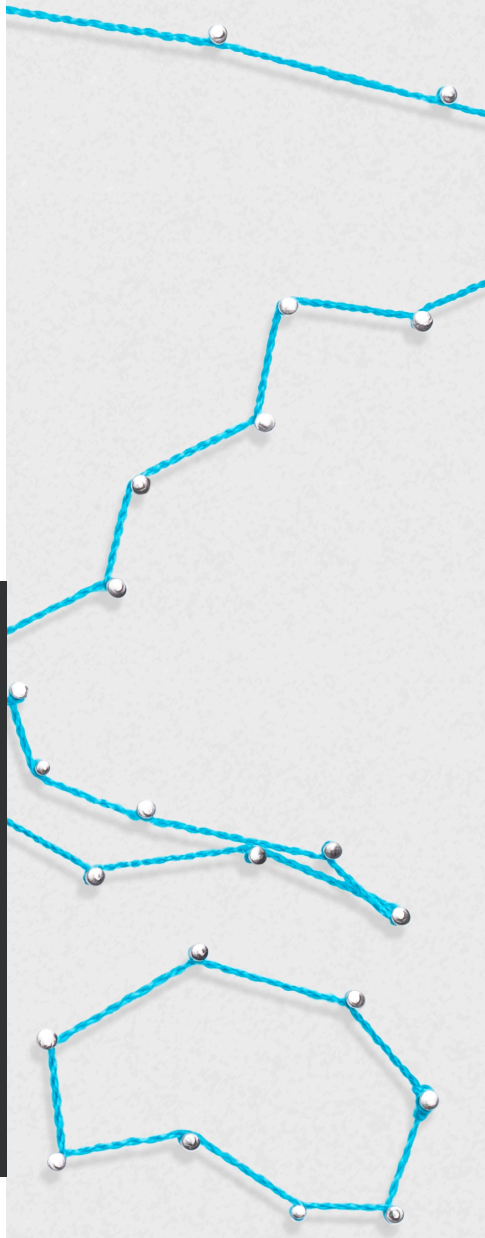


TABLE 2

26 Indicators

Strategic Indicators

National Data Strategy	Public Administration Strategy	AI Strategy	Strategy for Data in Emerging Digital Ecosystems
A strategy designed to increase the provision, use, and re-use of various types of data in adherence with national norms and laws. Most such plans cover data as a commercial asset, and some strategies address data as a public good.	A strategy that delineates how the government will collect, share, protect and control data funded, collected, and controlled by governmental entities.	A strategy that outlines how a nation can build and/or maintain its ability to create and utilize AI for commercial as well as societal use.	A strategy that outlines how a nation can utilize various data-driven technologies for economic and societal benefit. The strategy emphasizes the importance of data governance to the achievement of this goal.

Regulatory Indicators

Personal Data Protection Law	Open Data Law for the proactive release of government information	Freedom of Information Act	Right to be protected from Automated Decision-Making	Right of Data Portability
Laws that delineate how private and often public entities are required to treat personal information when these entities collect, store, utilize and monetize personal data.	Laws that require governmental bodies to make the bulk of public sector data freely available, easy to use, distribute and reuse, subject to limited exceptions, in a proactive manner rather than at the request of citizens.	Laws designed to ensure that upon request, citizens can access government documents.	Laws designed to provide individuals with a legal right not to be subject to a decision based solely on automated means and/or to be profiled by such systems.	Some laws provide individuals with the legal right to receive one's personal data from a data controller and have it transferred to other controllers in a structured, machine-readable format.

Responsible Indicators

Data Charter	Public Sector Data Ethics Framework	Responsible AI Initiatives
A grant of authority or rights from the government that delineates a set of principles designed to build trust and signal users that their human rights will be protected as they go online.	Framework or guidelines for public servants to deal with data ethically and responsibly in the course of their work.	A set of principles and/or a framework issued by a government body that outlines how officials can promote and utilize artificial intelligence in an ethical, accountable, and human rights respecting manner. Also includes algorithmic accountability policy initiatives, including a broad array of frameworks, principles, laws, and reports.

Trust Framework for Digital Identity Management	Guidelines for non-governmental data sharing
Framework or guidelines that establish rules for providing digital identity services, to ensure that people's information is safe and secure and to ensure that such systems are built on trust and human rights protection.	Guidance or toolbox created by a government as to how nongovernmental entities can share data in different contexts.

Structural Indicators

Personal Data Protection Body	Open Data Portal	Open Data Coordinating Body	Public Sector Data Governance Body
An institutional structure accountable for the governance and protection of personal data in society. This structure is typically established by the country's personal data law and is responsible for enforcing it.	An online government platform which enables users to access collections of government data that have been opened for public re-use.	Institutionalized body or oversight committee responsible for coordinating the opening of governmental data sets to the public.	Institutionalized body responsible for coordinating public sector data assets to extract or exploit the value of data in the public sector. Often responsible for supporting data sharing among governmental entities; managing digital identity programs and/or base registry programs.

Participatory Indicators

Public Consultation on Data	Government Response to Consultation	Multistakeholder Advisory Body
Government has formally asked for public comment on data-related legislation, strategies, or policies.	Government official or body has recorded public comment and directly responded to stakeholder inputs in an official document.	A formal, ongoing consultative body that advises and works with the government on data governance issues. Requires a diverse group of stakeholders as members, including from the public and/or civil society.

International Indicators

Convention 108+	Open Government Partnership	OECD AI Principles
A binding convention (treaty) developed by the Council of Europe to protect personal data which was updated to accommodate digital technologies. It includes rules governing sensitive data such as genetic or biometric data. Each Party has to adopt in its domestic law the measures necessary to give effect to the provisions of the Convention.	A voluntary international partnership that requires member states to advance open government principles and cooperate with citizens on issues of open government.	The OECD AI Principles are a set of voluntary principles designed to promote use of AI that is innovative and trustworthy and that respects human rights and democratic values. It was first adopted only by the 38 OECD members, but as of May 2022, some 60 countries say they adhere to these principles.

Binding Trade Agreements on Cross-Border Data Flows	Budapest Convention
Trade agreement with binding provisions governing cross border data flows. Under such provision, the signatories must allow the free flow of data for covered persons across borders with legitimate exceptions to achieve essential domestic policy purposes such as protecting public health.	The convention developed by the Council of Europe is the first international treaty on crimes committed via the Internet and other computer networks, dealing particularly with infringements of copyright, computer-related fraud, child pornography and violations of network security.

Scoring

We determined individual country scores as follows: If a country had the indicator in full, we gave it a 1, if not we gave it a 0. We then translated these 1's and 0's into scores that could be used to compare the countries. Because we viewed each indicator as essential, the team decided to weigh each indicator equally within its attribute, regardless of the number of indicators contained within that attribute. Each attribute's score is therefore the sum of its indicators divided by the number of indicators, expressed as an integer out of 100. Similarly, we believe each of the six attributes is vital and interdependent, so we gave each of the six attributes equal weight in the final scoring by averaging the scores of the six attributes. This strategy enabled us to make each country's final score also out of 100.

Robustness Check

In order to make sure our evidence was as complete as possible, we performed extensive searches on general purpose search engines in the official language of each country and used other free online translation services to ensure the consistency of our results. Because the team lacked language and policy expertise, we also hired outside experts.[19] In addition, we had multiple reviewers double-check evidence of every indicator to ensure veracity and consistency. Finally, we checked our analysis against those of other scholars, research organizations, and data governance databases,[20] and reached out to scholars and policymakers for feedback.[21]

Limitations/caveats for the Hub's Metric of Data Governance

We recognize that our methodology has several limitations. First, the metric does not cover all types of data or all approaches to data governance. Both iterations cover personal, public, and indirectly proprietary data (through rules that govern the use of algorithmic decision making).[22] Second, we do not claim to cover a representative sample of the world's 192 countries but instead a diverse sample of countries at different levels of development, income or digital prowess. Third, our metric reflects our bias as citizens of a democracy–we may overemphasize participatory and accountable governance as well as guidelines for ethical, responsible. or trustworthy data governance. Hence, while we designed the metric based on facts which we include as indicators, we acknowledge that these indicators reveal our biases.

Fourth, our indicators reflect the state of our understanding of data governance. We rely on the countries we are evaluating (and ultimately their web presence) for the data to develop our metric, an endogeneity problem. However, these countries have little incentive to misrepresent their policies, visions, and processes. Moreover, many of these nations adhere to international commitments that encourage them to make their policies in an open, participatory, and accountable manner such as the WTO or the Open Government Partnership.[23] Nonetheless, we cannot say whether or not an indicator definitively does not exist in a country. To ensure our data is as correct as possible, we constantly monitor data governance changes and will revise the metric every 12 months. Fifth, we do not do correlations with our data to human rights, governance, democracy, and other indexes. We only have two years of data and that is too short a period to show change over time.

Finally, we do not measure the effectiveness of data governance among our sample nations. The indicators do not reveal whether policies or agreements are enforced; if ethical frameworks are anything more than bluster; whether new institutional structures are doing what they were designed to do, or whether policymakers actually revise policies in response to public comment.

Findings

01

Consistent performance over the two year period

The UK, Germany, Australia, New Zealand, and France take the most comprehensive approach to data governance at the national and international levels. This finding is consistent with our first iteration, where these countries were also in the top five **(See Chart 1)**.

02

Income disparities in data governance

Taking our attributes in sum, what the World Bank terms high income nations do more to govern data and in particular do more on the international and responsible attributes. In contrast, lower and middle income countries tend to focus their data governance efforts on structural or regulatory actions to govern data rather than develop strategies or put forward human rights/ethical guidelines **(Chart 2 and 3)**.

03

Shared evidence of key components of comprehensive data governance

Most of our case studies have enacted or created a freedom of information law, an open data portal, a public data protection law, and a public consultation related to data governance or data driven sectors **(Chart 4)**.

04

Growing importance of digital trade agreements as a form of data governance

We noted an increase in the number of nations adhering to a trade agreement with the free flow of data (with exceptions) as the default.

05

Advice from experts

Most nations have created advisory committees to govern data and data driven technologies, but these committees are mainly composed of representatives of business, government, and academia rather than representatives of the broad public. By including such representatives, policymakers may be better able to anticipate and understand data driven issues that could affect public trust.[24]

06

Policymakers are generally not responsive to public concerns regarding data governance

Although most countries seek public comment on proposed laws and regulations related to data, we have little evidence that policymakers revise their data governance policies in response to public concerns. The Hub will provide additional detail in an upcoming report.

Chart 1 shows how each case study nation has performed on the 2nd iteration of the metric. The UK has retained its top position, which means that, more so than other countries, it has taken steps to comprehensively govern data. However, we believe there is little difference statistically among the top performing nations which include the UK, Germany, Australia, the Netherlands, New Zealand and France. We note that several nations in Latin America perform well, including Brazil, Uruguay and Colombia.

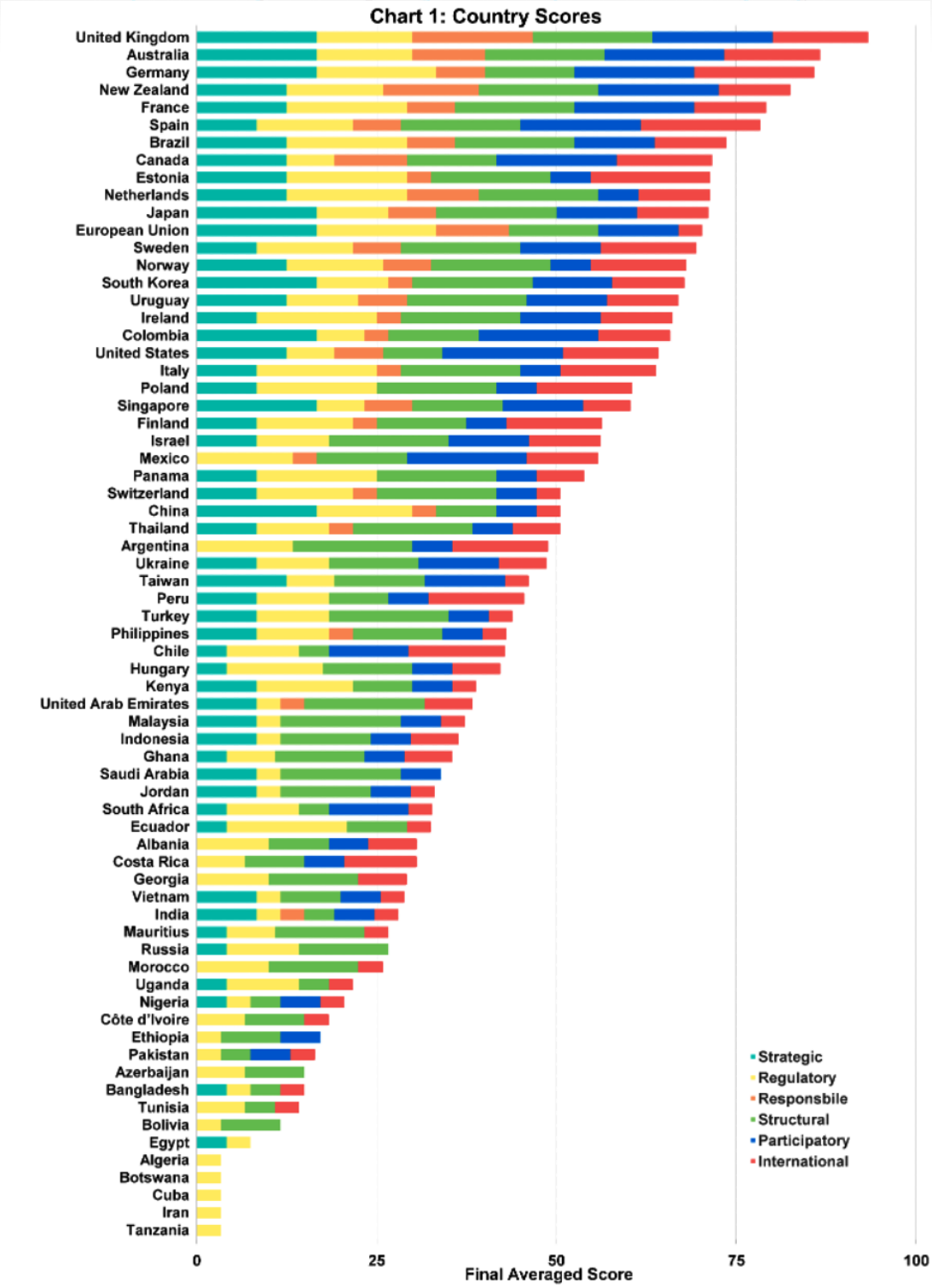


Chart 2 shows the average attribute score for the countries in our set from each of the World Bank income groups. As with our findings from last year, on average, countries with high incomes do more on each attribute than less wealthy nations. Developing countries are incentivized to focus more on other aspects of development such as poverty reduction and job creation.[25] In particular we noted that lower income countries are less likely to focus on ethical or human rights guidelines related to data or data driven technologies. In fact, as in 2021, we find that only high income countries focus on ethical and human rights guidelines.

Chart 2: Income Category Average Attribute Scores

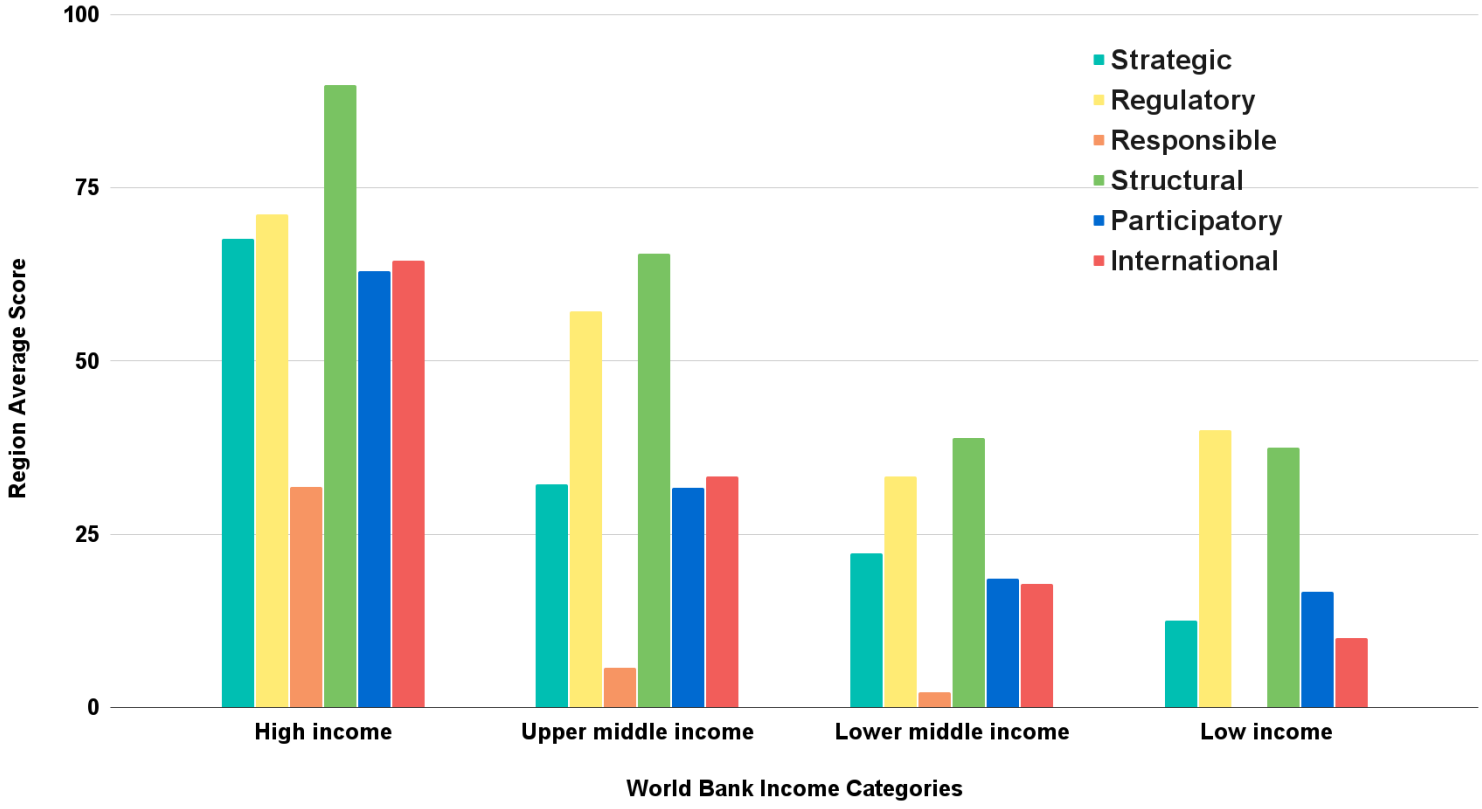


Chart 3 compares the average attribute score for our sample of 68 countries and the EU that are OECD members with those that are not members of the OECD. In general, members of the OECD are high income countries, with the exception of four in our sample- Colombia, Mexico, Turkey and Costa Rica.[26] These four countries are upper middle income countries according to the World Bank.[27] The OECD countries scored significantly higher than non-OECD countries across all attributes.

Chart 3: OECD Status Average Attribute Scores

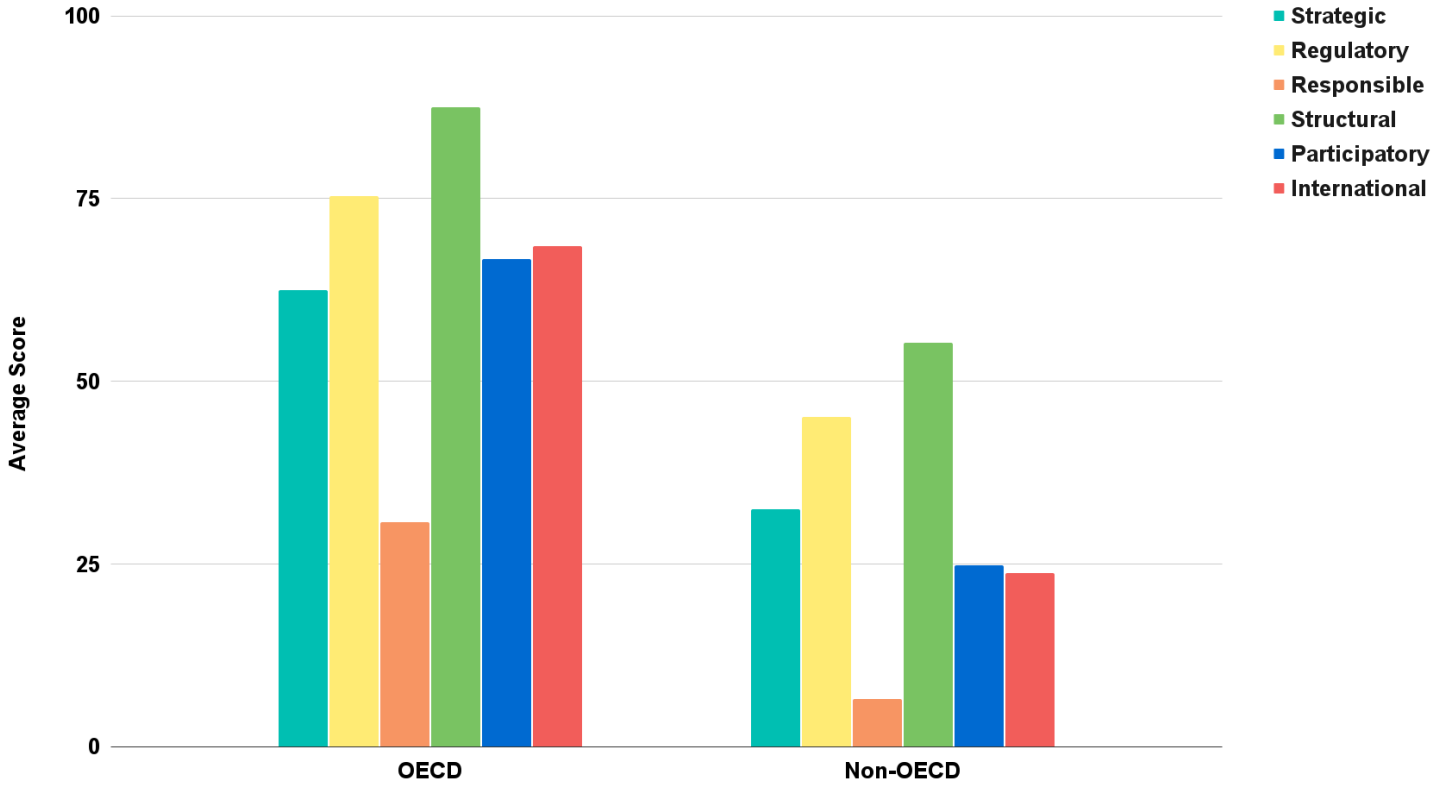
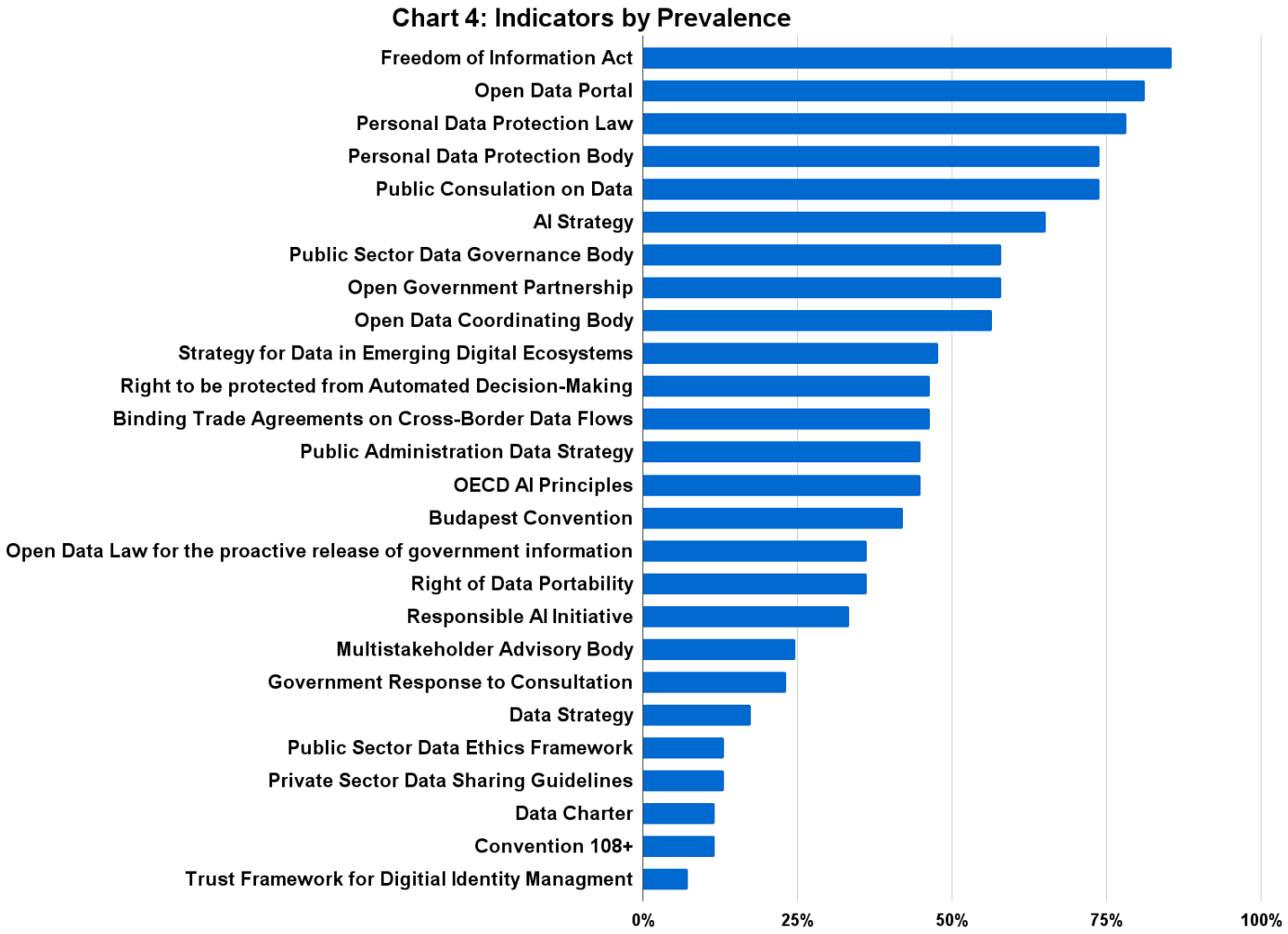


Chart 4 illuminates which indicators are the most prevalent among our sample nations. Over 75% of our countries have Freedom of Information Acts, open data portals, and personal data protection laws. In contrast, fewer than 25% have a data strategy or data charter.



Sample Case Studies

CASE STUDY 1

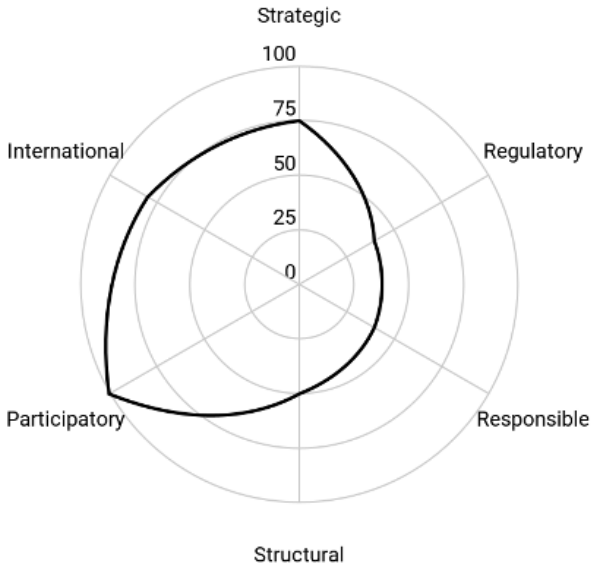
United Kingdom

The United Kingdom provides an example of a nation with significant digital prowess and increasingly comprehensive data governance. UK data governance is moving in tandem with the rapidly changing data-driven economy. The UK is perceived as one of the world's leading digital economies.[27] Moreover, UK policymakers have made data governance a priority; they state they want to lead the world on the governance of data and digital regulation, in the belief that they can balance innovation and rapid change with trusted governance and the rule of law.[29] The UK received a higher score on our metric than any other country in both 2021 and 2022. However, the UK has yet to pass an open data law, instead relying on a 2012 white paper for its open data policy,[30] and in the international realm, the UK has not yet fully ratified Convention 108+.[31] Consequently, as with our other case studies, the UK's data governance is a work in progress. The UK scores higher this year than in the 2021 iteration in part because we phased out the indicator 'international data affairs body' in the structural attribute, which the UK did not have.

CASE STUDY 2

United States

The United States of America provides an example of divergence between digital prowess and data governance. The US is the world's leading data-driven economy, home to many of the largest and most innovative firms.[32] Yet America's governance of data continues to lag behind many other countries active in the data driven economy. The US was the first nation to delineate the importance of privacy and personal data protection to trust online in 1997, when the White House put forward a Global Framework for e-Commerce.[33]Although the US has many national sectoral laws governing personal data, it still does not have a comprehensive federal personal data protection law or data protection body.[34] Despite Congressional gridlock, US policy making on

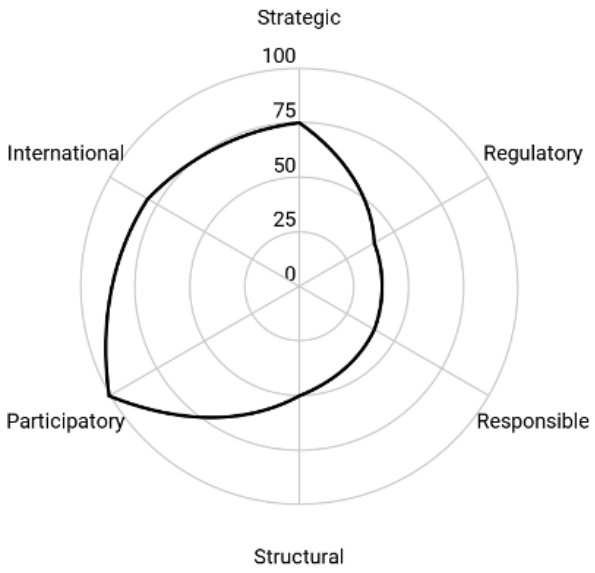


data is not frozen, for example the US improved on participatory data governance attributes. In 2021, the US performed well on our attributes of international, strategic, and structural, but less well on regulatory, responsible, and participatory data governance. In 2022, the US performed well on participatory, international and strategic and less well on responsible, regulatory, and structural attributes. We attribute the difference to changes that we made in our evidence base rather than specific US policy actions. Specifically, although we previously counted the FTC as America's data protection body, it has not been explicitly granted that authority by Congress and we thus discounted it.

CASE STUDY 3

South Africa

South Africa has one of the strongest digital economies in Africa. Yet many of its poorest citizens lack access to the internet as well as the skills to fully take advantage of the data driven economy.[35] Moreover, South Africa lags behind two other African nations, Kenya and Ghana, on our metric of data governance. Like the US, South Africa provides an example of uneven digital prowess and data governance.



On the one hand, South Africa has established some key aspects of data governance. The government published a Report of the Presidential Commission on the 4th Industrial Revolution in 2020,[36] which emphasizes the importance of data protection and an integrated data policy repeatedly. Moreover, policymakers have enacted regulations, including the 2013 Protection of Personal Information Act,[37] and like its democratic peers, South Africa tries to involve its public in data governance–it has held public consultations[38] and responded to public feedback.[39] On the other hand, we could not find a multistakeholder advisory body working on data governance. Moreover, the government has not yet adapted many institutions of governance to the challenges of data governance. While the country has an independent body responsible for monitoring and enforcement of the Protection of Personal Information Act,[40] we could not find evidence of an open data portal, open data coordination body, or public sector data governance body. South Africa was also weak in international cooperative effects. It is a member of the Open Government Partnership, but it has not participated in other international cooperative initiatives.[41] Finally, we could not find any evidence that the country has taken steps to encourage responsible data governance.

Next Steps

Research

This year the Hub plans to issue reports on two issues related to data governance: the first on political participation and the second on the encouragement of ethical responsible behavior. The Hub will compare how policymakers in a subset of countries ask for and incorporate public input on data governance at the national and international level. We will produce a policy brief outlining our findings utilizing the IAP2 Spectrum of Public Participation to see if governments are informing, consulting, involving, collaborating with and empowering their constituents.[42]

For our second report, we will perform a content analysis of data strategies, public sector data ethics frameworks, and trust frameworks for digital identities for all our case study governments to understand if they are complementary and mutually reinforcing.

Outreach

In addition, we will organize a webinar series later this year on data governance topics based on the six attributes of this metric.

Reevaluation and Feedback

As noted earlier, we are constantly evaluating ways that we can improve the metric. Feedback helps us make it better. We hope to continue to increase the number of countries and add new indicators as policymakers continue to evolve their approaches to data governance. Over time, as we include additional countries and indicators, we will be better positioned to generalize our results and see if the same countries continue to lead on data governance.

We welcome ideas for improving the metric such as suggestions for additional indicators.

If you think we have missed data, please contact **Thomas Struett at tstruett@gwu.edu** or **Adam Zable at ajzable@gmail.com.**

Thank you for your feedback!

Endnotes

[1] The Economist. "The world's most valuable resource is no longer oil, but data." The Economist, May 6, 2017,www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data and Mark Allison, How has Data Become the World's Most Valuable Commodity? Robotics and Automation, July 22, 2021, https://roboticsandautomationnews.com/2021/07/22/how-has-data-become-the-worlds-most-valuable-commodity/44267; and World Economic Forum. 2021a. "Articulating Value from Data." White Paper. November 16, https://www3.weforum.org/docs/WEF_Articulating_Value_from_Data_2021.pdf.

[2] The Digital Trade & Data Governance Hub team includes Susan Aaronson, Research Professor at the Elliott School of International Affairs; Thomas Struett, Director of Research; Adam Zable, Director of Emerging Tech and Data Governance. Siaka Togola Director of Digital Marketing and Operations created the project website and made the dataset searchable. Ian Wheeler, Director of Outreach, edited and improved the report.

[3] OECD, "Data governance: Enhancing access to and sharing of data", October 2021, https://www.oecd.org/sti/economy/enhanced-data-access.htm

[4] Olivia Benfeldt Nielsen, "A Comprehensive Review of Data Governance Literature" (2017). Selected Papers of the IRIS, Issue Nr 8 (2017). 3, https://aisel.aisnet.org/iris2017/3

[5] KPMG and University of Queensland, "Trust in Artificial Intelligence: A five country study, 2020, https://home.kpmg/au/en/home/insights/2021/03/artificial-intelligence-five-country-study.html

[6] The Economist. "The world's most valuable resource is no longer oil, but data." The Economist, May 6, 2017, www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data

Mark Allison, How has Data Become the World's Most Valuable Commodity? Robotics and Automation, July 22, 2021, https://roboticsandautomationnews.com/2021/07/22/how-has-data-become-the-worlds-most-valuable-commodity/44267/; and World Economic Forum. 2021a. "Articulating Value from Data." White Paper. November 16, https://www3.weforum.org/docs/WEF_Articulating_Value_from_Data_2021.pdf.

[7] OECD, " Data governance: Enhancing access to and sharing of data, October 2021, https://www.oecd.org/sti/ieconomy/enhanced-data-access.htm

[8] World Bank, "World Development Report: Data for Better Lives," 2021, https://www.worldbank.org/en/publication/wdr2021

[9] World Economic Forum, "Data for Common Purpose: Leveraging Consent to Build Trust," November, 2021, https://www.weforum.org/whitepapers/data-for-common-purpose-leveraging-consent-to-build-trust/;

Abd Diane Coyle, "Big Data for the Public Good," April 20, 2020, Bennett Institute for Public Policy Blog, https://www.bennettinstitute.cam.ac.uk/blog/big-data-public-good/

[10] OECD, The OECD Innovation Strategy: further information, 2015, https://www.oecd.org/sti/theoecdinnovationstrategyfurtherinformation.htm

[11] International Association of Political Participation, the P2 Pillars, https://www.iap2.org/page/resources

[12] Council of Europe, Modernization of the Data Protection "Convention 108", https://www.coe.int/en/web/portal/28-january-data-protection-day-factsheet

[13] Council of Europe, The Budapest Convention, The Budapest Convention on Cybercrime:

benefits and impact in practice, July 13, 2020, https://rm.coe.int/cyber-buda-benefits-v6/168072bddc

[14] Benfeldt Nielsen, Olivia, "A Comprehensive Review of Data Governance Literature" (2017). Selected Papers of the IRIS, Issue Nr 8 (2017). 3. https://aisel.aisnet.org/iris2017/3

[15] https://www.oecd.org/governance/trust-in-government/

[16] Following Alfred D. Chandler, Jr. Strategy and Structure: Chapters in the History of the Industrial Enterprise. MIT Press, 1962.

[17] The World Bank defines governance as "the traditions and institutions by which authority in a country is exercised." The Bank's Worldwide Governance Indicators assesses 6 dimensions of governance, which include policies, processes, and feedback loops (Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi, Worldwide Governance Indicators: Methodology and Analytical Issues, Policy Research Working Paper 5430, September 2010, p.4). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130. In contrast the Ibrahim Index of Governance defines governance as the provision of political, social, and economic public goods and services that every citizen has the right to expect and that the government should deliver to its citizens. https://mo.ibrahim.foundation/iiag.

[18] We reviewed the OECD's Our data Index, World Bank's Statistical Performance Indicators, the Open Data Inventory, and the European Open Data Maturity Assessment.

[19] Professor Henry Gao of Singapore Management University and Dr. Carolina Aguerre, Senior Research Fellow at Centre for Global Cooperation Research GCR21, Universität Duisburg-Essen

[20] We checked our work against the following: Professor Graham Greenleaf does an analysis of data protection laws, as does the law firm DLA-Piper and the website DataGuidance. The OECD does a Digital Trade Inventory and the University of Lucerne maps digital trade agreements. We also looked at the Open Data Barometer, OECD databases, etc.

[21] Feedback from: Vivien Foster and David Satola, World Bank Data for Better Lives, WDR Team 2021; Teresa Scassa, Canada Research Chair in Information Law, University of Ottawa; Stefaan Verhulst, Govlab; Aart Kraay, World Bank; Esther Huyer, Capgemini SE; Jenni Tennison, Open Data Institute; Gabriel Marceau, WTO; Javier Lopez-Gonzalez and Francesca Cassolini, OECD and audiences at a webinar addressed by Aaronson for the Indian think tank IMPR on September16, 2021I.

[22] We do not address financial data, intellectual property rights, research data, government statistics, ICT and digital infrastructure, or cybersecurity. We also do not include data on the quality, enforcement, outcomes, or public opinion of data governance.

[23] For example, 51 of the 51 countries and the EU countries in our original sample (except for Iran) are obligated to make domestic regulations that can affect trade (such as personal data protection rules) in a transparent accountable manner and to encourage public comment or they could be challenged in a trade dispute. On the WTO see, Susan Ariel Aaronson and M. Rodwan Abouharb, "Unexpected Bedfellows: The GATT, the WTO and Some Democratic Rights," International Studies Quarterly, 2011) 55, 379–408. In addition, 32 of our case studies are members of the Open Government Partnership. OGP, countries have to commit to uphold the principles of open and transparent government by endorsing the Open Government Declaration. Open Government Declaration.

24 KPMG and University of Queensland, "Trust in Artificial Intelligence: A five country study, 2020, https://home.kpmg/au/en/home/insights/2021/03/artificial-intelligence-five-country-study.html

[25] World Bank, Data for Development; Susan Ariel Aaronson, Data as a Development Issue: CIGI Paper 223, July, 24 2019, https://www.cigionline.org/publications/data-development-issue/; and David Medine and G Murthy, Making Data Work for the Poor: New Approaches to Data Protection and Privacy. Consultative Group to Assist the Poor, Washington, DC, 2020,. https://www.cgap.org/sites/default/files/publications/2020_01_Focus_Note_Making_Data_Work_for_Poor_0.pdf

[26] OECD, "Our global reach," 2021, https://www.oecd.org/about/members-and-partners/

[27] World Bank, Would Bank Country and Lending Groups, last searched June 29, 2022 https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

[28] Consultancy UK, "UK has the 4th largest digital economy in the world", https://tinyurl.com/2p9aahff

[29] UK Department for Digital Culture, Media, and Sport, "Digital Regulation: Driving growth and unlocking innovation: Ministerial Statement, June 22, 2022, Digital Regulation: Driving growth and unlocking innovation - GOV.UK and National Data Strategy, June 13, 2022, National Data Strategy

[30] Cabinet Office, "Open Data: unleashing the potential," 28 June 2012,

https://www.gov.uk/government/publications/open-data-white-paper-unleashing-the-potential

[31] Council of Europe, "Parties/Observers to the Budapest Convention and Observer Organizations to the T-CY," 2022, https://www.coe.int/en/web/cybercrime/parties-observers

[32] The digital economy accounted for 9.6 percent ($2,051.6 billion) of current-dollar gross domestic product ($21,433.2 billion) in 2019, Bureau of Economic Affairs, US Department of Commerce, Updated Digital Economy Estimates – June 2021, https://www.bea.gov/system/files/2021-06/DE%20June%202021%20update%20for%20web%20v3.pdf

[33] White House, The Framework for Global Electronic Commerce, 1997, https://clintonwhitehouse4.archives.gov/WH/New/Commerce/

[34] Diane Bartz, "Online privacy bill easily passed by U.S. House panel," June 23, 2022, Reuters, https://www.reuters.com/world/us/online-privacy-bill-easily-passed-by-us-house-panel-2022-06-23/

[35] World Bank, South Africa, Digital Economy Diagnostic, 2019, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/464421589343923215/south-africa-digital-economy-diagnostic

[36] Department of Communications and Digital Technologies of the Republic of South Africa, "Report of the Presidential Commission on the 4th Industrial Revolution," April 9, 2019,

https://www.gov.za/sites/default/files/gcis_document/202010/43834gen591.pdf

[37] Government Gazette of the Republic of South Africa, "Protection of Personal Information Act," November 26, 2013, https://www.gov.za/sites/default/files/gcis_document/201409/3706726-11act4of2013popi.pdf

[38] Department of Justice and Constitutional Development of the Republic of South Africa, "INVITATION FOR PUBLIC COMMENTS PROTECTION OF PERSONAL INFORMATION ACT, 2013," September 9, 2021, https://www.gov.za/sites/default/files/gcis_document/202109/45120gon829.pdf

[39] Department of Communications and Digital Technologies of the Republic of South Africa, "Data and Cloud Policy Virtual Colloquium," June 18, 2021,

https://www.gov.za/speeches/minister-stella-ndabeni-abrahams-data-and-cloud-policy-virtual-colloquim-18-jun-2021-0000

[40] Government Gazette of the Republic of South Africa, "Protection of Personal Information Act," November 26, 2013, https://www.gov.za/sites/default/files/gcis_document/201409/3706726-11act4of2013popi.pdf

[41] Open Government Partnership, "South Africa," 2022, https://www.opengovpartnership.org/members/south-africa/

[42] Iap2, "Core Values, Ethics, Spectrum – The 3 Pillars of Public Participation," 2022, https://www.iap2.org/page/pillars