

Sub-Saharan Africa

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Key points

- The open data movement in Sub-Saharan Africa has evolved substantially over the last seven years, but is still far from mature. However, there are promising examples of civil society intermediaries using data to support citizen engagement with government.
- Although the main source of data is often official statistics, open government data initiatives are rarely hosted by National Statistics Offices (NSOs), but instead by technology and communications ministries or ministries of finance. Private sector engagement is very low compared to other global regions.
- Open data is seen as a secondary priority, separate from other development agendas, such as physical infrastructure, agriculture, education, water, and health. There remains a perception that open data is an external priority that is owned by funders, rather than adopted and valued to serve domestic agendas.
- Strict definitions of open data can act as a barrier to data production. There are opportunities for data to be made more accessible and to be used to address social or government needs, even if not fully open.

Introduction

A story is often told of a group of open data civil society advocates in Uganda who requested that the government make budget information available as open data. The government official who responded could not understand why they were making this request in the first place. “But the data is already open!” was the response before he went on to point out to them that if they looked at various newspapers, they would see that the government regularly published summaries of approved budgets. This anecdote points out the importance of considering nuance and context when one reviews the successes and failures of African open data initiatives.



The norm for policy-making on the continent is for it to be based more on perceptions and personal experience, without the necessary data analysis that would help to paint a more accurate picture of any given issue or situation. Additionally, the open data movement in Africa has emerged against a backdrop of state-driven cultures within which it is considered sufficient to have public institutions alone responsible for control and monitoring of executive functions.

Historically, in many African states, data access was governed by the infamous “Secrets Acts”, a remnant from the colonial era (for British colonies in particular) when most government information was considered pertinent to national security and not for public disclosure. However, mounting pressure from donor institutions and a well-informed and digitally connected citizenry have provided the necessary incentives to kick start the open data movement. This has led to improved governance practices, including constitutional provisions for citizen participation (directly or indirectly via civil society organisations (CSOs)) and the establishment of national consultation frameworks for government planning related to resource allocation, as well as the monitoring of policy implementation by public institutions. The effectiveness of these mechanisms, nevertheless, is dependent on an informed citizenry; therefore, the right to access information, and by extension, open data, is a critical tenet for democratic states that value citizen involvement in the governance process.

Since Morocco launched the first open data initiative in Africa in 2011, open data movements on the continent have remained vibrant, with several countries and institutions rolling out new initiatives each year. More than 20 countries, regional organisations, and international groups have launched open data initiatives specific to Africa. However, this chapter will also address how many initiatives have struggled to find solid ground or have been deemed unsustainable by failing to show evidence of value and impact to the citizenry, the ultimate beneficiary of open government initiatives.

The progression and regression of different open data initiatives in Africa over the past few years has been attributed to several factors. For open data initiatives to thrive on the continent, they require “proper infrastructures, a high technology literacy rate, adapted national policies and strategies, national leadership, local intermediaries, local competencies and plenty enthusiasm among public institutions, civil societies, ICT companies, non-governmental organisations (NGOs) and academics”.¹ This chapter will focus on an analysis of open data ecosystems on the continent with a focus on Sub-Saharan Africa, providing a view of the state of open data in both Anglophone and Francophone countries. It will seek to describe the African open data landscape by unpacking the catalysts for the progress made to date and explore why some gaps persist in many existing open data initiatives across the continent.

The African open data ecosystem

The initial premise for launching open data initiatives was to advance democracy and drive economic growth in African countries. These outcomes were expected to result from increased transparency, accountability, data reuse, and technology innovation, so accordingly, when we examine the African open data ecosystem, many different stakeholders have emerged, each potentially driven by different motivations.

Government institutions

Within the open data ecosystem, government institutions have primarily been designated as open data producers, hosting national data portals and developing the frameworks required to govern the release of open data. However, in the Sub-Saharan African context, there is rarely any general consensus on which government institution is designated to host the national open data portal. While the majority of the data released is based on official statistics, National Statistics Offices (NSOs) are not necessarily the custodians of open data initiatives. There are notable situations where government open data initiatives are hosted by specific ministries, such as the ICT/Communications Ministry in the case of Ghana and Kenya or the Ministry of Finance in the case of Tanzania.

More recently, local governments have also become involved in the open data ecosystem, setting up their own portals, often complementary to their national counterparts. Local initiatives provide more granular and thematic data specific to the locality (e.g. City of Cape Town open data initiative in South Africa and the Edo State initiative in Nigeria). Similarly, multilateral organisations, such as the UN Economic Commission for Africa (UNECA),² have initiated open data initiatives that provide comparable data at a regional level on a range of topics, including population, health, national accounts, and other development indicators.

Development partners

The history of open data in Sub-Saharan Africa, and more generally, in developing countries, cannot be told without featuring the prominent role played by development partners. For instance, the World Bank is credited with being the critical catalyst for the emergence of an open data ecosystem on the continent, providing both financial and technical support to at least ten open data initiatives. This involvement has often integrated high-level dialogue with governments and the completion of Open Data Readiness Assessments³ in countries such as Rwanda, Mauritania, and Ethiopia, providing them with an understanding of their baseline positions in terms of the availability of data that can be reflected in planned open data initiatives.⁴ In several cases, such as in Kenya, Tanzania, and Ghana, this support has resulted in the development of customised roadmaps and funding to implement open data initiatives.

In addition to providing external support to national initiatives, development partners have been credited as being producers and aggregators of open data. As an example, the Africa Information Highway,⁵ an umbrella open data platform, was launched by the African Development Bank in 2013 with the aim of solving the difficulty in accessing data on key socioeconomic indicators for African countries. It allows each African country to have its own open data portal hosted on the platform, and the national data is mainly provided by each country's NSO, donors, and other international institutions.

Other key development partners that have been critical to the growing African open data movement include the United States Agency for International Development (USAID), the Department for International Development in the UK (DFID), and the International Development Research Centre (IDRC). All of these organisations have open access policies that require that data from supported projects be made available in open formats, although with some



exceptions. IDRC, together with the World Bank, DFID, and the Government of Canada, has also funded and supported knowledge generation and the development of thriving open data ecosystems in Africa through the Open Data for Development Partnership (OD4D). USAID has similarly actively supported capacity building for stakeholders in the open data ecosystem by providing grants for influential open data initiatives such as the Data Collaboratives for Local Impact programme.⁶

Civil society organisations

NGOs have been instrumental to the growth of African open data ecosystems. These organisations mainly support the implementation of open data initiatives and build capacity for the use of open data to increase access to information in support of advocacy and service delivery.

Some notable institutions actively promoting the development of the open data ecosystem in Africa include Open Knowledge International, the Open Data Institute (ODI), and the World Wide Web Foundation. These organisations have rolled out several initiatives with grassroots communities, providing thought leadership and creating knowledge resources and capacity building for open data government champions⁷ and civil society, as well as supporting annual Open Data Day activities.⁸ Other institutions, such as the International Budget Partnership, Extractive Industries Transparency Initiative (EITI), and Development Initiatives, have also been champions for thematic open data access and use with regard to budgets, the extractives industry, and poverty, respectively.

CSOs have also been instrumental in the growing demand for open data to support technological innovation. In particular, open data is increasingly used to develop effective civic technologies, especially those that enhance citizen–government engagement. Initiatives, such as *CodeforAfrica*,⁹ have developed citizen-focused applications utilising open data, while others, such as the Africa Open Data Collaboratives,¹⁰ have supported the convening of civic hackers, data journalists, and other open data stakeholders at regular conferences, such as the Africa Open Data Conference, as well as online events.

Private sector and academia

The private sector and academia have not been particularly active in the African open data ecosystem to date, with their participation traditionally limited to internal data production and the use of data for research and business purposes. However, more recently, as the private sector and academia look to contribute to the sustainable development agenda, there are emerging examples of the role that they can play as partners in growing the open data ecosystem. For instance, IBM and Ericsson have been involved in Smart Cities initiatives,¹¹ in partnership with government and development partners. The Smart Cities blueprint for Africa recognises the role open data will play in building efficient technology-driven cities via the management of city infrastructure, flows, and services.¹²

Academic institutions are also embracing open data policies in governing the dissemination of their research outputs, recognising the major impact that open access to the related data can have on development and other research. Electronic Information for Libraries (EIFL) is working

in partnership with a consortium of library partners toward the creation of open access repositories for academic research, which include data developed within research institutions.¹³ Academia is also contributing to the open data ecosystem through the completion of research on open data itself, such as the work undertaken by the University of Cape Town.¹⁴

To illustrate the potential interaction of African open data stakeholders, an initial model for the Kenya Open Data ecosystem (see Figure 1) was conceptualised by Rahemtulla et al. for the World Bank in 2012, describing the emerging and fluid relationships between civil society as drivers of demand for open data, development partners as supporting partners, and government officials serving as champions and agents of change.¹⁵

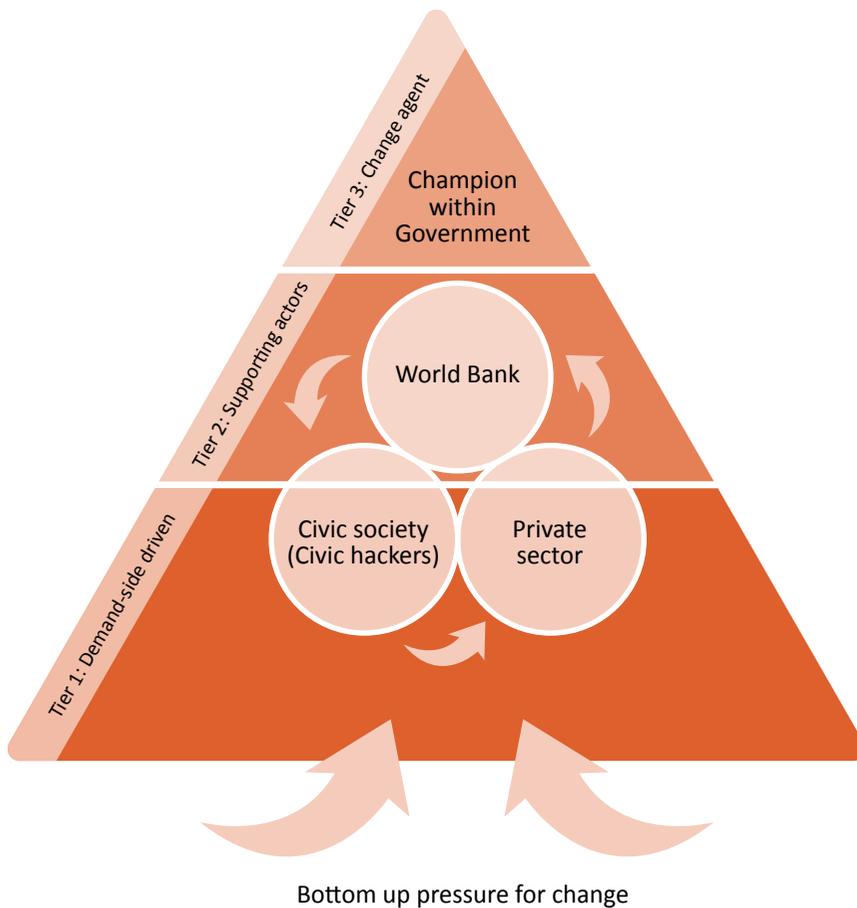


Figure 1: Kenya open data ecosystem as envisioned by Rahemtulla et al. (2012)

This “government/civil society/development agency” model can easily be extrapolated to many African country contexts. While relationships and the influence of open data stakeholders may vary in extent within the context of each country, they ultimately fulfil more or less the same role, although this model has started to become outdated as African open data ecosystems have evolved to include more actors with broader and multi-level interactions. For example, citizens have begun to feature more prominently in the open data ecosystem: first, as the ultimate beneficiaries of the value created by open data and, second, as the producers of alternative open data via crowdsourcing activities.

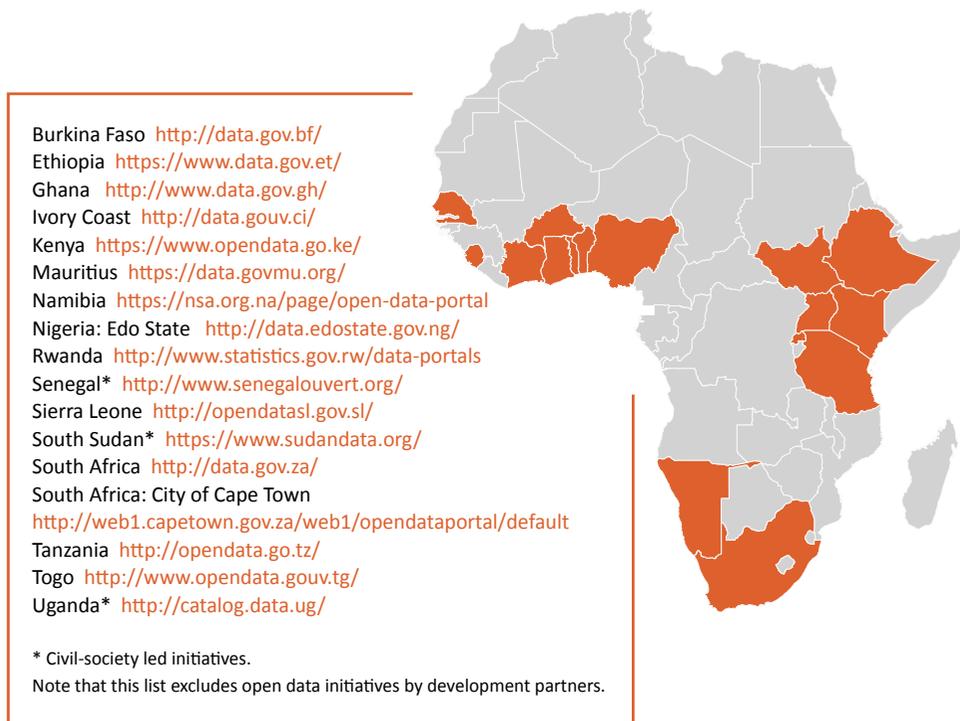


Figure 2: Countries in Sub-Saharan Africa with local open data initiatives

Source: Authors

Production and access to open data

Production of open data

During the past seven years of the global wave of open government activities, more than 15 Sub-Saharan African countries have launched open data initiatives (see Figure 2). Countries in the region with national open data portals can be classified into two categories: those with an official government-led open data initiative or open data portal, and those whose main open data

initiatives are civil society driven. Initial efforts to build open data ecosystems began with English-speaking countries launching portals and initiatives beginning in 2011, followed by countries from Francophone Sub-Saharan Africa who started their initiatives in 2012.

Most African open data portals make data available in machine-readable formats;¹⁶ however, very few datasets can be categorised as truly open (based on principles provided by the Open Data Charter).¹⁷ A review of these open data portals via global measurement tools, such as Open Data Watch,¹⁸ the Open Data Index,¹⁹ and the Open Data Barometer,²⁰ reveals that the most common datasets available cover demographics, education, healthcare, agriculture, budgets, economic data, procurement, oil/energy, and water. Of these datasets, it seems that census and budget data are the most commonly available on most portals, most likely because of the historical need for these datasets for planning purposes and resource allocation. While the majority of open data is created from government statistics, in some instances, development partners, CSOs, and research organisations have also made available the open data from projects that they have supported.

Production of open data has not been without its challenges, with several African countries struggling to produce and provide high quality and accessible open data. Data from the last three years of the Open Data Barometer shows a decline in readiness and implementation of open data across most of the Sub-Saharan African countries that were studied.²¹ This implies a consequent decline in the quality and quantity of updated open data available for public access even though the demand for data in new categories is increasing.

The Open Data Barometer further indicates that only two out of 375 datasets in the Africa regional analysis met the full definition criteria for open data.²² This is first and foremost attributed to the fundamental issue of data licensing. Despite the availability of data via open data portals, many datasets are subject to copyright and disclaimers are provided that restrict the reuse of the data.²³ In other instances, data is available in the form of scanned documents or as printed booklets, rendering its reuse very difficult without an additional process of manual or technology-enabled extraction of the data, which, in most cases, is an expensive exercise. For example, detailed data on government expenditures in Kenya is available from the controller as scanned documents, but only compiled reports are available online.²⁴

In addition, for some published open datasets, it is difficult to establish provenance as not all datasets are published with proper metadata, and it is not uncommon to find variations of the same datasets on different government sites. Some ministries and other public institutions are known to publish data on their own websites, but not via portals, making open data discovery and availability quite fragmented and difficult to trace.

Open data initiatives in Sub-Saharan Africa have been criticised for not generating high value datasets in open formats and more disaggregated data in thematic areas, such as healthcare, agriculture, and education. Most datasets on official government open data portals are rarely updated. Additionally, despite the fact that a few cities have launched open data initiatives, granular/localised datasets are still not widely available. It seems that institutions working on the supply side of data are still not collecting granular data, nor are they sufficiently supported to collect this data at the grassroots level. Yet these datasets are critical if development is to be localised.



Access to open data

Open data is produced and made available for access on digital platforms, but an essential requirement to access and use of open data is digital literacy. On a continent where more than 50% of the population is still without access to digital tools and mobile phones,²⁵ the lack of connectivity and technology is a barrier to the proliferation of open data initiatives, especially at the grassroots level. While the continent has leapfrogged the curve of technology uptake through the widespread adoption of mobile technology, crucial infrastructure elements, such as mobile internet, are still beyond the reach of many, with the penetration at just 38% in 2017.

Even with connectivity, open data is, in practice, only useful to those who are data literate and able to synthesise it into actionable insights. There is still poor use of open data by both government officials and CSOs due to limited data literacy. The literacy gap is large, especially for those CSOs that operate at the grassroots level, where they are expected to play a critical intermediation role between the citizen and public institutions.²⁶ Similarly, government officials are often unable themselves to leverage open data to support policy-making.

Language barriers also exist, further distancing potential access and the use of open data locally. For instance, open data literature is frequently in English only, which is a limiting factor that can exclude people who could benefit from open data if guidance was also available in local languages.

Key role for intermediaries in open data use

Although direct access to open data can be challenging, citizens still have the right to access the necessary information to make decisions and engage with their public institutions on policy-making. This necessitates some form of intermediation. Open data intermediaries play a critical advocacy role, as well as offering tools and access to information for potential users at the community level. In particular, traditional institutions, such as media outlets and religious institutions, have played an important role in relaying government information to grassroots communities in Sub-Saharan Africa.²⁷

To combat the barriers to access related to limited data literacy and technological capacity, intermediaries have taken up the role of distilling open data and creating products and information packages in formats that can be accessed offline.²⁸ Common tools used by intermediaries include citizen town halls and visual presentations that allow information synthesised from open data to be shared with citizens. For instance, the Open Institute in Kenya has worked with community members from Lanet, Nakuru County to collect local household data, which they then visualised in dashboards in order to share findings with community leaders.²⁹

CSOs, technologists, and data journalists have emerged as central open data “intermediaries”. Civic hackers and technologists have also created a variety of applications that are based on open data synthesised with other information to make data more readily available to citizens. For example, BudgetIT³⁰ in Nigeria and PesaCheck³¹ in East Africa are promoting participatory governance on budget issues, enabled by synthesised open data that they are disseminating to local communities.

Similarly, there has been demonstrated growth in data journalism efforts on the continent. In 2016, the African Network of Centers for Investigative Reporting demonstrated the role of open data in investigative journalism by publishing articles on illicit financial flows mined from the leaked Panama Papers.³² The Sudan Evidence Base Programme has also promoted data journalism as it encourages journalists and civil society members to use a storytelling approach to monitor development, government policies, and the use of government resources.

Legal, economic, and political frameworks for open data

More than half of the countries in Sub-Saharan Africa have either a constitutional mandate or right to information legislation in place, granting citizens the right to access information held by the state or public institutions.³³ Additionally, the advent of the Open Government Partnership (OGP) and the implementation of the African Peer Review Mechanism by African Union member states have been monumental in advancing the creation of government open data initiatives.

The OGP, through their support for the development of National Action Plans, has advocated for member states to commit to open data initiatives. These OGP commitments have been the channel through which countries, such as Côte d'Ivoire, have launched their open data initiative. Sierra Leone, South Africa, Ghana, Tanzania, and Kenya also have commitments related to open data as part of their OGP National Action Plans.³⁴

However, neither a Right to Information Law nor an OGP commitment necessarily translate to the existence of a thriving open government data initiative. In fact, it has been noted that several of these laws are insufficient or have significant weaknesses. These include restrictions within the laws on what information can be released, vague provisions that allow for withholding of information as deemed necessary, and difficult procedures for requesting information held by the state.³⁵ It has also been observed that much of the existing legislation related to open data is not backed up by any government policies or regulations that ensure the enforcement of these laws.

The impact of laws that are poorly implemented is visible in that some of the pioneering open data initiatives, such as the stalled Nigeria and Ivorian open data initiatives, were unsustainable as they were unable to transcend changes of government. Open data in African countries mainly thrives due to strong political will from open data champions within government; however, if this political will is not institutionalised, governments that must transition to new administrations are at significant risk that limited interest from the subsequent governments will undermine any pre-existing open data initiatives. Similarly, some open data initiatives are not funded sustainably and are threatened once funding from development partners ends if there is no custodial ownership from host government institutions.

Some institutions, including NSOs, face legal restrictions even where there is willingness to open up data for the general public to access. NSOs are also, in some cases, mandated to sell data in the form of publications to generate revenue in order to fund their complex work collecting and structuring national datasets. As a result, some data is available, neither openly nor for free, but solely in printed compendiums that have to be purchased.



Within data lies power, and those who hold data hold the power. Government officials, therefore, without the guidance of regulations and policies to publish open data are likely to be reluctant to publish this information, claiming that once open, data is subject to misinterpretation, challenge, or contradiction if citizens are free to manipulate government data without restrictions. The Statistical Act of Tanzania, published in 2015, restricts unauthorised communication and the dissemination of data that has not been sanctioned by the National Bureau of Statistics.³⁶ In this way, the law is running counter to the government's commitments to open data.

Given that many African governments are still not culturally open by nature, several have found difficulty to establish sustainable policies. There is a need for a "blueprint" for open data policies that can account for the many different contexts for African governments. However, successes do exist, such as Kenya's public participation frameworks that have been put in place to ensure citizen input on legislation, budgets, and resource allocation.³⁷ These frameworks are promoting active and meaningful participation in governance processes by prescribing the publication of relevant data and information in advance of barazas (town hall meetings), and could still be inspiration for development of local open data policies.

The African Data Consensus developed at the High Level Conference on Data Revolution held in Addis Ababa in 2015 attempted to provide principles that African governments could fall back on as they establish data initiatives. The document included specific references to ensuring government data is licensed as open by default, the use of technology, and the production of disaggregated data;³⁸ however, this document was never formally adopted, and open data advocates must rely on collaborative efforts within the open data ecosystem to domesticate the principles presented in the consensus.

Open data in the context of African development

Evidence of the use of open data in policy-making has been observed in several contexts; however, the most impactful outcomes from uses documented to date are in the area of governance and technology innovation. The drivers of these initiatives are mainly non-governmental actors: non-profits and civic technology innovators.³⁹ These stakeholders are the demand drivers and early adopters of open data in the African ecosystem, yet the private sector is conspicuously missing, unlike on other continents, where open data is also used directly to create innovation in business as well as for business research.

Throughout the continent, technology innovators and CSOs are employing open data in their projects. Examples of the impact of open data are found in several sectors. For instance, in Ghana, *Where My Money Dey?* is a volunteer built project that aims at improving public accountability of allocated funds in Ghana,⁴⁰ and *Farmerline* aims to impact the agriculture sector by offering an SMS-based service that provides small-scale farmers with up-to-date agricultural data.⁴¹ In 2014, during the serious Ebola outbreak in West Africa, a number of data-driven initiatives were established to improve the quality of information available to the humanitarians working to address the crisis, including work by the National Ebola Response Centre, United Nations Humanitarian Data Exchange, and the Ebola GeoNode.⁴²

Despite these exciting outputs resulting from open data use, such initiatives do not publish the extent of their impact (i.e. how many citizens or policy-makers have been affected by these initiatives). Therefore, their impact is not seen as widespread especially within government. In fact, according to the Open Data Barometer, the continent scores poorly on impact,⁴³ which is calculated as a composite of political, social, and economic impact. The first major limitation to wider impact of open data initiatives is the limited funding available to open data projects. In African countries, priority is given to investments in physical infrastructure, agriculture, education, water, health, and sanitation. Open data is seen as a separate project from these priority development agendas. Even after starting an open data initiative, governments will often prefer to direct follow-up investment toward development projects that are more visible to the electorate, rather than to data-related innovation.

As a result, open data projects are often funded by external donors and development partners, and they exist within a limited time period. Accordingly, it is inevitable that there is a potential disconnect between the objectives of those funding open data initiatives and those of the implementing governments and institutions. For instance, although the initial argument for open data initiatives was to promote good governance practices, such as transparency and accountability, it is challenging to find support for this narrative without giving consideration to the current institutional contexts and other political motivations. Therefore, open data initiatives are perceived as not grounded in reality and development priorities for host countries, but rather aligned with external priorities set by funding partners.

As discussed previously, the demand for open data has mostly stemmed from technology innovators, international organisations, and CSOs. Their efforts in some ways have been siloed, alienating public institutions and resulting in little to no ownership or commitment by government institutions, either as suppliers or advocates. Once again, without this institutional ownership, open data initiatives remain low on the priority scale and consequently receive little to no resources once donor funding runs out. Initiatives become dormant or regress in open data readiness as a result.

A second limitation to the developmental impact of open data initiatives in Sub-Saharan Africa is related to technical capacity at the government level. There is inadequate evidence of the use of open data to actually enhance government efficiency even though this has been identified as one of the key benefits touted by the open data movement. There are varying levels of data literacy both within policy-making and implementing institutions, presenting a challenge to actually using open data to drive development processes and produce high economic value. Collaborative initiatives such as OD4D, the Open Data Leaders Network, and similar fellowships for government officials are working to address this issue.

Additionally, there have been concerns that important data communities are currently not engaged in ongoing open data initiatives in the region, whose strengths could be leveraged to bridge gaps in development activities. Data communities are defined as “a group of people who share social, economic, political and/or professional interests in data across the entire data value chain – production, analysis, management, dissemination, use, and storage”.⁴⁴ For instance, the statistics community plays a pivotal role in harnessing the data revolution to achieve Sustainable Development Goals (SDGs). However, over the past seven years, empirical research has noted that this particular data community has more recently been side-lined, with more importance



being attached now to technology entrepreneurship and innovation communities. Nevertheless, NSOs will be very important to promote standards adoption for open data and ensure high levels of data quality, as explored in more depth in Chapter 13: National statistics.

Other important data communities that are not a mainstay within the region's open data ecosystems include agriculture associations, health professionals, and education experts, as well as gender experts, all of whom are not active at this time in helping to contribute toward achieving national development goals. We argue that it is necessary to mainstream open data further into these and other thematic communities to build capacity to use open data within these settings.

Partnerships for open data

As we have seen previously, different stakeholders in the open data ecosystem bring different skills to the table; however, there is limited collaboration documented between the different users of open data, particularly between government and civil society actors, despite their mutual interest in using open data being for policy-making, governance, and economic development.

Currently, efforts in this space are highly fragmented, and these siloed efforts result in repetitive initiatives, each with limited impact which could have been expanded with opportunities for peer-learning or a greater legacy footprint if they had a broader resource base. This leads to a chicken-and-egg situation where impact is necessary to compel additional resourcing for open data initiatives, but, at the same time, resources are required to implement these initiatives in the first place to fully realise the impacts.

This calls for the establishment of beneficial partnerships as advocated for by SDG 17 (Strengthen the means of implementation and revitalise the global partnership for sustainable development) and the African Data Consensus. The Communauté d'Afrique francophone des Données Ouvertes (CAFDO) and the Africa Open Data Networks (AODN) are two communities on the continent established to promote open data use to achieve Africa's development goals. They have been established as nodes of the OD4D initiative and are convening open data stakeholders across the data value chain, working to drive supply and demand for open data in the context of development and to mobilising the requisite resources and human capacity toward this goal. Through these kinds of collaborative efforts, the open data community can pool resources and strengthen its capacity to tackle the continent's most pressing needs.

Outlook for open data in Sub-Saharan Africa

While the open data movement on the African continent has definitely evolved over the past seven years, it is still far from mature. The number of open data portals and initiatives implemented is impressive; however, several of these are neither sustainable nor have they shown evidence of mass impact. Access to, and the use of, open data is still skewed to benefit a select few as the digital divide prevents widespread open data access. Regardless, the capacity of those with access to use open data, particularly those from grassroots communities, is questionable. Those with access are curtailed in their role as conduits to communicate the needs of every citizen and

compel action by government institutions in delivering required services. Any capacity building activities should be geared to enable institutions with access to open data to become better intermediaries in order to expand access more widely.

Weak institutions and weaker legal infrastructures are limiting the extent to which open data can impact developmental outcomes. Despite the existence of political will and laws that preserve the citizen's right to access information in most countries, it is vital to establish strong leadership to promote the production of open data that meets quality standards to provide maximum benefit to those who access and use it. To realise impact from such use, it is necessary to strengthen the capacity of open data stakeholders to create solutions to real problems based on the data. Therefore, the next step for the growth of the African open data movement involves ramping up advocacy efforts that can identify and support champions of open data within government institutions. To further strengthen these champions, there is also a need to promote the establishment of more sustainable open data initiatives by providing these initiatives with the support of appropriate policies and local resourcing modelled to the nuances of Sub-Saharan Africa's data ecosystem that will institutionalise open data within governments.

There is also an opportunity to resource open data initiatives via public–private partnerships to overcome existing funding gaps. Additionally, getting private sector actors more actively involved in open data initiatives can complement government open data with the non-competitive data that they may be holding. Combined with this is a need to systematically document outputs from active open data initiatives and their impacts on society, which could amplify these impacts through further research and other knowledge sharing platforms. Establishment of open data networks, such as CAFDO and AODN, are examples of efforts in this area that will go a long way in boosting open data initiatives and supporting stakeholders across the ecosystem. To realise the full potential of open data in Africa, these networks will have to galvanise the different data communities operating in Africa to work with governments at all levels to accelerate the supply, demand, and use of open data.

Further reading

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