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The role of digitalisation in inclusive governance: A case study of sub-Saharan Africa

Kashema Bahago
Adedeji Adeniran
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Abstract

This study discusses the transformative impact of technology on society and on understanding how technological innovation in the public sector is driving citizens' participation in governance.

The study also examines the roles of technology and governance in sustainable development. It highlights the importance of promoting an institutional framework that fosters digital evolution. The authors argue it is the key to inclusive and sustainable growth, improved governance, and responsive service delivery.

The paper focuses on three sub-Saharan countries—Nigeria, Rwanda and Senegal. It evaluates the contexts of digital transformation and governance to link the two, and develops a framework to guide the discussion on inclusive digital transformation in government. In addition, a rigorous evaluation of current policies, combined with expert interviews, was conducted to highlight how these issues interact to attain sustainable development. We argue that realising the benefits from the growing utilisation of digital technology for public policy service delivery will depend on the extent to which such transformation accommodates all sections of society (inclusivity) or excludes certain fragments of society (exclusivity). Achieving inclusivity through technology in public service delivery will depend on efficient political institutions that limit elite capture, as well as manoeuvring of the system to further consolidate political power, and demagoguery.

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Acronyms and abbreviations

EAC	East African Community
ESS	Espaces Sénégal Services
GDPR	General Data Protection Regulation
ICT	Information and Communications Technology
LACs	Latin America and the Caribbean
MIT	Massachusetts Institute of Technology
NCC	Nigerian Communication Commission
NDPR	Nigerian Data Protection Regulation
NITDA	National Information Technology Development Agency
OECD	Organisation for Economic Co-operation and Development
REAP	Regional Entrepreneurship Acceleration Programme
SSA	Sub-Saharan Africa Treasury Single Account
TSA	Treasury Single Account
UNCTAD	United Nations Conference on Trade and Development

The role of digitalisation in inclusive governance: A case study of sub-Saharan Africa

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Introduction

Technology has shaped individuals' way of life and revolutionised the service delivery approaches of institutions. The positive impact of technology on society ranges from its effects on agricultural mechanisation, the transportation system, communication, education, and the learning process (Loubier, 2021). It has also impacted public sector administration, health sector service delivery, and other aspects of governance.

> **Digital public service delivery has transformative effects in Nigeria, Rwanda, and Senegal, creating improved efficiency and a trend in addressing inequality and exclusive development.**

Okunogbe and Pouliquen (2022) also note the impact of technology on state revenue generation outcomes and corruption, pointing to innovations such as e-filing and the ability of e-tax to reduce extortion opportunities in the public sectors of developing countries. The adoption of technology poses other challenges, such as low skills to facilitate its usage and the financial cost of its adoption, among other factors.

However, these issues are incomparable to the benefits. Therefore, policies and interventions aimed at improving technology adoption and innovations must be encouraged. This can be done most notably by the adoption of technology-driven public service delivery, which improves efficiency and minimises the risks of perpetuating inequality and exclusive development (Ingram et al., 2022).

The transformative role of technology is often viewed as leading to positive developmental outcomes, for example, adopting a particular technology for service delivery in a specific public sector. However, this perspective fails to take other factors into account, for example, protecting technology users from fraud and data privacy.

This underscores the importance of promoting an institutional framework that fosters digital evolution—the key for inclusive and sustainable growth, improved governance and responsive service delivery (Hanna, 2016).

This study therefore considers it important to understand how technological innovation in the public sector has driven citizens' participation in governance, particularly in selected developing countries in Africa. Specifically, the study focuses on desk reviews and expert interviews the authors undertook to understand the specific institutional innovations selected countries adopted to support public sector digital transformations for service delivery. The aim—to understand current actions and to propose actionable potential future directions.

The future policies herewith proposed resemble others within the African region, including the African Union's Digital Transformation Strategy for Africa (2020-2030), which identified digital government as a significant enabling factor for the digital transformation of economies in sub-Saharan Africa; the Africa Continental Free Trade Area agreement to support digital economies that are networked for intra-continental trade and global e-commerce; and the Declaration of Principles on Freedom of Expression and Access to Information in Africa.

Other relevant regional initiatives are the Declaration on Internet Governance, the African Union Declaration on Internet Governance (2017) and the African Union Convention on Cyber Security and Personal Data Protection—the Malabo Convention (2014). Regarding the latter, only 28 of 54 African countries have data protection laws, and just 15 of the 28 have data protection authorities.

Against this background, this study examines the roles of technology and governance in sustainable development. The authors expect that a governance framework that promotes technology for inclusivity, ensures efficient and responsive service delivery, and protects the beneficiaries and users of such services will achieve sustainable development. These issues are examined based on a framework that links countries' governance structures and digital transformation, thereby demonstrating how the evolution of governance can result in inclusive digital transformation for sustainable development.

The authors also identify recent public sector initiatives that have improved government service delivery, and their transformative effects in the selected countries, namely, Nigeria, Rwanda and Senegal. A contextualised understanding of these issues is required as innovative policies and practices can inadvertently exclude citizens, reinforce the historic top-down approach in governance despite the goal of efficient service delivery, or can lead to new inequalities due to exclusiveness and thereby set back inclusive development.

Thus, the project research team worked with government experts and partners to evaluate governance through digital initiatives and to identify actions that could strengthen citizens' access to public services, improve the rights of poor and marginalised people, and achieve broad-based, inclusive and sustainable development.

Approach

This study has adopted three approaches to address the role of digital technology in public service delivery and its impact on inclusive and participatory governance in developing countries to achieve sustainable development. First, it evaluated the contexts of digital transformation and governance in selected countries in order to link the two. Secondly, the related literature was reviewed, and a framework was developed to guide the discussion on digital transformation in government and inclusiveness. Thirdly, a rigorous evaluation of current policies, combined with expert interviews, was conducted to highlight how these issues interact and impact sustainable development.

The data used for the study is gathered largely from secondary sources. The researchers also benefited from personal communications with selected stakeholders, whose expert knowledge about technology-driven public sector initiatives and governance in the study's context enriched this analysis. Another positive factor was access to quantitative data from various sources, including the Institute for Management Research Radboud University, the World Bank World Governance Indicators, publicly available government documents and other datasets, which are referenced.

Digital transformation and governance in sub-Saharan Africa

Digital Technology in the sub-Saharan Region

The use of digital technology for efficient service delivery and inclusivity and the protection of users/beneficiaries require holistic approaches that embrace good governance, better services and public-private partnerships for inclusive, sustainable development. Achieving such a transformation requires a public policy that promotes an inclusive information society focused on digital literacy, local content, social intermediaries, and grassroots innovation (Hanna, 2016).

Such change would require political will, a public-private partnership and the availability of infrastructures for affordable access to the internet and digital technologies. But challenges loom in Africa, such as internet shutdowns by governments, emerging social media tax regimes and lack of access to finance.

> **Kenya, Nigeria and South Africa are bellwethers in the African digital revolution.**

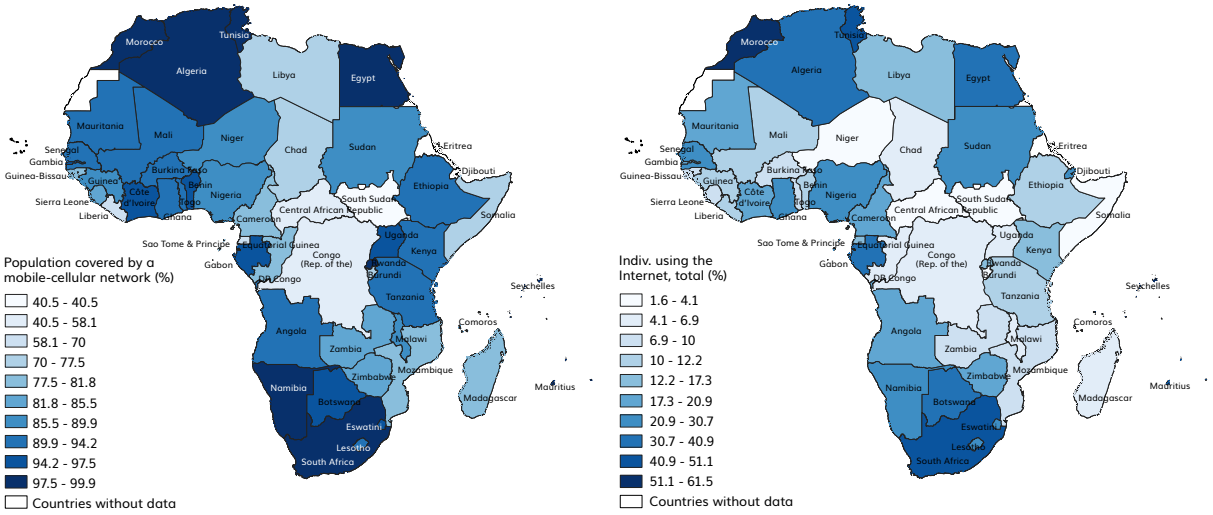
There are also other ad-hoc tech-related policies that complicate and impede market access, growth and innovation for online users and tech entrepreneurs. Further, while digital rights and data-protection laws enshrine and protect the rights and data of African citizens, regulatory inconsistencies and constraints in enforcement across countries persist.

The high cost of digital access and the low digital skills of the population are impediments to information and communications technology (ICT) and digital transformation advancement in the region. In 2021, 33% of Africans used the internet compared to 87% of Europeans, 81% of Americans, 57% in other developing countries and 63% of the world's population (International Telecommunication Union, 2021).

In contrast, the cost of internet access is highest in this region compared to other parts of the world. The average prices of fixed-broadband basket prices as a percentage of gross national income in 2020 for African countries was 19% compared to 2.8% for the world average, 1.3% for Europe, 4.7% for the Americas, 3% for Asia and the Pacific and 4.4% for other developing countries.

This paper also examines the extent of ICT infrastructure availability and access to ICT technology for individual sub-Saharan countries in Figures 1 and 2. Figure 1 shows the enablers of digital transformation, such as mobile cellular network coverage (2010 to 2020) and the proportion of individuals using such technology. In contrast, Figure 2 shows the cost of mobile phone calls and internet access. Figure 1 presents countries' cellular phone and internet usage, two essential components driving digital transformation in countries, a trend that results in significant investment in other sectors (Hai et al., 2021).

Figure 1. Infrastructural availability and access to ICT technology in sub-Saharan countries



Note. Authors' computations from *Measuring digital development: Facts and figures* by International Telecommunication Union (2021).

Figure 1 shows growing mobile cellular technology coverage in sub-Saharan countries, with less coverage in mostly Central African countries—Burundi, Central African Republic, and the Democratic Republic of the Congo. Countries such as Nigeria, Rwanda and Senegal, have a relatively higher proportion of their population covered by mobile cellular networks. However, Figure 1 also shows a lower proportion of internet usage by their populations. In Nigeria and Senegal, a higher percentage of the population uses the internet than in Rwanda.

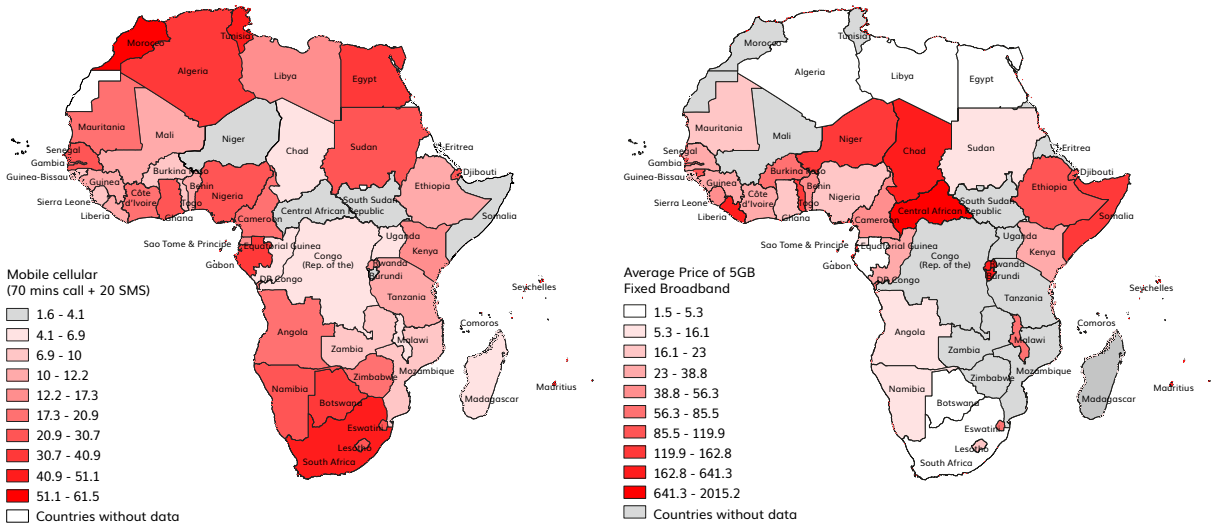
Figure 2 examines the cost of telecommunication in sub-Saharan African countries, focusing on the price (in USD) for mobile cellular low-usage service for a 70 minute call and 20 Short Message Services from 2010 to 2020 (left) and the average price of 5 gigabytes of fixed broadband network from 2008 to 2021 (right). The countries with the lowest priced mobile cellular service include Niger, Central African Republic, Somalia and South Sudan, with prices ranging from USD 2 to 4. Nigeria and Rwanda have lower mobile cellular service prices than Senegal. The price of internet in the region is lower in Senegal than Nigeria, while Rwanda has the highest internet prices of the three.

Free market competition in mobile cellular pricing may account for the price differential in Nigeria and Rwanda compared to Senegal. The Rwandan Government created an enabling environment for telecommunication companies to thrive and grow with initiatives like a government-sponsored fibre-optic expansion project throughout the

country, a well-developed cellular network covering nearly 98% of the population, and a liberalised telecommunication sector.

In 2014, the East African Community (EAC) made a commitment to create a one-network area for the five EAC countries—Burundi, Kenya, Rwanda, Tanzania, Uganda. For example, taxes on incoming calls were eliminated. Companies in Rwanda could now make mobile calls more cheaply within the bloc. The higher internet price is due to its access being limited to the capital, Kigali, the economic hub of Rwanda. The rural population, for its part, has both limited financial means and lack of access to the internet.

Figure 2. Cost of telecommunications in sub-Saharan African countries



Note. Authors' computations from *Measuring digital development: Facts and figures* by International Telecommunication Union (2021).

Stakeholders have attributed the high cost of fibre optics in Nigeria to a lack of transmission infrastructure in the country resulting in higher service costs, including for data services, especially in cities outside of Lagos. As a solution, the Nigerian Communications Commission (NCC) has licensed *InfraCos* with a mandate to build a fibre optic infrastructure for operators to lease at a competitive cost.

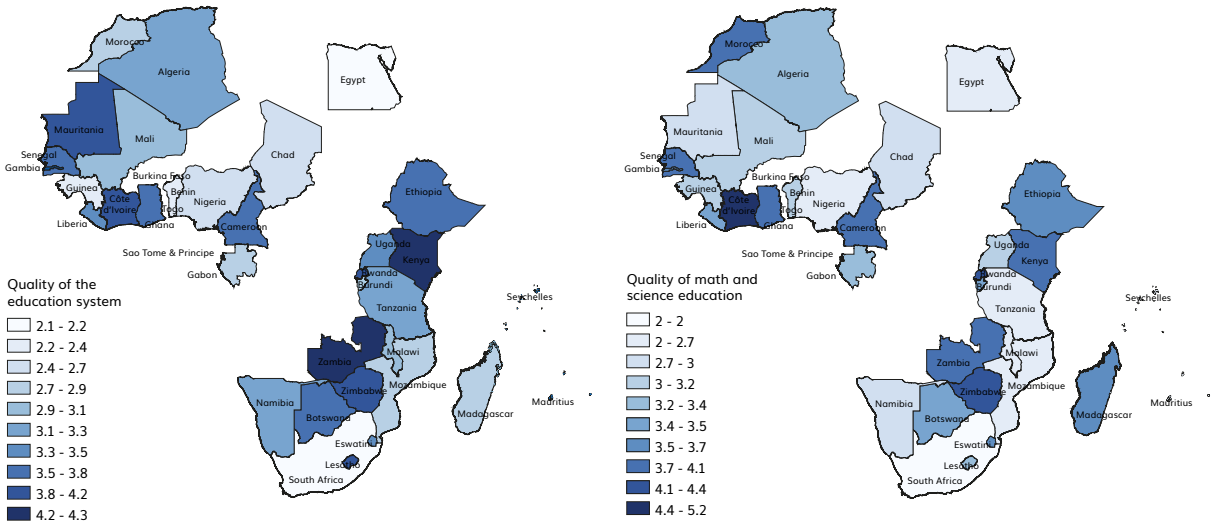
Operators are not using existing national and metro fibre links due to the cost, which is why stakeholders are calling for a business-friendly policy to provide a telecommunications transmission infrastructure countrywide. Compared to other countries, Nigerian telecommunication companies cite a 40% increase in their operating costs. Moreover, the introduction of the 5% excise duty on telecom service providers has increased the multiple tax and levies burden on the industry.

The telecommunications sector in Senegal was poorly developed until recently, which was due to the poor state of fixed-line networks and the *Sonatel* monopoly on fibre-optic internet. The lack of competition hurt prices. But from 2018, players such as *Société Nationale des Télécommunications du Sénégal*, *Tigo Sénégal* and *Orange-Bissau* entered the market. Competition ensued and prices for internet services decreased. However, *Sonatel* (*Orange* Senegal) remains the major player in the internet market.

Unfortunately, the call and SMS segment of the telecommunication market in Senegal is still monopolistic with higher prices for services. There are only three service providers in this subsector - *Orange* - 53% of the market, *Tigo* (now free) - 25% and *Expresso* - 22%.

As to the requisite skills to foster the adoption of digital technologies, the quality indicators of the education system and of maths and science education varies by country (see Figure 3). The figure on the left shows the quality of the education system, on the right, that of maths and science education compared to the rest of the world. Nigeria ranked lower than Rwanda and Senegal in both of these indicators.

Figure 3. Skills relevant to digital transformation in sub-Saharan countries



Note. The scores rank countries from 1 = not well at all to 7 = extremely well. The figures show the quality of the education systems and their ability to meet the needs of a competitive economy (figure on the left) and how well the quality of maths and science education compared to the rest of the world. Authors' computations from The Global Enabling Trade Report by World Economic Forum (2016a).

The three countries in focus are particularly relevant in the digital environment of Africa given the differentials in their pricing, usage and infrastructure coverage; the varied pace of digital technology adoption and of acquisition of requisite skills for digital transformation; and the diverse digital policies in the three countries.

The overarching question of this study is understanding the degree that countries' governance framework is evolving in tandem with their digital transformation to support sustainable development. A particular focus is on those national governance frameworks that can accelerate the pace of digital transformation to promote inclusive and sustainable development.

Governance and digital transformation in the sub-Saharan Africa region

Improving the governance framework in sub-Saharan countries is a prerequisite for inclusive digital transformation. Governance indicators in this region show marginal trends. For example, the voice and accountability statistics from the World Bank World Governance Indicators for 2021, which measures the extent of the freedom of expression and the ability of citizens to express opinions to influence government policies, show that the sub-Saharan countries' average percentile ranking is 33rd.

This statistic is lower than the average for South Asian (SA) countries (37th percentile), countries in Latin America and the Caribbean (LACs) (59th percentile) and the average for the Organisation for Economic Co-operation and Development (OECD) region (87th percentile). Despite the low ranking, Rwanda ranked lower than the average for sub-Saharan countries (22nd percentile), while Nigeria stood at the 30th and Senegal at the 55th percentile).

The region also ranked low in government effectiveness, an indicator of the quality of public and civil service delivery and the degree of inclusivity in policy formulation and implementation. In 2021 the average for SSA countries was 27th percentile, 38% lower than the average for SA countries, 47% lower for LACs, and 69% lower for OECD countries. In 2021, Rwanda and Senegal scored higher than the SSA percentile average (i.e. 62nd and 56th percentiles, respectively), while Nigeria scored in the 14th percentile, showing low performance for this measure.

A similar trend was recorded for indicators of regulatory quality in the private sector and private investment growth, and for corruption control, which shows the extent to

which public power is exercised for private gain. This includes both the smaller and the more significant forms of corrupt practices, and the 'capture' of the state by elites for their private interests. Two conclusions emerge from these indicators: first, the sub-Saharan countries average remains lower than that for South Asia, Latin America and the Caribbean and OECD countries; secondly, Rwanda and Senegal scored higher than Nigeria.

> **Improving the governance framework in sub-Saharan countries is a prerequisite for inclusive digital transformation.**

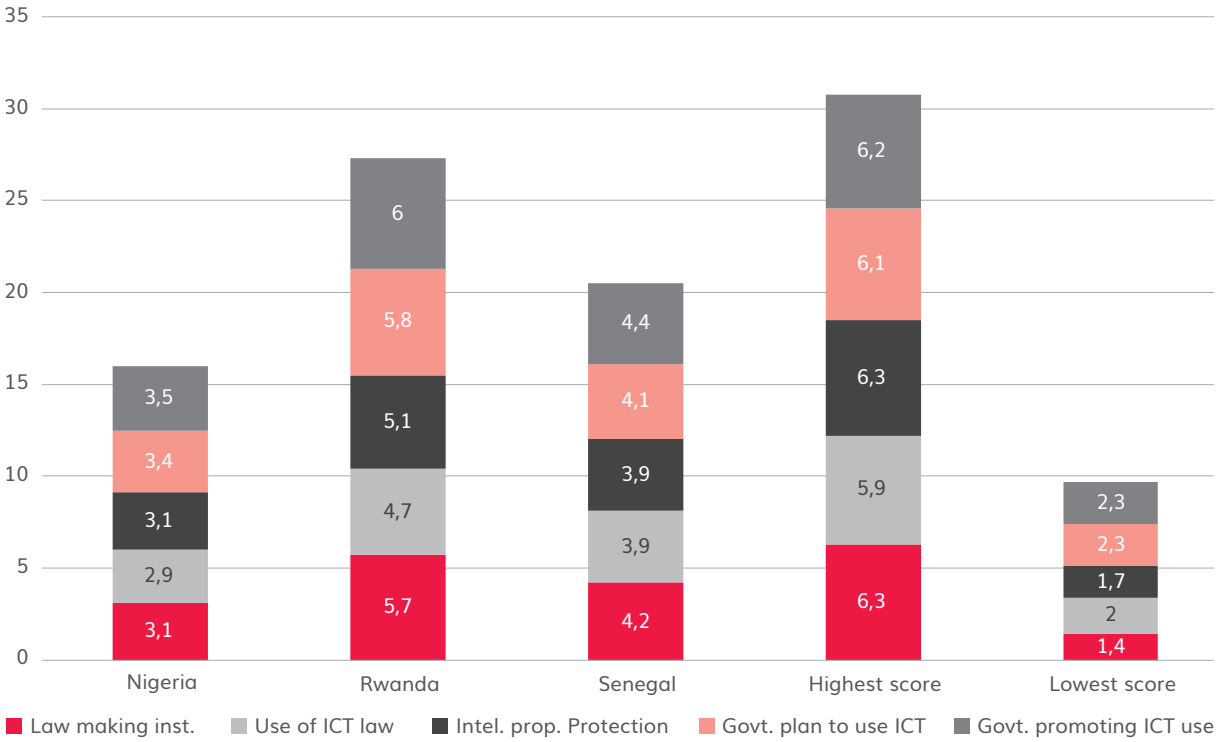
Figure 4 examines other specific indicators from the World Economic Forum that relate to the effectiveness of the national parliament/congress as a law-making institution; the development of the respective country's laws relating to the use of ICT; the extent of intellectual property protection; the clarity of the implementation plan for utilising ICTs to improve countries' overall competitiveness; and the government's success in promoting the use of ICT.

Two key points emerge from Figure 4: first, the governance structure in Nigeria still performs poorly in driving digital transformation compared to Rwanda and Senegal. Specifically, Nigeria performs low (3.1 out of 7) regarding the effectiveness of the national parliament/congress in formulating relevant laws for driving sustainable digital transformation, including digital security and data protection issues, compared to Rwanda (4.2 out of 7) and Senegal (5.7 out of 7), with Senegal's values almost equal with the best-performing countries in the world (i.e. 6.3 out of 7).

Secondly, the same pattern persists for the other indicators, with Nigeria recording the lowest score in the development of national laws on the use of ICT for electronic commerce, digital signatures and consumer protection (scored 2.9 out of 7). Senegal maintained its lead in this category (4.7 out of 7), and Rwanda – (3.9 out of 7).

Given the statistics cited, the logical question is: to what extent can governance for inclusive digital transformation drive sustainable development, particularly in addressing inequality? This report considers sustainable development from the viewpoint of a multidimensional framework approach and includes health, education, and individual and households' living standards.

Figure 4. Governance structure for digital transformation



Note. Authors' computations from *World Economic Forum Database* by World Economic Forum (2016b).

Governance, digital transformation, and sustainable development

To gauge if the evolution of governance and digital transformation correlates with sustainable development in the sampled countries, the research relied on the measure of sustainable development from the Institute for Management Research at Radboud University – Global Data Lab Subnational Human Development Index.

This source uses data from statistical offices to aggregate indicators from household surveys and census datasets on health (life expectancy at birth), education (mean years of schooling of adults aged 25+) and income (standard of living, gross national income per capita). It normalises the population-weighted averages of the indicators to their national levels in the UNDP-Human Development Index database.

To gauge progress in governance and digital transformation in respective countries, the research relied on World Economic Forum data that showed how ICT use by

governments improved the quality of public service delivery. It measures the speeding-up of delivery time, reduction in errors, the introduction of new online services and the enhancement of transparency.

> **Effective governance is needed to achieve the digitalisation of public services, strengthening accountability and inclusiveness in the African continent.**

The estimates from Table 1 support the proposition presented in this study – that the evolution of governance, a prerequisite for digital transformation, has a significant correlation with countries' sustainable development. This linkage is consistent for individual countries, although a higher correlation pertained to Nigeria – a 0.143 increase in the aggregate sustainable development index with better scores for ICT usage and governance. The corresponding statistics for Senegal – 0.112 increase and for Rwanda – 0.093 increase.

Similar correlations are found for indicators of sustainable development, such as the health, education, and income index. This would suggest that improvements in ICT usage among countries for improved public service delivery and governance could correlate with a rise in countries' efforts towards attaining sustainable development. However, given that such results are based on aggregate analysis, a key question of this study is – what national governance frameworks could ensure that digital transformation supports inclusive and sustainable development?

This paper assumes that countries in Africa will take advantage of the benefits of technology to achieve inclusivity and sustainable development thereby strengthening citizens' access to government services and improving the rights of poor and marginalised people through better governance.

Table 1. Correlation of ICT usage for efficiency in governance and sustainable development

	All countries	Nigeria	Rwanda	Senegal
	Aggregate Human Development Index			
ICT usage and governance	0.109*** (0.005)	0.143*** (0.008)	0.093*** (0.001)	0.112*** (0.005)
Observations	18	6	6	6
	Health Index			
ICT usage and governance	0.140*** (0.004)	0.139*** (0.008)	0.128*** (0.001)	0.161*** (0.007)
Observations	18	6	6	6
	Educational Index			
ICT usage and governance	0.089*** (0.005)	0.128*** (0.008)	0.080*** (0.001)	0.077*** (0.004)
Observations	18	6	6	6
	Income/Standard of Living Index			
ICT usage and governance	0.106*** (0.009)	0.165*** (0.008)	0.077*** (0.001)	0.114*** (0.005)
Observations	18	6	6	6

Note. *** connotes significant levels at 1%. Authors' computations from *World Economic Forum Database* by World Economic Forum (2016b); *Human Development Index | Human Development Reports* by UNDP (2022); *Individuals using the Internet (% of population) in Senegal* by World Bank Data (2020).

How are African countries applying digital technology to governance?

Some facts

To achieve efficient service delivery, government ministries, departments, and agencies in this region have prioritised digitalisation. For example, government activities are now enabled through digital tools and technologies for services that include financial transactions with government agencies and institutions; accessing public education and health services; public recruitment; and accessing legal services, immigration and customs services, to mention a few (Auriacombe & Vyas-Doorgapersad, 2019).

Kenya, Nigeria, and South Africa are bellwethers in the African digital revolution. These countries have shown commitment and resilience in catching up in the global effort to build a digital planet (Schelenz & Schopp, 2018). Their strategy—to ensure an e-government approach that deploys technology for efficient government service delivery, for example, using mobile and web applications to transform government-citizen interactions (Ndlela, 2009; Hutton, 2011; Al Athmay et al., 2016).

In Kenya, for instance, the government has set up portals to connect citizens to public services, and invested in digital education to improve citizens' capacity to interact with such portals and in ICT infrastructure to improve availability. The government also rolled out a digital inclusion policy to ensure that different social groups can access public services. Setting up the Huduma centres is one such example.

Huduma is a decentralised virtual hub that provides a wide array of governmental services, including dealing with applications, renewals of government documents and provision of financial transactions to the public. In 2017 in South Africa, the government rolled out its blueprint for using technology to improve government efficiency, termed the National e-Government Strategy and Roadmap. This strategy aims at enhancing e-government services and building a digital society.

Other African countries are also applying digital tools for public participation through private/public sector-led initiatives. For example, by using social media technologies, citizens can collaborate with the government in sourcing solutions to service delivery issues (Bertot, 2010). As a result, some countries are leveraging technology, particularly digital technology platforms, to improve government-citizen interactions. The main aim is to achieve governance efficiency in service delivery and to enhance inclusivity in public

service access, for example, so that those living far from government offices can now access services.

Barriers and drivers of digital technology usage for efficient governance

As the public grows more tech savvy, their expectations of high-tech public services increases leading governments to adopt new technologies to meet citizens' expectations (Fashoro & Barnard, 2021). For example, social media now connects politicians, public officers, and their constituents leading to better cross-sectoral communication.

Politicians and public officers communicate with their constituents and expect feedback from them through social media. The public also uses social media to demand government accountability and transparency. Such interchanges led to greater public trust and citizen engagement with the government (Bonsón et al., 2015; Arshad & Khurram, 2020).

Nonetheless, the introduction of digital technologies in some countries has highlighted challenges that further exacerbate the digital divide: inadequate digital protection policies, lack of skills, red tape and bureaucratic bottlenecks, and a weak political will to promote transparency using digital mediums (Fashoro & Barnard, 2021).

Other barriers include the low quality or weak availability of digital infrastructure and broadband internet inaccessibility for many low-income rural Africans. Such a divide significantly impacts household welfare in Africa. For example, evidence shows that the expansion of 3G internet coverage in Senegal is associated with a 14% increase in household consumption and a 10% decline in poverty (Masaki et al., 2020).

Countries failing to address internet access are jeopardising opportunities for their citizens, magnifying an already substantial degree of inequality, and inflaming regional, political and ethnic divides. Improving access to public service, facilitated by digital technologies, could result in improving citizens' trust in government and lead to greater inclusivity in public service access. Citizens' engagement in most African countries is a one-way interaction, such as through memos and reports and wider broadcast to citizens, e.g. through websites or online newsletters.

This model, the informative model of e-government, is one where the government produces and distributes information to citizens, disabling comments on the page or failing to respond to public comments. Such one-way communication hampers public participation (Halpern & Katz, 2012). Another barrier is the lack of digital tools and infrastructures, particularly in rural areas in Africa.

Associated risk: digital tools and the urgent need for 'governance' data

Digitalisation has also brought certain negative consequences. For example, countries must now align their workforce with the demands of a new digital landscape (Bührer & Hagist, 2017; United Nations Conference on Trade and Development [UNCTAD], 2017; Valenduc & Vendramin, 2017). Many African governments have prioritised knowledge-sharing and digital technology procurement as the key to sustainable development (Banga & te Velde, 2018).

However, some have imposed limits on information and communication access to protect the country from cyber-attacks (Bidemi, 2017). Internet shutdowns have been employed to control and monitor a country's population in ways that decrease democratic freedoms (Denardis, 2014; Bimbe et al., 2015; Ayalew, 2019).

Moreover, shutdowns undermine economic growth and interfere with start-up ecosystems, which presents a problem for Africa's myriad technology-enabled start-up enterprises and innovation hubs (Friederici, 2016; Kathuria et al., 2018). In Africa, the use of ICTs has significantly been affected by state-imposed restrictions and by limited access to online platforms and services.

A framework: governance and digital transformation

This section describes how inclusivity can be attained through consistent interactions between governance and the digital environment. In the framework in Figure 5, the linkage is shown between the governance structure in Africa and digital transformation. Governance, defined as the use of institutional structures to manage and oversee a country's affairs, can be deployed to support inclusive or exclusive citizens' participation.

This depends on how policy engagement supports human development or entrenches the existing elitist power structure. In this study, governance is referred to as 'inclusive' or 'exclusive' based on how the public authorities and institutions are deployed to foster or inhibit inclusive and sustainable development policies. Digital policy is the vehicle that will deliver on this.

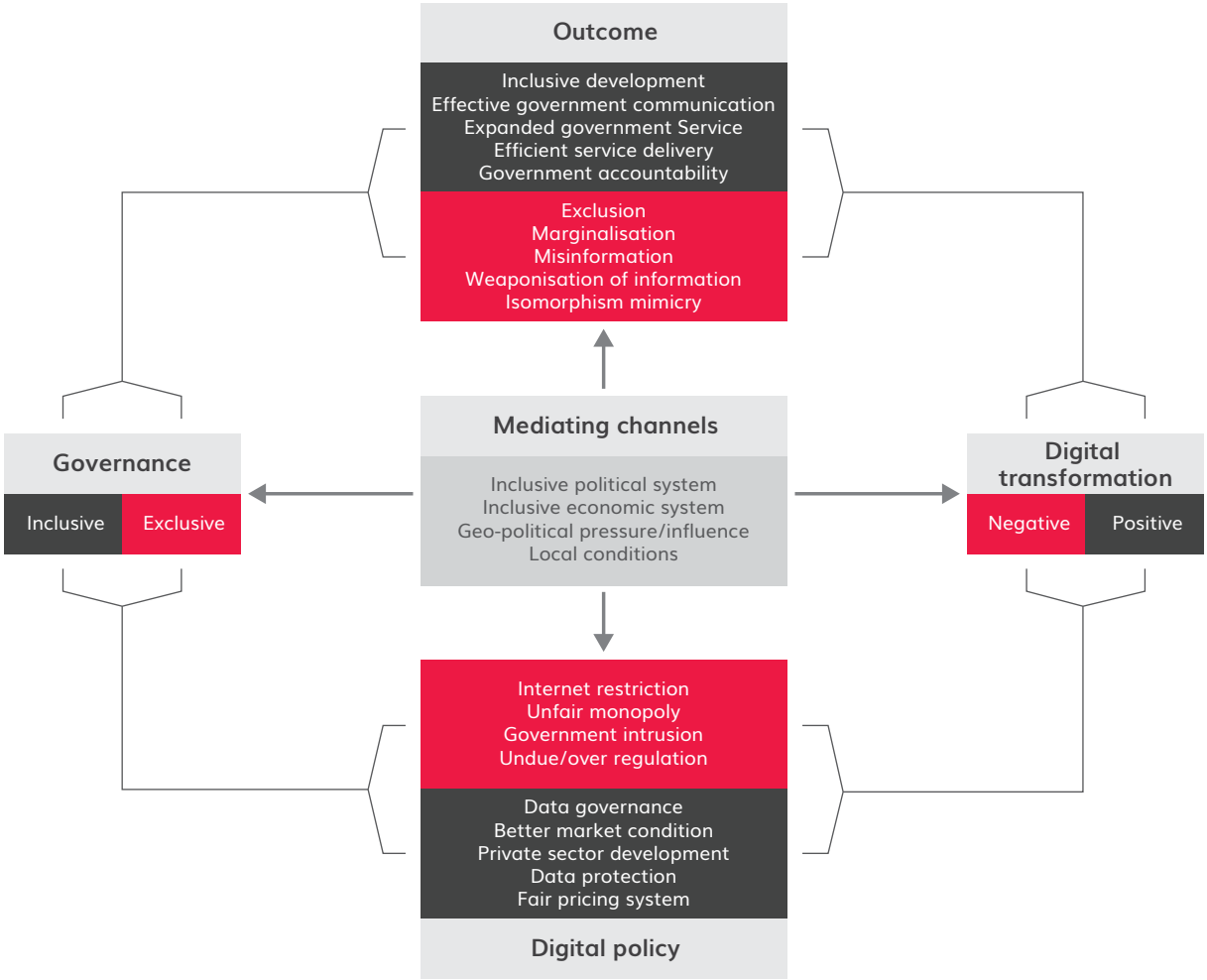
Figure 5 shows that, depending on the kind of governance, the type of digital policies introduced within the governance space may be inclusive or exclusive, which could impact digital transformation. For example, assuming the governance framework is developed to be inclusive, digital policies from such settings may include improved data governance frameworks, better market conditions to enhance industries that promote a digital

presence, private sector development and data protection and fair pricing mechanisms to ensure better access to digital platforms.

On the other hand, assuming the governance structure is set up to be exclusive, digital policies could include internet restrictions, unfair monopolies, government intrusion, and unnecessary/overregulation.

Thus inclusive policies lead to a positive digital transformation—inclusive development, effective and expanded governance service delivery and government accountability. They can also produce a negative digital transformation, with such outcomes as exclusive development, exclusion, marginalisation, misinformation and weaponization of information.

Figure 5. Governance and digital policy framework



Note. Elaborated by the authors

Our framework predicts that such linkages are a recurring cycle for both 'inclusive' and 'exclusive' governance. The global geopolitical environment also plays a role in this recurring cycle. For example, when the European Union adopted the General Data Protection Regulation (GDPR), the number of African countries that introduced data protection laws increased. Since the adoption of the GDPR in 2016, 24 African countries out of 53 have adopted rules and regulations to protect personal data. The number is slowly increasing because these countries see the regulation as a norm.

The extent that these countries enforce these regulations is unclear. To be noted is the low rate of signing and ratifying of the African Union Convention on Cyber Security and Personal Data Protection. However, the authors found a strong positive correlation between governance efficiency through the deployment of digital technology and sustainable development.

This conceptual framework is not envisaged as a linear process. Positive and negative digital transformations can coexist in a country. This is the rationale for situating the case study within countries with low and better institutional development, as depicted in the governance indicators in Figure 4. Our framework underscores that governance structures help to determine the type of digital transformation that will enhance public participation and public sector use of digital technologies.

Case study evidence

This section examines specific case studies on digitalisation and governance in Nigeria, Rwanda, and Senegal. The case study involved a review of relevant government documents and personal communications/interviews with stakeholders possessing expert knowledge about technology-driven public sector initiatives and governance in these countries.

Table 2 depicts digital governance policies, their levels of digital transformation, and digital outcomes for the respective countries. Key areas are digital government service delivery, data governance framework, social media policies, and digital innovation and entrepreneurship.

Government service delivery

Digital tools and technology deployment are central to government service delivery—e.g. digitalising education, health, legal and general government administration services (Thomas et al., 2009).

Nigeria

Nigeria is planning a nationwide digital transformation of government services (see Table 2) to be achieved by 2030. This is to be achieved by focusing on eight pillars to accelerate economic growth, including a regulatory framework for the ICT sector, population training, infrastructural development and enterprise engagement. Some innovations in Nigeria have been private sector-led with the transformation occurring both at the subnational and national level, including electronic voting at the subnational level—Kaduna state—and the Kaduna state-citizen engagement centre (website, mobile app, and SMS toll-free).

The government has implemented the Open Governance Partnership at the national level to enhance transparency, accountability, and citizen participation in governance (Ejugbo, C, 2020). It also seeks to leverage its partnership with civil society to review existing laws on transparency and accountability jointly.

The Nigerian public sector has also adopted innovative service delivery, from manual operations in accessing government services to electronic procedures

Shine your Eye, another Nigerian Government initiative, helps citizens connect with their elected officials at all tiers of government. The objective is to improve government service and accountability in governance by making it easier for Nigerians to connect with their elected officials.

This public-private partnership project seeks to promote better service delivery, transparency and accountability in constituencies in Nigeria. Citizens are encouraged to engage their legislators to perform their oversight functions effectively to ensure allocated constituency projects are well implemented. Table 2 indicates that this initiative categorises Nigeria's public service digital policy as inclusive.

The Nigerian public sector has also adopted innovative service delivery, including transitioning from manual operations in accessing government services to electronic procedures. The immigration process, tax services, applications, electoral processes, citizens' registration and identification, and submission of government tenders are some services that the Nigerian Government has made available electronically.

Despite such successes across manifold sectors, challenges remain that inhibit their positive outcome. This includes the cost of internet access in Nigeria, which is higher than the global and the African average, even higher than the average cost of internet access in Rwanda and Senegal (World Bank, 2022).

Other initiatives to improve citizen's access to government services in Nigeria include the recently implemented Treasury Single Account (TSA). Its priorities are twofold: first, to enhance government revenue generation, and to ensure transparency and accountability by aggregating government revenue into a single account; secondly, to stop the proliferation of commercial bank accounts by ministries, departments and agencies. A positive outcome of the TSA—revenue leakages, a significant challenge to economic growth, decreased (see Table 2).

The integrated payroll and personnel information system is another relevant initiative. Salaries and wages are paid directly into government employees' bank accounts. The Bank Verification Number is another initiative of several Nigerian banks with a country-wide biometric system implemented for 23 banks and the Central Bank of Nigeria in 2014 and 2015. The National Identification Number, which grants citizens access to government services, is another initiative that provides a primary digital identity for all citizens and legal residents in Nigeria.

Rwanda

In Rwanda, governance effectiveness in service delivery has improved, including reduced bureaucratic delays, because citizens can now access a one-stop online shop to access government services. As a result, corruption has declined, and Rwanda is now the fifth least corrupt country in Africa, according *to Business Insider Africa*.

Table 2 highlights the positive outcomes of both an inclusive government and digital policy. Rwanda's health system uses drones to deliver blood, plasma, and coagulants to hospitals across rural western Rwanda, helping to cut waiting times from hours to minutes. Zipline, the US start-up running the project, says the cost per trip is roughly equal to that of the current delivery method by motorbike or ambulance. The technology releases small packages attached to parachutes without needing to land at the delivery points before returning. The technology promises to make deliveries faster than by road showing how digital transformation brings positive outcomes in Rwanda.

The *e-Rwanda* project is part of the National Information Communication Infrastructure Plan of the Government of Rwanda aimed at transforming the country from an agriculture-based economy to a knowledge-based one by investing in ICT. The

Irembo—one-stop government 'shop'—is an example of an e-government initiative. Citizens also rely on their mobile phone or internet service for economic transactions and other public service engagements, e.g. for obtaining birth and marriage certificates, land registration, building permits, and health insurance, among other services.

Other government databases with huge amounts of data repositories serve as a foundation for other services, including the *Irembo* citizen portal that keeps all government service transactions. The Government Command Centre tracks key performance indicators for major national projects; Smart FMS manages national budgets; E-Procurement is used for the public tendering process; and Integrated Electronic Case Management System has a repository of all public case files.

The *Ubudehe* Data Base tracks citizens' poverty levels and profiles; the National Citizen Registry contains all citizens' biometric data; the Business Registration Database stores the active profiles of all registered companies. Others include the tax payment database at the Rwanda Revenue Authority; the Health Public Insurance Database for the health sector; the Pension Database managed by the Rwanda Social Security Board; the Census and Survey Database for the general population by the National Institute of statistics; the Telecom Mobile Subscribers Databases; and more.

However, the implementation of these initiatives has been delayed due to challenges such as low public awareness on ICT benefits. Only 11.8% of potential users are reportedly aware of the *Irembo* platform for e-government services, with the actual users likely to be fewer (Rwanda Governance Board, 2017). This means only a small elite has direct experience using e-government services underscoring the exclusivity in Rwanda's use of digital tools for government service delivery. Nevertheless, the benefits of this innovation are substantial which is why Rwanda is categorised as having a positive e-government service delivery in Table 2.

Other constraints to the effective implementation of e-governance in Rwanda are the lack of a highly skilled ICT labour force, inadequate funding and a lack of public-private partnerships required to achieve the various programmes and strategies set out for digital transformation of the country (World Bank, 2008).

Senegal

Senegal also has a positive ranking in digital government service delivery (see Table 2). The one-stop shop for government service delivery is an innovation for business creation/registration, social protection, cross-border data trade, and investment incentives.

These tools help overcome capacity constraints, improve data management, streamline administrative efficiency, reduce corruption, and improve transparency.

The *Espaces Sénégal Services* (ESS) is a one-stop shop centre with well-trained staff who help locals access public service delivery at the grassroots. The ESS has both a website and a mobile application for both android and IOS for the digitally literate public to access e-services. However, the service is limited, with citizens still unable to make online requests for administrative documents, including those related to individual and professional administrative procedures (see Table 2).

The Senegal Digital Health Platform was introduced to support the digital transformation of Senegal's health system. It has three primary missions—to map health care supplies throughout the country via the health map; to implement the e-health strategy through the national deployment of digital health tools and projects to develop uses; and to monitor and assess the country's health transformation through the health observatory.

> **"The social media campaign done by government agencies in Senegal played an important role in raising public consciousness to address health concerns**

The online service deals mainly with e-health practices, which comprise major digital health projects, a vaccination campaign against COVID-19, a directory of public health establishments, webinars, and online training of physicians.

The Senegalese Government has other initiatives, for example, creating the Ministry of Trade e-commerce platform to encourage more traditional businesses to go online. The e-commerce platform enables companies to reach consumers in all the major urban centres, especially beyond Dakar, where current e-commerce services are concentrated. It is also an information portal with various e-commerce operators' contact details, with plans to pool and optimise goods distribution by creating a national consortium of e-commerce operators open to all producers and merchants.

Data governance framework

Data protection policy and governance is another critical aspect of sustainable digital transformation.

Nigeria

The Nigerian Government set up the Nigerian Data Protection Regulation (NDPR) in 2019, the most comprehensive legislation to protect Nigeria's data landscape. The NDPR contains provisions covering the rights of data subjects, the obligations of data controllers and data processors, and the transfer of data to a foreign territory, among others.

The Federal Ministry of Communications and Digital Economy has prioritised the digital economy. To that end, it created the National Digital Economy Policy and Strategy for a Digital Nigeria whereby digital infrastructures will be built, digital literacy will increase, and Nigeria's digital divide will be reduced. The National Information Technology Development Agency (NITDA) has partnered with the Massachusetts Institute of Technology (MIT) on the Regional Entrepreneurship Acceleration Programme (REAP) which is designed to help regions identify innovation and entrepreneurial gaps and to devise ways to address them. REAP plans to train a million developers to build indigenous digital products for use by both the public and private sectors.

Rwanda

Rwanda has already enacted legal, policy, and regulatory regimes guiding access to information and personal data protection and privacy. For example, Law No. 18/2010 of 12/05/2010 on Electronic Messages, Electronic Signatures and Electronic Transactions, specifies data confidentiality matters. Regarding hosting, a Ministerial order of the 12/03/2012 law provides that all critical government information data should be hosted in one central national data centre.

The Smart Rwanda Master Plan places the use of data at the heart of national development by identifying particular areas, including where data will be applied. These include big-data analytics, the Internet of Things, Digital Lifestyle and Mobility, and Creative Industries.

Further, Rwanda's law on protecting personal data and privacy was officially gazetted on 15 October 2021. One of its tenets is a person's fundamental right to give consent to the collection, storage and processing of personal data. The law aligns Rwanda with international data protection standards, vital for a modern digital economy, and facilitates e-commerce, international financial transactions and various online services. However, Rwanda has yet to sign and ratify the Malabo Convention.

Senegal

Senegal is set to implement a digital sovereignty policy and ensure security in data transfer from abroad to Senegal. The government is also involved in cybersecurity, cybercrime, and cyber defence.

Senegal has had a law on personal data since 2008, Law No. 2008-10 on the Orientation Law on the Information Society, one of the few African countries to have adopted such a law. It is also one of the first African countries signatories to the Malabo Convention of 2014 (see Table 1). This agreement between member countries aims to strengthen confidence and security in African cyberspace. Senegal was the first signatory of this convention, followed by Mauritius in 2018.

Social media policy

Nigeria

In Nigeria, social media has also impacted citizens' demands for feedback from their elected officials. Such interaction was demonstrated in the civil activism that harnessed social media and internet platforms to demand government accountability, including the #EndSARS protest. This series of mass protests across the country called for the disbanding of a police unit accused of human rights violations known as the Special-Anti-Robbery Squad.

The spontaneous formation of this movement was facilitated by social media, with the campaign getting about 28 million tweets bearing the hashtag #EndSARS on Twitter. Beyond Nigeria, the movement gained prominence in the diaspora, and sympathisers emerged in many major cities worldwide.

Another example—is the activities of the Bring Back Our Girls (#BBOG), an activist group in Nigeria that raised awareness that resonated across the world, including the United Nations and the White House, following the kidnapping of over 300 schoolgirls by the terrorist group Boko Haram (Mourdoukoutas, 2018). This could not have been disseminated so wide and far without social media.

Nigeria's 1999 constitution guarantees the right to freedom of expression and the press. However, challenges to its interpretation arose in its application to new social media. The National Assembly, for instance, passed the CyberCrime Act, 2015 over public concern on social media use to promote bigotry and hatred in society. The law prohibits cybersquatting, and individuals and groups from engaging in racist and xenophobic attacks.

Other legislation, which the public suspected represented a government attempt to subvert the use of the internet and social media, was met by significant resistance through the use of social media platforms. The hashtag *#NotoSocialMediaBilll* was used to protest a proposed bill that would jail anyone for two years, or fine them USD 10,000, if they posted an "abusive statement" on Twitter, WhatsApp, or any other social media platform.

Rwanda

In Rwanda, government initiatives such as the 2012 One Laptop per Child Programme which distributed 500,000 laptop computers to primary schools, led to the emergence of social media platforms in public service delivery. Some infrastructural projects for technology utilisation are introducing fibre-optic cables across the country for affordable and reliable internet services. The results are palpable—since 2012, the proportion of the Rwandan population with internet access has grown at a higher rate than before.

While conducting research for this study, there were no restrictions found on social media in Rwanda. However, the 2001 Law Governing Telecommunications gave the government powers over regulating telecommunications networks to preserve "national integrity." A report has noted that such powers have been used to target government critics. Freedom House (2021) report notes that in 2019, WhatsApp disclosed that its messaging service had been exploited to target Rwandan dissidents with Pegasus, a suite of surveillance software.

Senegal

In Senegal, citizens and government agencies have also effectively used social media platforms. For example, a citizen-led public social media initiative via Facebook, also fostered via traditional media campaigns and via public support, made progress on tobacco control and government action was catalysed on a bill to address this concern[1].

This initiative succeeded in decreasing tobacco use in youth from 15% in boys and in 6% of girls aged 13 to 15 years in 2013 to 12% in boys and a slight increase to 6.9% in girls in 2020. About 8,000 people signed the petition and at least 3.5 million were reached online. The social media campaign played an important role raising public consciousness and creating citizen advocates championing the passage of the legislation (Paul & Emmanuel, 2022)

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1 Citizen-led tobacco control in Senegal. Petition site: www.sanstabac.sn

The government has also used social media platforms to address health concerns, for example, to obtain blood donations for critical life-saving interventions. This digital initiative was a government and international organisation-led project, launched by the Senegalese National Blood Transfusion Centre (CNTS) and supported by World Health Organization (WHO), which sought to capitalise on the country's rising social media usage to encourage people to donate blood regularly.

Senegal's blood donations plummeted by 75% at the pandemic's start. The CNTS social media campaign helped those figures rebound at a rate of 10% annually. Between 2020 and 2021, donations increased by 11%.

Other examples of civil rights initiatives include the public's use of social media to protest the arrest of Ousmane Sonko, Senegal's leading opposition figure, for allegations of violating the public peace and rape. The results—an internet shutdown in Senegal.

On Twitter, citizens were using the #FreeSenegal hashtag to draw attention to the situation, asking global figures to use the hashtag and help circumvent the media silence imposed. At the time of writing, the hashtag had been used 113,000 times and it was number one on Twitter's Trends list.

Despite the positive role played by social media platforms, there are accounts of internet shutdowns and government censorship (claimed to be due to national security concerns), fake news/misinformation and the spreading of hate speech, among other actions (see Table 2).

Increasing terrorism activities in neighbouring countries and the Sahel region and insurrection in the country's Casamance region have also been cited as a reason for increased surveillance and the social media clampdown.

Table 2. Summary of evidence from case study

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
NIGERIA				
Digital government service delivery	Significant digitalisation of government service operations, e.g. immigration process, tax services, applications, electoral processes, citizens' registration and identification, and submission of government tenders, among other services.		Government services have significantly moved online and are data driven.	**Positive:** 1. Growing effective service delivery; 2. Minimising revenue leakages and enhancing government revenue generation to ensure transparency and accountability in government expenditure by aggregating government revenue into a single account; 3. Minimising inefficiencies in the public service by eliminating 70,000 ghost workers; 4. Curtailing fraudulent activities and reducing non-performing loans in the banking system via bank verification numbers; 5. Curtailing political violence and terrorism via national identification numbers; 6. Public and private intermediaries between the government and citizens in the service delivery process 7. Increasing access to public information and data (open governance). **Negative:** 1. Poor service delivery; 2. Poor implementation of digital policies; 3. Low and unstable energy supply (electricity); 4. Digital divide (lack of digital literacy and poor digital infrastructure).
Data governance framework	1. The establishment of data governance institutions, e.g. NDPB and NITDA	1. No national data protection law in Nigeria; 2. Nigeria has not ratified and is not a signatory to the the Malabo Convention (2014)	Positive Transformation: Digital protection, information privacy Negative Transformation: Limiting freedom of expression Limiting voice and accountability	**Positive:** 1. Greater investment into Nigeria's digital economy space; 2. Innovation and growth of digital platforms facilitated; 3. Increased public trust in the use of the internet in Nigeria; 4. Data platforms and data processors held accountable for misuse of private data; 5. Data protection authority established; 6. Digital divide (digital infrastructure and digital literacy) reduced. **Negative:** 1. Surveillance; 2. Multiple taxation; 3. Overregulation

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
NIGERIA				
Social Media Policy	The ability to demand for voice and accountability, e.g. in the #EndSARS protest and in the Bring Back Our Girls [#BBOG] campaigns.	The formulation of laws and bills that seek to limit internet freedom, such as the Cyber Crime Act, 2015, and the #HateSpeech Bill,	Positive digital transformation: Establishment of data protection regulations. Negative digital transformation: Overtly regulating speech. Internet and social media shutdown.	**Positive:** 1. Awareness and public engagement increased; 2. Public protected from harmful content, e.g. misinformation, disinformation and malinformation; 3. Entrepreneurship and business growth enhanced; 4. Public engagement by the government; 5. Political campaign and advocacy; 6. Digital inclusion; 7. Digital literacy; 8. Demand for government transparency and accountability. **Negative:** 1. Restrictions to rights to freedom of expression; 2. Disruption of citizens' internet access; 3. Restrictions in access to information; 4. Restrictions in media freedom; 5. Economic losses from internet shutdown in Nigeria: as of 2021 estimated at $1.5 billion; 6. Increased unemployment rate; 7. Reduction in business sales, revenue and growth; 8. Curtailing of government accountability and transparency.
Digital Innovation and Entrepreneurship/ Digital Transformation	Establishment of REAP by NITDA and MIT to design and to help regions identify innovations and entrepreneurial gaps with ease and to help them craft strategies to fill these gaps. To train a million developers to build indigenous digital products, which can be used by both the public and private sectors.		Expansion of the innovative ecosystem and empowering future digital manpower.	**Positive:** 1. Nigerians are able to participate in the development of hardware, software and emerging technologies; 2. Job creation; 3. Growth in the number of digital/ data-driven companies; 4. Growth in the number of venture capital incubators and start-up incubators; 5. Nigerians can acquire cutting-edge technological skills; 6. Establishment of the National Digital Innovation and Entrepreneurship Centre. **Negative:** 1. Internet fraud and financial-related crimes; 2. High cost of internet; 3. Low internet penetration; 4. Access to finance; 5. Poor energy access (Electricity).

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
SENEGAL				
Digital government service delivery	1. The establishment of a one-stop shop for government services delivery called *Espaces Sénégal Services* (ESS); 2. The ESS) has a website and mobile applications in both IOS and android; 3. There are well-trained ESS staff who help locals access public service delivery at the grassroots in Senegal	*Implementation of the* ESS is slow and not operational yet.	Using digital technology for all government service delivery.	**Positive:** 1. Effective service delivery growing; 2. Digital inclusion by paying wages and salaries of workers in Senegal digitally; 3. Acceptance and implementation of public opinion/feedback; 4. Significant innovation and digitalisation of government service delivery; 5. Curtailing political violence and terrorism via the national identification number; 6. Public and private intermediaries between the government and citizens in the service delivery process; 7. Increasing access to public information and data (open governance). **Negative:** 1. Government digital service delivery is in the process of being established, but has not started; 2. Low internet penetration; 3. Little or no digital government service users in Senegal; 4. Digital divide (lack of digital literacy and poor digital infrastructure)
Data governance framework	Senegal is implementing policies on digital sovereignty, and security on cross-border data flows. Senegal has had a law on personal data since 2008 and is one of the first African countries to have signed the Malabo Convention 2014.		Data governance structure and compliance is efficient at the national and subnational level.	**Positive:** 1. Good data governance strategy and framework; 2. Innovation and growth of digital platforms facilitated; 3. Increased public trust in the use of the internet in Senegal by protection of digital rights; 4. Hold data platforms and data processors accountable for misuse of private data; 5. The establishment of data protection legislation and authority in Senegal. **Negative:** 1. Poor management of data; 2. Poor implementation of digital policies; 3. Poor sensitization and education on what constitutes public and private data; 4. Over-regulation.

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
SENEGAL				
Social Media Policy	Use of social media platforms to demand right to self-expression and accountability in tobacco control and blood donation in Senegal	Internet censorship, surveillance, and internet shutdown in the case of the agitation by an opposition leader, e.g. Ousmane Sonke in Senegal via a Twitter hashtag "#FreeSenegal"	Two-way government interaction with citizens, aimed at improving voice and accountability. Negative transformation is a legislative attempt to curtail freedom of speech.	**Positive:** 1. Awareness and public engagement; 2. Job creation; 3. Protect the public from harmful content, e.g. misinformation, disinformation, and malinformation; 4. To enhance entrepreneurship and business growth; 5. Public engagement by the government; 6. Political campaign and advocacy; 7. Digital inclusion; 8. Digital literacy. **Negative:** 1. Restrict the rights to freedom of expression; 2. Disruption of citizens' internet access; 3. Restrict access to information; 4. Imposing stiff penalties; 5. Curtail government accountability and transparency.
Digital Innovation and Entrepreneurship/ Digital Transformation	The establishment of an e-commerce Senegal platform by the Ministry of Trade to encourage more traditional businesses to go online and extend its reach to rural areas, and the underserved. throughout Senegal.		Growth of digital enterprises.	**Positive:** 1. Promotion of digital technologies in Senegal; 2. Employment and direct job creation; 3. Growing investment in the digital ecosystem in Senegal; 4. Growth in the number of venture capital incubators and start-up incubators; 5. Senegalese can acquire cutting-edge technological skills; 6. Digital technology park of 25 hectares established to build a digital economy ecosystem; 7. Digital economy system growing through its rising ease of doing business ranking. **Negative:** 1. Internet fraud and financial-related crimes; 2. High cost of internet; 3. Low internet penetration; 4. Sustainable access to finance.

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
RWANDA				
Digital government service delivery	Only 11.8% of potential users are reportedly aware of the *Irembo* platform for e- government services. On the positive side, 80% of the electronic services on *Irembo* are delivered indirectly through intermediaries to the digitally underserved.		The digitalisation of all government services. Emerging as one of the best in the region for government service delivery.	**Positive:** 1. Effective service delivery growing; 2. Public and private intermediaries between the government and citizens in the service delivery process; 3. Evaluations are conducted to ensure accountability at public institutions and agencies; 4. Public opinions are accepted and utilised even at the grassroots level through the Irembo agents that offer government services in rural areas; 5. Increasing access to public information and data (open governance); 6. Control of corruption. **Negative:** 1. Limited e-government users; 2. Cybercrime threats on the government digital infrastructure; 3. Low and unstable energy supply (electricity); 4. Digital divide (digital literacy and poor digital infrastructure).
Data governance framework	Rwanda has a law on protecting private data and privacy	Rwanda is not a signatory to the Malabo Convention of 2014	Efficient data protection laws and establishment of a framework for information protection.	**Positive:** 1. Good data governance strategy and framework; 2. Facilitates the innovation and growth of digital platforms in Rwanda; 3. Increased public trust in the use of the internet in Rwanda by protecting digital rights; 4. Data platforms and data processors held accountable for misuse of private data; 5.Establishment of a data protection legislation and authority in Rwanda. **Negative:** 1. Poor management of data; 2. Poor implementation of digital policies; 3. Poor sensitization and education on what constitutes public and private data; 4. Over-regulation.

Key Areas	Inclusive	Exclusive	Digital Transformation	Outcomes
RWANDA				
Social Media Policy	No record of internet shutdowns yet	Rwanda had a law governing telecommunications as far back as 2001 that gave the government powers over regulating telecommunications networks.	Positive: Government-citizen interaction. Negative: Internet shutdown and surveillance.	**Positive:** 1. Awareness and public engagement; 2. Job creation; 3. Public protected from harmful content, such as misinformation, disinformation and malinformation; 4. Entrepreneurship and business growth enhanced; 5. Public engagement by the government; 6. Political campaign and advocacy; 7. Digital inclusion; 8. Digital literacy; 9. Demand for government transparency and accountability. **Negative:** 1. Rights to freedom of expression restricted; 2. Citizens' internet access disrupted; 3. Access to information restricted; 4. Media freedom restricted; 5. Government accountability and transparency curtailed; 6. Digital divide increased.
Digital Innovation and Entrepreneurship/ Digital Transformation	Rwanda's use of drones in the health sector to deliver blood, plasma and coagulant to hospitals across rural western Rwanda, helping to cut waiting time from hours to minutes by Zipline, the U.S. start-up		Growth of a regional technology and innovation hub.	**Positive:** 1. Nigerians can participate in the development of hardware, software and emerging technologies; 2. Job creation; 3. Growth in the number of digital/ data-driven companies; 4. Growth in the number of venture capital incubators and start-up incubators; 5. Nigerians can acquire cutting-edge technological skills; 6. Establishment of National Digital Innovation and Entrepreneurship Centre; 7. Access to finance through the Rwanda Innovation Fund (RIF) launched to support disruptive and innovative companies through a public-private partnership between the government and investment firm, Angaza Capital. **Negative:** 1. Internet fraud and financial-related crimes; 2. High cost of internet; 3. Low internet penetration; 4. Difficulty of access to finance; 5. Poor energy access (electricity).

Conclusion

This study has focused on a nascent field—the interplay between a country's governance structure and digital transformation and its effect on inclusive and sustainable development. This study has demonstrated the complexity of this relationship while connecting inclusive and sustainable development to digital policy and governance structures in three sub-Saharan African countries—Nigeria, Rwanda and Senegal.

It is clear that African countries will benefit from the growing utilisation of digital technology for public policy administration, such as for government service delivery, designing frameworks for development, social media administration and private sector innovative entrepreneurship. However, the success of such a transformation, particularly in enhancing sustainable development, would depend on whether the transformation is inclusive, or pursues exclusivity, i.e. excludes certain social segments.

Examples from three sub-Saharan African countries, Nigeria, Rwanda, and Senegal, that are contextually relevant to the debate, give further credence to the following question: does a country's governance structure that is aligned with digitalisation yield inclusive and sustainable development in and of itself? The cases drawn from these countries highlight the benefits of digitalisation in public administration, including improving the government's responsiveness to citizens, reducing public administrative waste of financial and non-financial resources, public accountability, and citizen engagement.

However, the extent of elite capture, manoeuvring of the system for greater consolidation of political power, privacy rights issues and demagoguery may be a significant concern in promoting digital technology for public administration in this region. Nonetheless, on the positive side, substantial evidence from the cases considered shows that use of digital technologies in these countries has yielded sustainable development gains.

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