Governance of Data and Data-driven Technology

Nagla Rizk and Tobias Schonwetter

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Contents

Authors

Dr. Nagla Rizk
naglarzk@aucegypt.edu
Rizk is a Professor of Economics and Founding Director of the Access to Knowledge for Development Center (A2K4D) in the School of Business at The American University in Cairo. Rizk is also an Associate Member of the Centre for Law, Technology and Society (CLTS) at the University of Ottawa, and serves as an Open AIR Steering Committee member, guiding Open AIR's work on alternative innovation metrics.

Dr. Tobias Schonwetter
tobias.schonwetter@uct.ac.za
Schonwetter is an Associate Professor in the Department of Commercial Law, and Director of the Intellectual Property Unit and iNtaka Centre for Law and Technology, in the Faculty of Law at the University of Cape Town. Schonwetter is also an Associate Member of the Centre for Law, Technology and Society (CLTS) at the University of Ottawa, and a co-founder and co-lead of Open AIR.

The authors will be grateful for inputs and feedback on the contents of this working paper. Please use the authors' email addresses provided above.

Abstract

This Open AIR Working Paper 29 explores governance challenges pertaining to data and data-driven technology, with emphasis on the relevance of these challenges to pursuit of the UN Sustainable Development Goals by low- and middle-income countries (LMICs). The paper identifies the core dynamics and challenges at play in regulation (as the core dimension of governance) with respect to digital divides; the data divide and competition dynamics in digital markets; artificial intelligence (AI), data and algorithm biases, and inaccuracies; cross-border data flows; data and platform work; and intellectual property, including data ownership.

Keywords

data, technology, governance, regulation, digitalisation, competition, intellectual property, platform work, inclusion, cross-border data flows, digital services, digital transactions

Acknowledgements

I. Introduction

This working paper sets out some of the key current dynamics in governance of data and data-driven technology, and the intersections between this governance and development outcomes. The paper explores the drivers and elements of regulation, as the core manifestation of governance, of data and data-driven technology, and then discusses core challenges to regulation in this domain. The core research on which this paper is based prepared was conducted as part of scoping study by the Open African Innovation Research (Open AIR) network for the International Development Research Centre (IDRC) (de Beer et al., 2022).

It is important to note at the outset that governance, chiefly via regulation, of data and data-driven technology is relevant to multiple development themes. It spans across almost all of the UN Sustainable Development Goals (SDGs), because well-informed policy, law and regulation on data and technology matters can, through supporting better livelihoods, contribute to numerous SDGs. For example, better data on the lives of the poor, and on poverty dynamics, can inform policy frameworks addressing poverty alleviation and achievement of the goal of no poverty (SDG 1). Proper collection and management of patient-generated health data can improve disease prediction, disease reduction, and health services (SDG 3). Gender-disaggregated data—measuring gaps in education, political environment, health, and economic participation—can support achievement of gender equality (SDG 5). Similarly, accurate data on education, skills and work can help achieve decent work and economic skills (SDG 8). More generally, monitoring progress towards all SDGs requires the use and management of data to assess fulfillment.

The Global Partnership for Sustainable Development Data (GPSDD) highlights how different data initiatives can support different SDGs (GPSDD, n.d.). The World Bank's explanations of these relationships are summarised in the Table below.

Table: Connecting data to the SDGs

SDG	Data elements
1. No poverty	Better data on who and where the poor are, and on their needs
2. Zero hunger	Data on crops, weather, prices
3. Good health and wellbeing	Health data for prediction of disease, better health services
4. Quality education	Disaggregated data on school enrolment, teachers, and education and attainment levels
5. Gender equality	Gender-disaggregated data to measure gaps in education, political empowerment, health, and economic participation
6. Clean water and sanitation	Data on water resources, efficiency of resource use, access to clean water
7. Affordable and clean energy	Data on how people have access to reliable energy and electricity as it is associated with better education outcomes and income levels
8. Decent work and economic growth	Data on skills, levels of education, prediction of future economic growth
9. Industry, innovation, and infrastructure	Population data, citizen data, investing in better infrastructure; water, energy, housing, transportation, and sanitation
10. Reduced inequalities	Data-driven approaches to inclusion—mapping communities and working with household surveys and other citizen data collection mechanisms
11. Sustainable cities and communities	Data on water and air quality, transportation, infrastructure
12. Responsible consumption and production	Data on patterns of consumption, waste

13. Climate action	Data-led decision-making for climate action, climate changes predictions
14. Life below water	Data for monitoring oceans, preventing overfishing, tackling pollution, monitoring climate change, working towards more sustainable fishing
15. Life on land	Data on land use and impact, overuse of land, destruction of fragile ecosystems
16. Peace, justice, and strong institutions	Civil registration data, for population information in support of government planning
17. Partnerships for the goals	Data on, and in support of, partnerships between governments, companies, people/communities

Source: Derived from World Bank (2021)

The potential of data and data-driven technology to foster inclusive development is demonstrated by the large amount of work carried out in programmes under the banners of "data for development (D4D)", "information and communication technology for development (ICT4D)", "artificial intelligence for development (AI4D)", "data for good", and "AI for good". At the same time, it is clear that data and technology can exacerbate divides. It is therefore imperative to both harness the power of data and data-driven technology to promote inclusion, and, at the same time, to mitigate the threats of deepening (or creating) digital divides. The governance of data and data-driven technology is key to the success of such balancing efforts, especially in low- and middle-income countries (LMICs) where threats to inclusion are pronounced.

Governance of data and data-driven technology involves establishing frameworks that manage and regulate data and technology throughout their lifecycles and across various domains. As a key aspect of the overall governance of technology, data regulation seeks to ensure the proper handling of data from creation to deletion, addressing concerns such as privacy, intellectual property, competition, and empowerment (OECD, 2024a). Regulation of data-driven technology, on the other hand, tends to focus on protection of shared values, principles, and human rights (OECD, 2024a). Both are essential to maximising the benefits of data and technology while mitigating risks. Regulation is the crucial engine of governance of data and data-driven technology, providing the necessary rules and standards to ensure that data and technology are used, inter alia, responsibly and ethically, thus contributing to a more resilient future.

The domain of data governance spans a range of issues at global, regional, and national levels. In its *World Development Report 2021: Data for Better Lives*, the World Bank defines four building blocks for a data governance regime that balances benefits and harms. These are: data infrastructure policies (the World Bank report's chapter 5); policies, laws, and regulations around data (chapter 6); related economic policies (chapter 7); and data governance institutions (chapter 8). According to the report, these building blocks are meant to establish and enforce "a new social contract […] that enables the use and reuse of data to create economic and social *value*, promotes *equitable* opportunities to benefit from data, and fosters citizens' *trust* that they will not be harmed by misuse of the data they provide" (World Bank, 2021, p. xi, italics in original).

With respect to data protection in particular, Access Now has developed a listing of 10 recommendations to be followed when law is developed in this area (Access Now, 2018, pp. 4-13): (1) "[e]nsure transparent, inclusive negotiations" when building the data protection framework; (2) "[d]efine and include a list of binding data protection principles in the law", including the principles of fairness, lawfulness, purpose limitation, data minimisation, accuracy, retention limitation, users' rights, integrity, confidentiality, and adequacy; (3) define a "legal basis for authorising data to be processed"; (4) "[i]nclude a list of binding users' rights in the law", including the rights to access, objection, erasure, rectification, information, explanation, and portability; (5) "[d]efine a clear scope of application"; (6) "[c]reate binding and transparent mechanisms for secure data transfer to third countries"; (7) "[p]rotect data security and data integrity"; (8) "[d]evelop

data breach prevention and notifications mechanisms"; (9) "[e]stablish independent authority and robust mechanisms for enforcement"; and (10) "[c]ontinue protecting data protection and privacy".

In its 2021 report on the data economy, the World Economic Forum (WEF) focuses on data exchange and its barriers, principles, capabilities, and enablers (specifically availability, usability, and building trust). The WEF report sets out a functional architecture, and a governance framework, for data exchange and incentivisation of data-sharing, concluding with a call for a multi-stakeholder approach so as to fulfill the promise of the data economy (WEF, 2021). Meanwhile, an UNCTAD report of the same year points to the importance of cross-border data flows and the transformation of the global data value chain, highlighting the severe imbalances in the global data economy and the tensions between national and global regulation (UNCTAD, 2021).

In reviewing the literature that is reported on in this paper, we surveyed both formal and gray literature, including reports by key institutions working on matters of governance of data and data-driven technology. In addition, we conducted a mapping exercise in order to identify the relevant institutional and regulatory stakeholders, the relevant instruments, and issues/gaps. Based on the literature review and the mapping exercise, we selected six challenges, with respect to regulation of data and data-driven technology, that are relevance to LMICs' pursuit sustainable development. These six sets of challenges, which are each covered in a separate sub-section in Section II of this report, are as follows:

- digital divides;
- the data divide and competition dynamics in digital markets;
- artificial intelligence (AI),data and algorithm biases, and inaccuracies;
- cross-border data flows;
- data and platform work; and
- intellectual property, including data ownership.

Crucial to addressing these challenges is regulation aimed at generating enabling environments, particularly through regulation of market structures and competition pertaining to data-driven innovation. And a key question is how stakeholders in developing countries should engage with national, regional, and global governance norms related to the behaviour of data-driven firms.

It should be noted that the six sets of challenges we highlight below are not the only challenges at play in the domain of governance of data and data-driven technology. Examples of other areas of importance that are mentioned below but are not examined in detail are: taxation matters and fiscal incentives.

II. Challenges in Governance of Data and Data-driven Technology

A. Digital Divides

The governance of data and data-driven technology should be seen against the background of persistent digital divides between and within countries. Such divides exist in terms of, inter alia, income, age, gender, ethnic origin and geographic location. Bridging and mitigating these divides is crucial to the discussion of governance of data and technology.

Digital divides extend beyond differences in access to data and technology to encompass inequalities in the use of, and contribution to, digital content. These inequalities reflect the divides in digital infrastructure, and also the divides in the human capabilities that develop and contribute digital content. In many ways, manifestations of digital divides mirror the analogue divides encountered by disadvantaged groups—with the poor, the under-educated, the marginalised, women, youth, and members of rural communities most

likely to experience digital inequalities (see Gillwald, 2017). The governance of data and technology must reflect cognisance of the complexities of such inequalities and of their on-the-ground socioeconomic manifestations.

At global level, digital-economy divides show signs of deepening. With data becoming an economic resource, LMICs stand to be confined to limited roles, as raw data providers, in their interactions with global digital platforms—with the LMICs then having to pay for the "digital intelligence" developed using LMIC data (UNCTAD, 2021). This vicious circle in the data value chain places LMICs at a severe disadvantage that is reminiscent of colonial-era inequities.

LMICs also experience a global digital governance divide, with the need for stronger voices in the global institutional architectures and arenas where norms for regulation of data and data-driven technology are established. Key matters of regulation for bridging digital divides include competition regulation with respect to ownership/control of digital infrastructure and pricing of digital services, and measures, oriented towards the aforementioned D4D, ICT4D and AI4D constructs, that target the marginalised.

B. The Data Divide and Competition Dynamics in Digital Markets

In line with the discussion above, the data divide manifests in asymmetries between large corporations and small businesses, especially in LMICs, with respect to data ownership, access and use. With data being an economic resource, it becomes a key differentiating factor and is typically most available to corporations that can afford to buy, gather, and analyse massive amounts of it. Asymmetries in data ownership feed into market concentration and are then reflected in power dynamics that disfavour local small businesses, homegrown start-ups, and data-driven innovators who are trying to carve out space for themselves in domestic markets. Lack of access to data can inhibit access to the market, thus limiting competition, lessening innovation, and serving to "stifle the energy and fresh ideas that startups and SMEs contribute" (ODI, 2018, p. 19). Regulation to ensure access to "essential sources of market data" for potential rival firms can, for example, be crucial to advancing competition among platform businesses (World Bank, 2021, p. 14).

The minimal cost of data reproduction and distribution in the digital sphere gives rise to network effects and economies of scale that favour first-movers, who typically are, or become, large corporations. The aforementioned World Bank *World Development Report 2021*, for example, emphasises this challenge and calls for "a paradigm shift", highlighting the need to address "the tendency of data-driven businesses to tip toward concentrated market structures and entrenched market power" (World Bank, 2021, p. 229). In terms of relevant regulatory measures, that report cites:

> […] *enforcement of antitrust laws*, with adaptations to the context of data-driven businesses. Enforcement involves detecting and punishing anticompetitive practices (in which a firm abuses its dominant position, or a group of firms enters into an anticompetitive agreement) or preventing anticompetitive mergers. (World Bank, 2021, p. 230, italics in original)

Such regulation is especially needed given the tax optimisation practices of large corporations—an indication of the critical role competition and tax policies have to play in mitigating imbalances generated by data ownership concentration (UNCTAD, 2019).

The World Bank recommends enforcing antitrust laws in parallel with designing regulations that protect users and allow data-driven businesses fair market entry and competition on a level playing field. These regulations would be designed especially for data-driven innovators, while maintaining mainstream regulation of traditional firms (World Bank, 2021).

The challenges faced by data-driven innovators are global, and thus need to be regulated not only nationally and regionally but also globally. At national level in LMICs, data-driven innovators tend to face a host of regulatory challenges in their respective contexts, including but not limited to nascent legislative

infrastructures and convoluted business environments. Proactive measures such as tax breaks and other financial incentives are often needed to support small businesses engaging in data-driven innovation in LMICs.

In African national contexts, due to the new forms of market power in the era of big data, competition regulation with respect to digital firms is gaining momentum. The Baker McKenzie *Competition in Africa Report 2022* found that several African countries had in the previous year taken steps to strengthen their competition and antitrust laws and regulations, with significant developments identified in Algeria, Angola, Botswana, Cameroon, Cape Verde, Egypt, Eswatini, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mauritius, Morocco, Mozambique, Namibia, Nigeria, South Africa and Zimbabwe (Naidu & Tzarevski, 2022).

In the case of South Africa, expert and policy reviews sourced from various jurisdictions have generated a range of recommendations for competition-based regulation of digital platforms, including: prioritisation of merger evaluations that encompass the potential harms to market competition; consideration of network effects and placement of relevant obligations on dominant firms; setting-up of "data units" that have the power to obtain information and enforce orders; and addressing anonymisation and privacy issues through regulation of data access (Roberts & Vilakazi, 2019).

On the global and regional fronts, cooperation is needed so as to ensure interoperability across national laws and regulations. UNCTAD notes, for example, that "[n]o single country's authority in competition or taxation alone can tackle the challenges posed by big digital corporations. Even developed countries and groups of countries, such as the United States and the European Union, are struggling in these areas" (UNCTAD, 2021, p. 181). An example of a recent domestic approach is the 2023 US Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence (The White House, 2023), which "emphasizes the role of the Federal Trade Commission to ensure fair competition in the AI marketplace and to ensure that consumers and workers are protected from AI harms" (OECD, 2024b, p. 16).

Market concentration may be amplified by cross-border data flows (see sub-section D below), as trade in data-enabled goods and services may work to the benefit of large corporations and jeopardise fair domestic competition. Ease of access by global firms to new markets and data can intensify their dominance. Competition between foreign and local firms, as well as between digital and analogue businesses, can also be undermined by a lack of effective taxation of international platform businesses, with effects for both competition in domestic markets and competitiveness in global markets (World Bank, 2021). Some global digital corporations retain the power to extract raw data from developing countries and to appropriate most of the value created, which increases the power imbalance and inequalities—and these phenomena are, in part, a result of the current absence of an international system regulating cross-border data flows (UNCTAD, 2021).

There also exist large concentrations of data owned by government national statistical offices, and these are typically "locked" by political and/or technological barriers. "Data lock" exists when the data is not accessible, is not updated, and/or its collection methodologies are not disclosed. Data may also be "politicized, filtered, incomplete, or censored" (Rizk, 2020a, p. 636). The data lock can manifest in the lack of accessible, high-quality, machine-readable data, and in "the cumbersome regulations and need for licenses to allow for reuse" (Rizk, 2020a, p. 637). Locking of data by governments can have severe repercussions for freedom of expression and human rights (Fatafta, 2021). In the health sector, "[o]ften data that exists in national HMIS [health management information systems] remains locked away in countries where they are deployed, and few portals host statistical datasets on health that contain full details" (Davies et al., 2019, p. 171).

Data can also be locked by businesses, presenting economic barriers. When combined with the aforementioned data asymmetries between large and small firms, data lock by governments and/or by big business presents a market barrier that hinders data-driven innovation, especially for small business and

start-ups in LMICs. Regulation is needed to open up this data, in ways that do not breach privacy and security, in order to enable citizens' and innovators' rights to data access and use. An example of an initiative to ease data concentration is the Open Government Partnership (OGP), which requires governments to make their information available in transparent and open data formats that increase levels of access, use, and interoperability (OGP, n.d.).

Legal rights for individuals and organisations to access government data are inherent in freedom of information acts, which are prevalent in high-income countries but much less present (and, when present, typically weakly enforced) in LMICs. In the Middle East and North Africa (MENA) region, three (Tunisia, Lebanon and Jordan) out of 22 countries have freedom of information legislation (Nait El-Rayes, 2024). Although Morocco adopted its Right to Information Law in 2018, the country is facing implementation issues in ensuring transparency and access to information to all citizens. Palestine has only a draft law (IFJ, 2023), and Egypt still lacks such a legal framework (*Ahram Online*, 2023).

Tools monitoring the availability and use of open data can serve to enable advocacy and to guide the governance of data towards the reduction of data locks imposed by governments and businesses. One such tool is the Global Data Barometer (GDB), which assesses performance and impact of open data initiatives (GDB, n.d.). The GDB maps the availability and use of open data, ranking governments on the readiness, implementation, and impact of open data. The GDB is useful for monitoring progress and supporting policymaking and civil society activities. The Open Data Inventory (ODIN), compiled by Open Data Watch (n.d.), is another tool to monitor and evaluate the coverage and openness of data. The ODIN provides a score that grades the comprehensiveness and openness of national statistical systems.

The Organisation for Economic Co-operation and Development (OECD) has developed an instrument to address data access and sharing in which it advocates a "whole-of-government approach to data access and sharing to ensure that data access and sharing arrangements help effectively and efficiently meet specific societal, policy, and legal objectives that are in the public interest" (OECD, 2021, Article IV). The OECD posits that for advanced, responsible access and sharing of data, regulatory environments should be agile, technology neutral and innovative, and should engage all different stakeholders (OECD, 2021). The OECD also highlights the importance of a sustainable, scalable and secure foundational infrastructure along the data value cycle. This can be achieved by promoting digital security risk management practices throughout the data value cycle, while encouraging investments across the data ecosystem (OECD, 2021).

C. Artificial Intelligence (AI), Data and Algorithm Biases, and Inaccuracies

Another core set of challenges are those raised by the biases and other inaccuracies inherent in data and data-driven technology, which can result in exclusion and other forms of harm to communities. In the data landscape, certain communities of people suffer from invisibilities and misrepresentations, and such invisibility on the data radar is reflected in absence from decision-making and/or policymaking. Examples of groups susceptible to poor visibility in data collection processes—e.g., pertaining to credit ratings, social protection policies, and inclusion policies—are informal workers, women, and migrants. Such inaccuracies can generate exclusion from policymaking and widening of development divides.

Data inaccuracies can also be caused by a lack of detail, which generates a "data blur" as "as aggregates cloud out granulations, which can only be captured by the disaggregation of the data" (Rizk, 2020a, p. 637). Data inaccuracy can also stem from methodological shortcomings, e.g., using a single-dimensional lens that assesses variables top-down and misses significant complex realities that are not visible from above (Rizk, 2020a). The work of Nobel Laureate Angus Deaton speaks to the importance of data collected bottom-up, e.g., household surveys using methodologies that reflect realities on the ground (Deaton, 2019).

Inaccuracies in data can then be amplified by biases in the algorithms that are used in AI models. These biases occur when algorithms are developed and implemented by so-called "experts" (who have control

over the ethics and the decision-making) instead of by the main beneficiaries, or "subjects", of the technology—possibly including marginalised groups (Crawford et al., 2019). In this regard, regulation needs to require that algorithms are humanised—through inclusion, in the process, of both domain experts and representatives of the subjects—so as to ensure relevance and accountability.

Given that algorithms are part of wider contexts, they may also generate direct harms. Most notable are facial recognition algorithms, which incur harms when used for discrimination and/or political surveillance. Regulation is crucial to ensure inclusive and democratic governance of such algorithms, including ensuring robustness and explainability, in order to prevent intended or unintended harms, especially those impacting privacy and security of citizens.

Regulation of bias or inaccuracies in data and algorithms is on the agenda of international organisations and think tanks, regional regulatory bodies, and domestic regulatory bodies. The Data for Development Network (D4D.net) has established the Global Index on Responsible AI (GIRAI), which represents the perspectives and needs of the Global South (D4D.net, n.d.). The first report on application of the GIRAI covers 138 countries, including 41 countries from Africa (Adams et al., 2024).

For its part, the OECD has set out five "[p]rinciples for responsible stewardship of trustworthy AI"—originally drawn up in 2019, and updated in 2024—which are as follows (OECD, 2024b, section 1):
- "Inclusive growth, sustainable development and well-being";
- "Respect for the rule of law, human rights and democratic values, including fairness and privacy";
- "Transparency and explainability";
- "Robustness, security and safety"; and
- "Accountability".

The OECD has also developed the following five recommendations for "national policies and international co-operation for trustworthy AI" (OECD, 2024b, section 2):
- "Investing in AI research and development";
- "Fostering an inclusive AI-enabling ecosystem";
- "Shaping an enabling interoperable governance and policy environment for AI";
- "Building human capacity and preparing for labour market transformation"; and
- "International co-operation for trustworthy AI".

Another important set of regulatory guidelines is the UNESCO Recommendation on the Ethics of Artificial Intelligence, which states that UNESCO Member States should provide "effective remedy" for algorithmic biases and discrimination; should ensure that AI systems do not replicate any discriminatory biases (e.g., gender stereotyping); and should be proactive in identifying and rectifying discriminatory biases (UNESCO, 2021). Such guidelines are particularly important for prevention of potential repercussions for gender equality, including violence against women online and offline (UNESCO, 2021). With respect to AI solutions for healthcare, the UNESCO Recommendation calls for Member States to pay special attention to the regulation of detection, prediction and treatment solutions; to ensure minimisation/mitigation of bias via oversight; to include domain experts in algorithm development; and to ensure mechanisms for personal data privacy (UNESCO, 2021).

The Global Partnership on AI (GPAI) Data Governance Working Group focuses on issues related to data justice and data trust (GPAI, 2024). Among the governance tools the Working Group is developing are "trusted mechanisms (e.g., certification badges) for displaying that datasets have undergone processes" to test their responsibility and trustworthiness (Digital Curation Centre, 2020, p. 56). Projects of the Working Group also include focus on public-sector "algorithmic transparency"; government provision of AI data; and the implications of generative AI on "rights and governance models in digital ecosystems" (GPAI, 2024).

Examples of regulatory tools that aim to reduce AI data inaccuracies are set out in the *AI Now 2019 Report*, which focuses on the accountability of algorithms and safeguards for biometric and facial recognition

(Crawford et al., 2019). The report highlights data protection as "the foundation of the majority of AI regulatory frameworks", and points to the need for regulating biometric recognition; ensuring accountability of algorithms; and assessing impact (Crawford et al., 2019, p. 31). In the *AI Now 2019 Report*, one activity recommended in order to address bias and ensure accountability of algorithms is the use of "Algorithmic Impact Assessments (AIAs)", which can "help governments, communities and other entities assess the social implications of AI, and determine whether and how to use AI systems" (Crawford et al., 2019, p. 8). Such AIAs must, according to the report, give consideration "to issues of bias, discrimination, and due process" and "account for AI's impact on climate, health, and geographical displacement" (Crawford et al., 2019, p. 8). The report also calls on machine-learning researchers to "account for potential risks and harms and better document the origins of their models and data" (Crawford et al., 2019, p. 8).

In addition to the above, the utilisation of context-specific data is crucial for ensuring data accuracy. The WEF highlights local context as a key issue for data governance, explaining that "how data are used and what is legitimate, fair or ethical vary greatly among different geographic and social groups" (WEF, 2015, p. 13). The WEF acknowledges the difficulty of incorporating context-specific nuances in regulation, yet warns that "having the universal data use policies that treat all data equally will face significant challenges to remaining relevant in all contexts and over time" (WEF, 2015, p. 13).

Europe has taken a leadership role in governance to foster trustworthy data and AI through a number of tools, including the European Commission's (EC's) AI Strategy and High-level Expert Group on AI (AI HLEG), the EU's General Data Protection Regulation (GDPR) and Law Enforcement Directive (LED); and, most recently, the EU's AI Act of 2024.

The GDPR of 2016 is the EU data protection law that lays out rules and obligations "relating to the free movement of personal data" (EU, 2016b), with the aim of ensuring the protection of personal data and expansion of privacy rights. In parallel to the GDPR, the LED of 2016 deals with the processing of personal data for law enforcement purposes (EU, 2016a). One key statement of the European approach to ensuring trustworthy AI is the EC AI strategy of 2018, entitled *Artificial Intelligence for Europe*, which sets out principles to establish human-centric and trustworthy AI (EC, 2018). In 2020, the aforementioned AI HLEG published the *On Artificial Intelligence* White Paper (EC, 2020), which set out seven requirements for guidelines on trustworthy AI, as follows:

- Human agency and oversight,
- Technical robustness and safety,
- Privacy and data governance,
- Transparency,
- Diversity, non-discrimination and fairness,
- Societal and environmental wellbeing, and
- Accountability. (EC, 2020, p. 9)

The White Paper pointed to tensions in the European regulatory framework. Given the pace of evolution of AI, the White Paper recommends that the framework must "leave room to cater for further developments" and that "[a]ny changes should be limited to clearly identified problems for which feasible solutions exist" (EC, 2020, p. 10). Related to this is the "[c]hanging functionality of AI systems", especially as AI programs and other software are integrated into products in a way that modifies the functioning of the products, with the possibility of giving rise to new, unanticipated risks that are not properly addressed in current legislation (EC, 2020).

Despite the European efforts to establish a common agenda, the White Paper points to a "current absence of a common European framework" and the lack of "an EU-wide approach" (EC, 2020). The paper calls for "[a] solid European regulatory framework for trustworthy AI" that "will protect all European citizens and help create a frictionless internal market for the further development and uptake of AI as well as strengthening Europe's industrial basis in AI" (EC, 2020, p. 10).

The White Paper also highlights the plethora of legislative tools governing various aspects of data and AI, directly or indirectly. Examples are legislation covering the protection of fundamental rights and consumer rights, e.g., EU directives on racial equity, equal treatment in employment, consumer protection, and, via the GDPR and LED, personal data protection and privacy. Moreover, related legislation includes laws covering financial services, migration, and responsibility of online intermediaries (EC, 2020). There is a need to assess and harmonise the array of tools in a way that ensures ethical governance of data and AI technology. In many ways, the above tensions are universal and can offer lessons for exploration of AI governance frameworks elsewhere.

The EU AI Act of 2024 came into force on 1 August (EU, 2024). The Act's Article 10: Data and Data Governance, sets out "quality criteria" that must be met in the "training, validation and testing" of datasets (EU, 2024, Article 10).

The African Union (AU) has made significant strides towards improved data governance on the continent (see Andere & Kathure, 2024). In 2022, an AU adopted its Data Policy Framework (AU, 2022). The AU's Convention on Cyber Security and Personal Data Protection, adopted in 2014, came into effect in 2023 (AU, 2014). In the same year, the AU organised its inaugural Data Governance and Innovation Forum, a platform for stakeholders to discuss new and innovative approaches to data policies and regulations (AU, 2023). With respect to AI, in 2021 the African Union Development Agency-NEPAD (AUDA-NEPAD) published *AI for Africa: Artificial Intelligence for Africa's Socio-Economic Development.* In April 2024, the AU convened online "multistakeholder consultative sessions on the development of a continental strategy" on AI (AU, 2024a).

Complementing the AU's efforts, the African Economic Research Consortium (AERC) has established a research programme around data governance on the continent (Internet & Jurisdiction Policy Network, 2022). The AERC brings together experts that include economists, lawyers, technologists and policymakers to create an interdisciplinary reference group that provides research and capacity building. In 2024, the AERC held a workshop for a collaborative project on a data policy and governance framework in Africa. The project is centred around, inter alia, best practices on data governance and policy; and identifying gaps, priorities and opportunities in digital technology in Africa (AERC, 2024)

At the African regional level, the Economic Community of West African States (ECOWAS) Supplementary Act A/SA.1/01/10 on Personal Data Protection was passed in 2010 to regulate data protection within the ECOWAS Member States (Andere & Kathure, 2024).

The African Union announced the Continental Artificial Intelligence Strategy in July 2024 (AU, 2024b) and, in an August media statement, pointed to the Strategy's emphasis on "unified national approaches" that will allow Member States to harness the power of AI and "navigate the complexities of AI-driven change" (AU, 2024c). A multi-stakeholder approach is among the recommendations of the Strategy, aiming to position Africa "as a leader in inclusive and responsible AI development" (AU, 2024c).

In the MENA region, some governments have been implementing technologies that heavily rely on data—e.g., national digital ID programmes, biometrics passports, e-health services—while data protection legislation is nascent (fewer than half of Arab countries have data protection laws in place, not to mention implementation and enforcement). This presents a clear threat to the privacy of citizens, especially as personal data is held by national security agencies and also may be exploited by private corporations for commercial purposes (Fatafta, 2021).

MENA countries have also taken steps towards open approaches to data regulation. For example, Morocco, Tunisia, Egypt, Lebanon, Jordan and Palestine have all launched open data initiatives and national open data portals (Rizk, 2020a). Several countries in the region have made efforts to promote free and open source software (FOSS) at a national level. Egypt's Ministry of Communications and Information Technology (MCIT) adopted a National Free and Open Source Software (FOSS) Strategy for the country's ICT sector (MCIT, 2014),

and the Jordan Open Source Association (JOSA) is promoting FOSS as integral to that country's digital transformation that promoted open source solutions (JOSA, 2021).

Egypt passed its first data protection law in 2020, which aims to establish a Center for Personal Data Protection (a regulatory mechanism) to develop policies and regulations for Egyptians' data. However, the Central Bank of Egypt is left outside the scope of the law and civil society was not consulted in its drafting and reviewing (Sayadi, 2020). Tunisia, Lebanon, and Morocco have weak and outdated national data protection laws and struggle to implement them (Fatafta, 2021).

Whether in MENA or elsewhere, having the necessary legislation is important but may not be sufficient. Enforcement, implementation, monitoring, and interoperability with the larger legislative environment are essential for achieving the desired benefits from data governance. Access Now reminds us that governments should not stop at having comprehensive law to protect personal data and privacy (Access Now, 2018). A data protection law must be regarded as a floor, not a ceiling for data governance.

Two regional initiatives, the African Observatory on Responsible AI[1] and the MENA Observatory on Responsible AI,[2] illustrate the efforts of the research community, working with various stakeholders, to raise awareness and promote the use and development of responsible AI. Among other things, these observatories aim to impact policy, foster networks, and bring local voices into the global debates on responsible AI.

In addition, the work of the A+ Alliance's f<a+i>r Feminist AI Research Network[3] in MENA[4] has supported initiatives to address data and algorithm biases for women. One research project developed a prototype entitled "Generative AI-Based Tutoring System for Upper Egypt Community Schools", which sought to optimise resource allocation to under-resourced educational settings with a focus on teaching girls in one-classroom, community-based schools (A+ Alliance, 2024a). Another research project examined the presence of principles of data feminism in large language models in MENA languages, under the title "Feminist Data and MENA Languages: Towards Building Feminist AI Tools" (A+ Alliance, 2024b).

D. Cross-Border Data Flows

Cross-border data flows cover a range of concepts that are summarised by UNCTAD (2021) as follows:

- *Data localization* refers to the requirement to store data in and/or process data using local servers. Data localization is also often referred to as data residency.
- *Cybersovereignty* broadly refers to the control exercised by States over various aspects of Internet and Internet-related activities – including digital content, digital infrastructure and digital services – inside their borders. Unlike multistakeholder models of Internet governance, cybersovereignty places the State at the heart of Internet governance.
- *Data or information sovereignty* refers to States controlling all data flows through the Internet (i.e. within and to and from their territory) to ensure, inter alia, that all data generated and processed within the State are subject to national laws and can be appropriated in any manner that the State deems fit.
- *Data protectionism* refers to the regulation of data flows by Governments to create competitive benefits for the domestic sector, including by adversely affecting level playing competitive conditions for foreign players.
- *Data nationalism* refers to policies that aim to ensure that domestic data are used primarily to benefit national interests. (UNCTAD, 2021, p. 120, italics in original)

The governance of cross-border data flows cuts across a number of axes, most notably the tension between national and transnational regulations. On a national level, countries must consider, inter alia: their

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[1] https://www.africanobservatory.ai

[2] https://menaobservatory.ai

[3] https://aplusalliance.org/global-fair

[4] https://aplusalliance.org/fair-middle-east-and-north-africa

economic, political and socio-cultural contexts; their domestic regulatory capacities; and their state of technological development (UNCTAD, 2021). From a more transnational/global perspective, countries must consider their foreign policy, including, inter alia: their international trade commitments; their degree of integration with the global digital economy; the globally distributed architecture of the internet; and the global nature of many challenges related to internet policy. To this end, the appropriate model for regulating data flows in each country remains a holistically complex policy choice requiring a careful balance. This balancing exercise is especially important for developing countries seeking both to maximise the potential benefits of the digital economy and to ensure greater welfare of their citizens (UNCTAD, 2021).

Most global digital platforms are based in the United States and China, while digital platforms based in the European Union remaining relatively marginal (UNCTAD, 2021). In LMICs, the global digital platforms play host to micro, small and medium enterprises (MSMEs) (UNCTAD, 2021). LMIC governments, therefore, need to avoid restricting data flows so as to, inter alia: preserve the quality and functionality of digital products and services available locally; allow foreign investment and entry in the local market; and avoid regulatory risks and costs (UNCTAD, 2021).

UNCTAD calls for an integrated approach to regulate cross-border data flows, grounded in legal instruments and regulations that govern data protection, cybersecurity, hardware and software, government procurement, trade agreements, state secrets, taxation and accounting (UNCTAD, 2021).

The OECD's position on cross-border data flows is set out in its 1980 Guidelines on the Protection of Privacy and Transborder Flows of Personal Data, its 1985 Declaration on Transborder Data Flows and its 1998 Ministerial Declaration on the Protection of Privacy on Global Networks (OECD, 1980; 1985; 1998).

The key EU regulation on cross-border data flows is currently the GDPR of 2016, which, as an Institut Montaigne policy paper points out, "includes provisions for data transfer outside the EU, such as adequacy decisions, standard contractual clauses, and binding corporate rules, as well as a list of derogations" (Institut Montaigne, 2023, p. 2). In August 2024, the EU and China commenced consultations with the framework of their new Cross-Border Data Flow Communication Mechanism (EC, 2024). Regulating cross-border data flows on the internet in the US follows a market-based regulatory approach that is grounded in a history of "open skies" internet privacy regulation related to international communication and information flows (LeSieur, 2012).

Emerging digital economies can either take a restrictive approach to cross-border data flows and face the risk of losing investments, or they may better achieve economic development by adopting regulations that facilitate secure and privacy-compliant cross-border data transfers—such that local companies can access services provided by foreign digital platforms (UNCTAD, 2021).

E. Data and Platform Work

The pervasive, global infiltration of technology into work practices has nuances for human development and clearly impacts SDGs—pertaining directly to SDG 8 (decent work and economic growth) and indirectly to SDGs 5 (gender equality) and 10 (reduced inequalities). What until recently was referred to as the "future of work" is now becoming a present reality, and it is increasingly impacted by the demographics and skills composition of human capital in LMICs.

With data and data-driven technology embedded in work arrangements, the threat of job losses for certain cohorts of workers in LMICs is pronounced, particularly for medium-skilled workers and women at the low end of global supply chains. Regulation to ensure accurate and timely data on work will help mitigate these threats and promote social protection, safety nets, and inclusion.

At the same time, the platformisation of the global economy, as accelerated during the COVID-19 pandemic and its aftermath, has also meant the emergence of new types of work that provide promise for highly skilled workers in LMICs. Examples include online work in architecture, design, finance, editing, and translation, all

of which offer work opportunities for educated individuals, including youth and women. Regulation of the data on which this work is based, including its cross-border data flows, is an important concern. Also important to consider are: regulating online innovations in this field, including data-driven innovators' initiatives and start-ups; and the tension, with respect to taxation, between local and extraterritorial work.

A Hinz (2019) study for the IDRC interrogated policy changes and emerging regulatory frameworks in the UK and EU for collection, analysis and sharing of platform-based user data, with focus on the EU's GDPR and the UK's Investigatory Powers Act and Digital Economy Act. Another study for the IDRC, by Delronge et al. (2019) investigated relationships between digital platforms and users, offering a policy framework for inclusion and protection of users in the platform economy. Two current IDRC projects are focused on platformised home-based work for women in Asia, with one project focused on Cambodia, Myanmar and Thailand and the other covering Sri Lanka and India. Findings from these projects have shown that while women are experiencing economic empowerment from platform work, they continue to encounter, in the digital labour market, the inequities they faced in traditional employment (IDRC, n.d.-a; n.d.-b).

Meanwhile, low-skill gig work has also expanded, with increasing precarity for labour in LMICs. Data regulation has a role to play in ensuring fair gig work in LMICs, as gig workers—and consumer of gig work—need, in addition to labour and taxation laws, proper regulation of their data, privacy, and security. And reliable and ethical data on gig work itself is necessary to inform social protection policies, which are integral to the fair work paradigm.

The Fairwork network (n.d.-b) is engaged in global research and advocacy in support of fair work practices in the gig economy. The project's methodology accords a score to gig work platforms based on an assessment of five principles of fairness—fair pay, fair conditions, fair contracts, fair management, and fair representation—and gives each platform a fairness rating out of 10. For example, in order to score a point for the principle of "fair conditions", a platform should have policies in place to protect workers, including a documented policy setting out responsible and ethical data protection and management measures. Through Fairwork assessments, platforms are pushed to implement data management policies that protect platform/gig workers.

One finding from the Fairwork research in South Africa and Egypt (Fairwork, 2021; Rizk et al., 2022) has been the relatively positive performance of homegrown start-ups, in sharp contrast with the performance of large multinational companies, when it comes to provision of fair work practices for gig workers. There is, thus, an argument to be made for incentivising local start-ups and working with them to ensure fair work conditions, so that they can serve as model businesses for other players in the economy (Rizk et al., 2022). Such incentivisation would also encourage innovation in these businesses, which are typically youth-led.

The Fairwork research in Egypt, conducted by Open AIR's North African hub institution—the Access to Knowledge for Development Center (A2K4D) at The American University in Cairo (AUC) School of Business—generated a notable success story through its interactions with one of the local start-ups that was studied. The start-up was providing services via the FilKhedma home-services gig work platform. After discussions with the Fairwork Egypt team at A2K4D, the FilKhedma platform agreed to implement a data management policy that satisfies the requirements of the Fairwork "fair conditions" principle and that is compliant with the EU's GDPR (Rizk et al., 2022).

F. Intellectual Property, Including Data Ownership

Regulation of intellectual property is another core challenge in governance of data and data-driven technology. Data regulation debates frequently focus on matters of privacy, concerning personally

identifiable information (PII), and data security. Yet, a comprehensive data regulation framework also needs to tackle questions of property, or property-like, protection in relation to data and its ownership, including data that does not qualify as PII. According to the World Intellectual Property Organisation's (WIPO's) then-Director General, Francis Gurry:

> [i]t's a question of where you want to locate in the economic system the incentives with respect to these crucial resource data, which are an integral component of economic and cultural production and distribution, but also social and political discourse. [...] Do you want to locate them with the origin of the data? The data subject? With the collector of the data? [...] [T]hat is a question for the future. (Gurry, quoted in WIPO, 2020)

A research paper by de Beer (2016) focuses on legal and non-legal mechanisms for data ownership, and highlights the degree to which current IP protections (including trade secrets) provide (or do not provide) for legal ownership of data. De Beer (2016) also examines the extent to which such ownership protections—usually through national copyright, patent and/or *sui generis* laws—are extended to compilations of data and databases. The de Beer paper emphasises the importance of domestic laws for determining ownership in data, as well as the (current and future) international instruments in terms of which these such laws are shaped (de Beer, 2016).

However, existing international and national IP frameworks tend to lack contextual grounding, struggling to provide (adequate) answers to the nuanced questions brought about by transformative and disruptive digital technologies, in particular with respect to AI. For instance, based on 92 responses received to an initial call for views on AI and IP, the UK's Intellectual Property Office identified the following three specific copyright and patent issues requiring deeper analysis:

- copyright protection for computer-generated works (CGWs) without a human author
- licensing or exceptions to copyright for text and data mining (TDM), which is often significant in AI use and development
- patent protection for AI-devised inventions (UK IP Office, 2021).

More specifically, some countries—including countries in the Global South such as South Africa—already provide copyright protection for computer-generated works (see, for instance, RSA, 1978). However, providing such protection raises several conceptual, legal, economic and philosophical concerns, including questions regarding the ability of AI systems to be "original", and the potential devaluation of human creativity. TDM, for example, can greatly support AI development and training, but it may involve copying of copyright-protected materials. Existing copyright laws may thus hamper AI development and training, especially when statutory copyright exceptions (e.g., for TDM) do not exist or are too narrow. Also, with respect to awarding patent protection for AI-devised inventions, profound concerns have been raised about patent proliferation, and the creation of patent thickets, as a result of granting such patents, with detrimental effects on innovation and entrepreneurship.

Context-appropriate regulatory responses to these and other issues—such as the potential lack of algorithm accountability and transparency as a result of overzealous IP protection, including trade secrets—need to be developed for and with strong input from LMICs, with the overarching objective of countering inequality and providing fertile ground for sustainable and inclusive development. Such regulatory responses are required in order to provide adequate protection for those involved in data collection and data creation. At the same time, such regulation also needs to speak to questions of data sovereignty and, crucially, must facilitate equitable data accessibility, sharing, reuse, and collaboration. Such regulation will arguably need to include IP models that promote openness (e.g., through open data), inclusion, innovation and entrepreneurship. There is an urgent need for more research in this area, as certain LMIC governments have already begun to respond to some of the pressing IP issues—often in a somewhat haphazard way that is inevitable given the dearth of contextualised and pro-development research evidence in this area.

Work on the annexes to the 2023 African Continental Free Trade Area (AfCFTA) Protocol on IP Rights (see tralac, 2023), as well as domestic developments such as South Africa's ongoing IP law reform processes (and the country's patent grant for a computer-generated invention created by the DABUS AI system) showcase the fact that regulatory research in this area is urgently needed.

Ideally, efforts in this area need to be in collaboration with relevant international and regional law-making and policymaking bodies, such as the AU (especially in connection with the ongoing conversations linked to the AfCFTA), WIPO, and the WTO. This is because these organisations have not only already heavily invested in identifying pertinent IP (and other) issues with regard to frontier technologies (such as AI and distributed ledger technology),[5] but also because they are bound, in terms of their official mandates, to make development considerations integral to their work.

III. Conclusions

As seen in this paper, probing matters of governance of data and data-driven technology opens up a wide array of issues, particularly as they pertain to achieving the SDGs. Accordingly, all six of the sets of challenges discussed above are, as demonstrated, integral to matters of regulation (as the core manifestation of governance) with respect to data and data-driven technology. However, at the same time, it is our finding that three of the sets of regulatory challenges, in particular, demand urgent research and engagement. These are:

- the data divide and competition dynamics in digital markets;
- data and platform work; and
- intellectual property, including data ownership.

All three tend to be characterised by asymmetries that favour market concentration and, in turn, aggravate development gaps.

With respect to **the data divide and competition dynamics in digital markets**, there are clear trends, at global, regional and national levels, towards concentration of data ownership, which in turn translates to market concentration. As a result, innovative and robust competition regulation is needed to address the myriad implications of this concentration, including both its commercial and human rights dimensions—particularly in instances where data ownership asymmetries serve as potential barriers to market entry and as tools for aggravating monopolies. A core priority needs to be researching, and engaging with stakeholders on, regulatory tools that can create favourable investment, employment and taxation conditions for domestic LMIC start-ups and MSMEs whose innovations are grounded in data.

There is also a need for nuanced and creative regulation to address the behaviour of the globalised data-driven firms who are the most powerful players in ecosystems of **data and platform work**. Regulation of the concentration of power (and of data) in these ecosystems must be a priority for forward-looking research and stakeholder engagement. The research and engagement need to take place on two levels in LMICs: (1) at the platform level, where market asymmetry holds between multinational corporations and small homegrown platforms; and (2) at the service level, where the platforms interact with MSMEs and gig workers.

As mentioned above, Fairwork project research by Open AIR's North Africa hub A2K4D on the gig economy in Egypt has illustrated tensions between large multinational companies and the competing homegrown platforms that are trying to find a place for themselves in a highly concentrated market (Rizk et al., 2022). Regulation of these market dynamics needs to be nuanced, and sensitive to the needs of local start-ups. The worst-case scenario can be seen in an example from Egypt, where a 2019 law regulating an element of the

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[5] See, for example, https://www.wipo.int/about-ip/en/artificial_intelligence/topics.html

platform economy—Resolution No. 2180 of 2019, widely known as the "Ride Hailing Apps Act"—was focused on the needs of the large global ride-hailing platforms such as Uber. The Resolution required payments that were beyond the financial means of small firms and their service providers (drivers). The Resolution was seen by small local businesses as being tailored only to the large ride-hailing carriers (Rizk, 2021).

Perhaps the starkest reality requiring regulatory attention in the context of the platformisation of work by data-driven platforms is the power asymmetry between platforms and their workers. When assessed against the criteria of "fairness" set out by the Fairwork project (Fairwork, n.d.), gig work platforms typically demonstrate unfavorable scores, e.g., in terms of fair pay, fair representation, and fair contracts. Integral to the power asymmetry is the platforms' control over workers' data, which exacerbates the precarity of the work. Regulation protecting the data rights of platform workers, along with a larger pool of economic rights for such workers (benefits, safety, organisation), is essential to achieving better governance of this radical transformation in service provision as mediated by globalised data-driven firms. And, at the same time, data protections for users of these platforms must not be overlooked.

With respect to regulation of *intellectual property, including data ownership*, it is clear from the discussion above that computer-generated works, TDM, and AI are three IP matters triggered by the digital economy that, among others, demand nuanced and urgent regulatory engagement.

In the literature reviewed for this paper, we see a consensus that for all three of the areas of regulatory challenge just highlighted (and also with respect to the other three challenge areas discussed in section II this paper), regulation of data and data-driven technology should be guided by principles of fairness, responsibility, transparency, justice, diversity, democracy, equality and inclusion. Also, based on our research for this paper, we feel that the following five realities hold true for governance of data and data-driven technology:

First, given that data and data-driven technology are intertwined with multiple SDGs, regulation in these areas should adopt holistic approaches. The regulation needs reflect inputs from across disciplines and in multiple fields, not from silos.

Second, there is a need for regulatory interoperability across jurisdictions—in order to ease tensions between global, regional and national frameworks, particularly given the growing degree to which data and data-driven technology are extended beyond national borders.

Third, governance of data and data-driven technology must be a two-way process. Broadly, regulation should happen along two axes: a vertical axis comprising top-down regulation driven by ground-up insights; and a horizontal axis comprising harmonisation across national, regional, and global jurisdictions. On the vertical axis, it is crucial that top-down approaches incorporate ground-up elements driven by communities and animated by the engagement of citizens and civil society. To this end, research should focus on regulatory action(s) to incentivise small data-driven innovators' businesses, e.g., via competition law measures and measures fostering enablement of start-ups and ground-up innovation ventures that engage youth, women and the marginalised. In that vein, regulations towards open data, open government, and freedom of information need to be on the priority list for easing data concentration and data lock by governments, and for opening the door for engagement by citizens and small private-sector firms.

Fourth, there must be innovation in regulation, with careful consideration of when it is appropriate for regulation to try to fit evolving new models into the old/conventional governance paradigm, and when it is appropriate to devise novel regulatory tools.

Fifth, as stated in the following quote from the World Bank's *World Development Report 2021*, there is a need for collaboration through a multistakeholder approach:

Although much of data governance is domestic in focus, an efficient and equitable resolution of many data governance challenges is possible only with international collaboration. Bilateral efforts are needed to manage cross-border spillovers of antitrust decisions and to join forces to combat cybercrime. Multilateral cooperation is essential to address global free-rider problems (such as data protectionism or tax evasion in data-enabled services) and to reduce transaction costs through harmonization of legal and technical standards for data protection and interoperability. At the same time, regional collaboration can help amplify the voice of low- and middle-income countries in global data governance negotiations and help realize economies of scale economies in the development of data infrastructure. (World Bank, 2021, p. 10)

The multistakeholder approach needs to include strong national capacity in LMICs. In their CIGI paper focused on African data governance, Ademuyiwa and Adeniran (2020, p. 15) call for each African country to have "autonomous regulatory institutions to coordinate data governance strategies" and to enable development of "appropriate laws for data protection, anti-competition and antitrust, taxation and other aspects of the digital economy". In addition, Ademuyiwa and Adeniran (2020) make clear that this national capacity cannot follow a one-size-fits-all model, pointing out that

[…] optimal institutional frameworks will vary across countries according to the existing political and economic realities and the level of development of the domestic digital industry. This is why flexibility and peer learning are required to create the right institutional frameworks (Ademuyiwa & Adeniran, 2020, p. 15).

At the same time, similar to the above-cited emphasis by the World Bank (2021) on the need for regional collaboration, Ademuyiwa and Adeniran (2020, p. 15) posit, correctly in our view, that "an individual country cannot effectively regulate the digital sector. Building broad partnerships internally and externally, at the continental level, will be important for African countries to annex the digital economy for economic transformation".

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ottawa@openair.africa
capetown@openair.africa