Open Data and Emerging Technologies:

Connecting SDG Performance and Digital Transformation

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Abstract

This brief aims to clarify the critical links that must be created between adopting emerging technologies in digital transformation strategies, open data, and data governance to strengthen the achievement of the Sustainable Development Goals (SDGs). Governments, especially in the Global South, can establish more sustainable data governance based on participatory and citizen-centric processes, multi-stakeholder business models, and performance management. Data governance has become a pillar of digital transformation. This document supports policymakers and public managers, particularly in the Global South, in the complex task of digital transformation and adoption of emerging technologies to better integrate open data and establish data governance to promote sustainability.

The Covid-19 Pandemic has exacerbated the challenges of economic, social, and environmental sustainability, deepening the problems of public trust in the Government. This unprecedented situation has highlighted the genuine need for data, digital government transformation, and the deployment of emerging technologies to address these complex challenges of sustainable development and progress on achieving sustainable developmentgoals.

Governments worldwide recognise the power of Digital transformation and the adoption of emerging technologies to advance and transform the public sector and its service delivery capabilities. This brief aims to provide research-driven policy recommendations on How open data could play a significant role in aligning the Digital transformation, the potential uses, adoption, and implications of emerging technologies, and appropriate data governance for advancing the SDGs and the UN 2030 agenda.

Key Recommendations
• **Building a sustainable data Governance framework based on structured governance and monitoring for digital transformation, emerging technology, and open data for an inclusive society.**

- **Define a clear data governance framework that ensures compliance with the regulation.**
- **Promote sustainable data governance, supporting a data culture, transparency, and accountability.**
- **Define a strategy to engage users of open data and support them with policy and regulatory framework.**
- **Enforce and update regulations for data privacy.**
- **Support the development of Digital and data-related skills.**
- **Establish an open data policy for sustainable development.**
- **Monitor progress on SDG by ensuring efficiency and effectiveness**

The Word report "Open data for sustainable development" highlights that open data played a critical role in achieving the SDGs through different types of use in the healthcare sector, financial inclusion, urban planning, and others. It resulted in harnessing economic growth, job creation, efficiency in the public sector, transparency, accountability, citizen participation, and better sharing of information within the Government, among other benefits.

Open data is as important as technologies for sustainable development by supporting the development of tools and technologies to address the SDGs. Open data and other information can empower technologies to seek evidence for decision-making and identify trends to inform policy. At the same time, open data and emerging technologies have the potential to play a significant alignment role in achieving the SDGs and driving digital transformation. This brief aims to show whether and how digital government strategies and the adoption of emerging technologies support the open data available to contribute to and facilitate the achievement of the SDGs. Digital transformation can expand the SDGs by combining open data and emerging technologies (Figure 1).
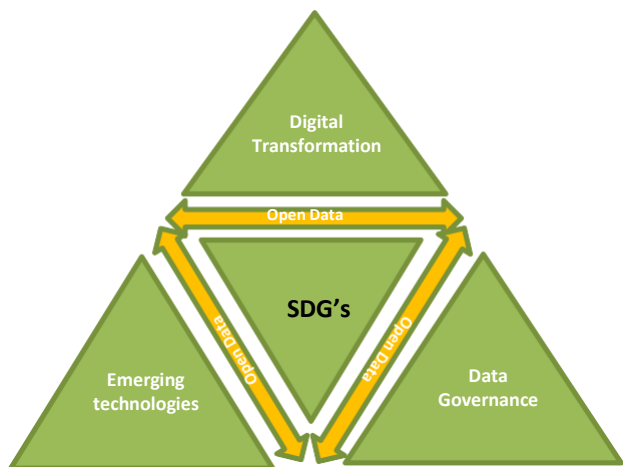

Figure 1. Connecting Digital transformation, emerging technologies, and data Governance to the SDGs

Digital transformation and open Data for achieving SDGs

Most countries in the Global South are in the early or middle of their Digital transformation journey. A strategic approach to digital transformation requires an institutional, organisational, and transformational framework that establishes practical and dynamic steps towards the diffusion of open data, access to digital technologies for all, and more collaborative, innovative, and open governments.

Digital government implementation and digital transformation strategies must prioritise effectiveness and efficiency. The sustainable development goals are often relayed to second-level objectives in the digital transformation strategy. While inclusiveness, social and economic equity, accountability, transparency, and a citizen-oriented perspective where everyone is included should be the priority of the Government. The challenges that the public sector has been facing to achieve digital transformation impact the performance of the SDGs and vice versa. According to the SDG 2022 Gender Index, one in three countries has made no progress in ensuring the well-being of girlsand women and achieving gender equity.

The low performance of the strategies for infrastructure, interoperability, data access; strategic alignment, managerial andorganisational resources; ethical and legal approaches, and investments limit the availability of data and its use to improve public services.

Certain social segments marked by systemic exclusion related to income, race, ethnicity, language, geographic location, and gender have limited resources to access the internet and, therefore, to use online data generation systems. The Electronic Government Development Index 2022 points out the risk of social invisibility resulting in denying fundamental rights.

Digital transformation in its various aspects depends on data, interactions, and policies to facilitate innovation and development with inclusion. With the increasing use of data worldwide, the Government is a data provider for businesses, academics, civil society, and other critical societal stakeholders. In the Global South, countries are opening their data. However, it is not made accessible more broadly. Furthermore, for open data to be valuable and exploitable, it must be presented readable and understandable to meet different users' and stakeholders' needs. Digital transformation should include strategies not only to open the data but also to engage with the users and support with policy and regulatory framework for the use and the properties of the data.

Furthermore, the digital transformation will require investing beyond data search tools and data visualisation and adopting APIs to contribute to the SDG. Creating a data culture where everyone feels safe and confident to share and use data is critical. Data remained a protected domain of experts and data scientists. Cultural change is essential to foster and improve data sharing, remove silos, and facilitate democratising data inside and outside the Government for better decision-making.

Harnessing open Data through emerging technologies to support SDG

Emerging technologies such as Artificial Intelligence can analyse datasets, identifying patterns and insights for decision-making and service delivery. Real-time and multi-source data can be collected and transmitted through IoT devices. Blockchain ledgers enable the sharing and use of tamper-proof data. Data storage and processing in public sector organisations be facilitated by cloud computing. Technologies based on augmented or virtual reality can support the public sector in new ways of visualising. The development of these technologies depends on large volumes of data, including open data, so that they can be applied and enable these new modes of knowledge and business models.

With the heavy use of emerging technologies in the public

sector, analysts need to pay more attention to harnessing open data through these technologies to contribute to the SDGs. Adopting emerging technologies and new data sources for the public good is not without risk. It raises various institutional issues, such as merging new data sources with traditional ones. It will necessitate building data governance frameworks or renewing them to ensure national ownership and the establishment of transparent mechanisms. Such mechanisms allow the private sector, academia, and civil society partners to contribute their data, expertise, and technology to achieve the SDGs.

The state of the data could play a critical role in the SDGs. The rapid pace of innovation of emerging technologies – AI, IoT, Blockchain, and others, present additional challenges for governments as technologies generate consequences and new ways of generating risk. Emerging technologies require qualified data to impact any initiatives related to the SDGs. Collecting, storing, processing, and sharing data between different actors depends on the governance architecture connected to regulatory policies. The complexity of the digital transformation and the deployment of emerging technologies requires that governments guarantee fundamental rights, including data protection, and promote adaptive and flexible governance related to technological development. For instance, governance to deal with artificial intelligence must pay attention to the problems of algorithms, bias, and data quality problems. Governance for the Internet of Things must deal with data collection and sharing challenges.

Thus, as emerging technologies encapsulate data of different shapes and scales, new governance dilemmas must be discussed with a focus on the public sector. The risks of exclusion, the concentration of power, misuse, and data abuse are challenging, especially in governments with limited administrative and democratic capacity, low digital literacy rates, and weak enforcement and corrective measures. Many questions about the value of open data have been raised and are still being investigated.

Implications of data Governance for open Data in achieving the SDGs

Data play a critical role in the sustainable development agenda. Open data, in particular, measures the direction and progress of the SDGs. Decision-makers need data and statistics that are accurate, timely, sufficiently disaggregated, relevant, accessible, and easy to use. Although data availability and quality have improved over the years, Global South still deal with data unavailability and quality, which tremendously reduces initiatives' impact. On the other hand, open data needs to be trained, updated, and represented to avoid gaps and biases. The data governance that feeds these systems acts to ensure transparency, effectiveness, and sustainability. Data governance can also support emerging

data structures like data-sharing pools, cooperatives, and public data trusts. Finally, data governance requires citizen consent so that the Government, and other potential actors, can process their data. Thus, consent is also an instrument of citizenship. While there is a growing movement towards open government data platforms, open data policies and plans, open-source data as a public good, sophisticated official statistics offices, data sharing, and data protection laws, more than these consent mechanisms are needed. Data and data governance need to improve.

Data governance shapes data policy by allocating resources and norms, creating accountability, principles, and norms, with the support of the Government, industry, the market, academia, and citizens. Contributions from different areas and actors promote the adaptive capacity of governance to match the range of innovations arising from emerging technologies.

Therefore, it is necessary to inform the state and scope of the data encapsulated by the technological tools and methods that operate on the data. As a good practice, governance should be based on a flexible model, such as formal and informal arrangements to direct, evaluate and monitor the management and delivery of policies and public services through relationships inside and outside the Government. In this scenario, data governance is a principle that must come first.

Data governance can complement data policy gaps by combining designs to protect citizens' data and privacy through consensus among multiple actors.

Policy guidelines for the data governance
• Adoption of a comprehensive policy that encourages different spheres of Government to adopt open data.   • Adopt guidelines or standards with clear instructions on collection, storage, sharing, and anonymisation, ensuring that personal data is protected and secure in government data disclosure.   • Establish a technical paradigm for metadata, data consumption, licensing, and anonymisation of open data cases involving personal data and cybersecurity-related events.   • Establish review and transparency standards for disclosure of personal data and in cases of incidents and cyber threats.   • Determining the carrying out of an impact assessment study and intervention measures related to the risks of opening data.   • Perform audits on open data maintained and managed in a controlled environment.

Therefore, the adaptive capacity of governance enables stakeholders to address compliance, provide information, change processes, and contribute their share to achieve the SDGs. Meeting target 17.18 is related to strengthening the data infrastructure, as decision-makers and public managers use key indicators to inform and formulate public policies. Ownership of indicators is critical to solidify sustainable data governance. More benefits can be associated with digital transformation strategies, stimulating innovation centred on people and offering services adapted to the needs of marginalised and minorities, specifically in the global south.

Thus, a data governance structure must, at a minimum: connect to the institutional system that promotes forms of interaction, collaboration, and coordination networks; institute monitoring and evaluation processes with the parties, preferably through the critical indicators of the SGDs; and manage the organisational, managerial processes that through sound practices of integrity, transparency, and accountability.

Towards sustainable data governance: lessons from Brazil

In 2018, the Brazilian Government created the National Digital Transformation System to enable the governance structure and the thematic axes of digital transformation. The SDGs were linked to thematic axes, connectivity infrastructure; research, innovation, and development; confidence in the digital environment; vocational education and training; and international integration.

To drive digital government transformation, the Government implemented: the data sharing ordinance between government entities supported by a central data governance committee and the Digital Government Law to create an aggregator platform of services and advertising in databases related to public services. From a regulatory point of view, the General Data Protection Law came into force in 2020, establishing protection as a fundamental constitutional right. From a political point of view, the National Open Data Infrastructure and the Open Data Policy must guarantee open data dissemination.

Although the Brazilian scenario looks promising in promoting open data to foster digital transformation, implement technologies, and achieve or impact the global South's SDGs, the Government has acted against the grain. First, it eliminated the mechanisms for monitoring and evaluating the SDGs from the Multi-Year Planning Plan between 2020-2023. Second, it abolished the National Commission for Monitoring the SDGs, which kept the evaluation indicators current. Concerning the maintenance of official statistical data, which includes open data, the responsible body had a substantial budget cut, making the democratic census unfeasible. Regarding articulating the digital transformation strategy with the SDGs, a budget allocation for the actions was not defined, making it difficult to assess the impact; moreover, the over-centralised governance structure has suppressed any practical discussion with stakeholders, particularly civil society.

In addition to promoting the emptying of monitoring and tracking mechanisms towards the SDGs, the Brazilian Government created a megabank of citizens' records with fifty-one sets of data from all government agencies and entities. Indiscriminate data sharing, justified for public policy purposes, supported massive surveillance and state control activities. Other databases were created from sharing personal data between government entities, and biometrics and confidential information were used in an abusive way, putting at risk the privacy of the citizen and the unconstitutionality related to the regulation of data protection.

The Brazilian Government is one of society's most significant data collectors, and data is at the heart of the Government's digital transformation initiatives. Analysing the Brazilian Government promotes and uses this resource – the data, to generate value from the digital transformation demonstrates which actions play transforming and facilitating roles in sustainable development.

The evidence from the Brazilian case demonstrates that we cannot assume that emerging technologies and the intensive use of data have only beneficial impacts, either to facilitate sustainable development goals or to boost the digital economy. Sophisticated techniques such as extensive data analysis and data mining were used to create representations of citizen behaviour and ultimately to control, restrict and violate the citizen.

Despite general data policy rules and principles, the need for clear guidelines on data collection, storage, processing, and sharing impacts open data widely accepted basic principles. Consequently, these gaps favour an opaque or invisible scenario of operations of algorithmic systems related to emerging technologies applied to the public sector without due citizen participation. Therefore, data reuse in the public sector depends on a governance structure capable of managing the entire data value chain, guaranteeing the ethical use of data through transparent and responsible treatment.

Policy recommendations and priorities

From the Global South experiences and lessons learned, it is critical to clarify the connection between adopting emerging technologies in digital transformation strategies, open data, and data governance to reinforce the achievement of the SDG through Digital transformation. Sustainable data Governance plays a critical role. A sustainable data governance structure for the public sector must keep up with society's demands and continuously implement improvements in its operations and services through responsible digital technologies that work under the citizen's scrutiny.

It is highly recommended that Government and public service consider in priority the development and promotion of Sustainable Data Governance the following:

Building Sustainable data governance

• Establish data governance structured by data quality requirements before using or applying emerging technologies or data analytics.
• Create a data governance structure composed of a board or committee capable of involving and representing the interests of multiple actors.
• Include cross-cutting elements such as gender, race, culture, literacy, linguistic diversity, and ethics as data governance requirements.
• Establish an assessment and monitoring for public policies on SDGs critical indicators related to data and technologies.

Promoting sustainable data governance

• Promote training and education for government agencies on implementing cybersecurity best practices and protection by opening government data and maintaining spaces for participation and transparency.
• Carry out public awareness campaigns on the reuse of open data.
• Establish cooperation with partners to share practices and experiences for sustainable disclosure of government data.
• Promote adherence to state and local policies on open data and disseminate sustainable data governance frameworks.
• Continuously engage experts and civil society in the framework of sustainable data governance and the definition of policies and norms as technologies and data grow exponentially.
• Integrate the governance structure and the decision-making process of opening data with data protection, information security, and political participation.

References

• De Magalhães Santos, L. G. (2022). Brazil's over-centralised governance of digital transformation. The African Journal of Information and Communication (AJIC), 30, 1-10. https://doi.org/10.23962/ajic.i30.14843
• ElMassah, S., Mohieldin, M. (2020). Digital transformation and localising Sustainable Development Goals (SDGs), Ecological Economics, Volume 169.
• Equal Measures (2022). Back to Normal Is Not Enough: The 2022 SDG Gender Index. Equal Measures https://www.equalmeasures2030.org/2022-sdg-gender-index/. 2030.
• Filgueiras, F.; & Raymond, Anjanette. (2023). Designing governance and policy for disruptive digital technologies, Policy Design and Practice, DOI: 10.1080/25741292.2022.2162241
• Giest, S., Samuels, A. (2020). 'For good measure': data gaps in a big data world. Policy Sci 53, 559–569. https://doi.org/10.1007/s11077-020-09384-1
• OECD. (2020). A Caminho da Era Digital no Brasil, OECD Publishing, Paris
• Wilson C.; Mergel, I. (2022). Overcoming barriers to digital Government: mapping the strategies of digital champions. Government Information Quarterly, Volume 39, Issue 2. https://doi.org/10.1016/j.giq.2022.101681.
• Wood, Alexandra; O'Brien, David; Gasser, Urs. (2016). Privacy and Open Data Research Briefing (September 26, 2016). Berkman Klein Center Research Publication #2016-16, available from SSRN: https://ssrn.com/abstract=2842816 or http://dx.doi.org/10.2139/ssrn.2842816
• Ulbricht, Lena. (2020). Scraping the demos. DigiDigitalisationb scraping and the democratic project. DemoDemocratisation. 426-442. 10.1080/13510347.2020.1714595.
• United Nation. (2022). E-Government Survey 2022. The Future of Digital Government. Department of Economic and Social Affairs.