



Digitalization and Integration of Sustainable Development Goals (SDGs) in Public Organizations in Kenya

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Accepted: 29 December 2020/ Published online: 4 February 2021

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Abstract

This study mapped the role of ICT, digital platforms, the internet connectivity and skills of the personnel vis-à-vis implementation processes of SDGs in public organizations in Kenya. Findings show cross-cutting institutionalization and internalization deficits as a result of limited mastery of ICT skills and training of the personnel, insufficient ICT platforms, mainly, computers, poor internet connectivity and poor investment in digital platforms by the government institutions. An organizational culture that predisposes institutions to change resistance also constrained integration of SDG goals in public organizations. The article concludes by providing critical policy recommendations for addressing these problems.

Keywords Public policy · Information governance · Digital era governance; E-government · Open innovation systems in africa

Introduction

In the last decades of the twenty-first century, the adaptation of digital platforms has revolutionized the way institutional and economic systems organize and carry out tasks amidst increasingly complex and uncertain environments. The recent outbreak of the COVID-19 pandemic, for example, has more than ever steered organizations towards digitalizing their systems of operation. While the use of digital platforms is not new, how these platforms improve policy integration in the public service is relatively understudied, especially, in the contexts outside the global North and African public service, in particular. The present task, therefore, explores this state-of-affairs as regards

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digitalization and the integration of the Sustainable Development Goals (SDGs) in public administration in Kenya. The digitalization process involve an array of technological implications including applications of digital skills, digital public service, Information Communication Technology (ICT) infrastructure, connectivity, and the use of the internet (OECD 2004, 2012). According to Gartner (2018) digitalization is more focused on organization business and involves a process of moving towards a digital business that underscores the use of digital technologies to provide innovative revenue, business model, and value-producing opportunities are paramount. Moreover, digitalization is based on the accessibility of huge and voluminous amounts of internal and external based on cloud data, machine learning activities, and data mining for prediction of client behaviour and future market (Khan 2016; Gray and Rumpel 2015).

In general, digitalization has undergone considerable improvements in the contexts of digital innovation and digital transformation in the past centuries. This has been embedded on the perpetual pursuit of new ways for improving economic and social interactions, as well as more effective and efficient systems of organizations (Ostrom 2008; Bobylev et al. 2018; Christensen et al. 2007). Further to this, digitalization has transformed local administration into dynamic and flexible organizations' in what is called *digitalization reformation* (Greve 2012). In public administration, it has been found that digitalization in forms of the *robotic bureaucracy* is central in resolving some forms of administrative burdens that are attendant to the hierarchical deficits (Bozeman and Youtie 2020). Thus, digitalization is key in the pursuit of democratic administration and can enhance the effective integration of policy-programs if institutionalized and internalized by the personnel in public administration (Ostrom 2008; Onyango 2018). This was explicitly underscored in Accenture study report noting that rapid developments in digitalization of most operational processes in African governments have greatly influenced the global economy, public policy, and the continent as a whole. More specifically, the acceleration of digitalization efforts for development has improved the benefits of the digital economy, skills, income, and growth in jobs (World Trade Organization 2018). In particular, Banga and te Velde (2018) contend that the discussion between SDGs and digitalization demonstrates that digital technologies play transformative and enabling roles in sustainable development (also cf. e.g. Accenture 2015).

Therefore, this article explores the degree of digital maturity of public managers, namely, their administrative capabilities to master, utilize, and even promote digitalization as the organization's strategic tool with respect to processes of policy implementation. In this discussion, attention is on the acceleration of SDGs in Kenya. The degree to which digitalization in public service has provided crucial opportunities for public administrators in tracking the impact of sustainable development projects is also explored. In so doing, the paper takes stock of significant deficits in information linked to the institutionalization and internalization of digital platforms and other tools in public organizations. Most especially, as relates to how the perception of the role of Information Technology (IT) in digitalization influences the institutionalization process (Greenwood et al. 2008).

The case of Kenya considerably presents a viable context for discerning the role of digitalization in the acceleration of SDGs in Africa. According to the World Bank report titled *ICT Competitiveness in Africa*, Kenya is one of the leading countries in ICT development in Africa with Morocco and Nigeria (Ewing et al. 2014). Kenya is,

therefore, a leader in digitalization in both private and public sectors with a growth of roughly 25% in internet penetration in the periods 2001 to 2016 (Banga and te Velde 2018). Further to this, Kenya's digital economy has been advancing with the growth of ICT as a development pillar in the country's comprehensive development strategy or the Vision 2030. Also in January 2006, Kenya promulgated the National ICT policy aimed at improving *the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services*. This policy also broadly lays out the ICT infrastructure or Open Innovation Systems in the public sector which covers information technology, broadcasting, telecommunications, and postal services. The ICT and other facets of digitalization also factor in the growth and inclusion of digital payment systems like mobile money financial services e.g. M-Pesa, setting up the undersea fibre-optic cables, private sector support to technology hubs and networks, the introduction of the National Cyber Security Strategy and National Broadband Strategy and the improvement in ease of doing business, and growth of e-government (Banga and te Velde 2018; Onyango 2017).

At the same time, however, digital skills and connectivity that form part of the digitalization process in the mainstream government in Kenya have suffered serious setbacks in most government institutions largely because public administrators are unskilled in ICT (Mingaine 2013). Apart from challenges with the degree of internet penetration and extensive digital gaps between the urban and rural areas, problems with digital skills among the majority of public university staff and other levels of learning, for example, have been evident during the COVID-19 pandemic in most parts in Kenya. All these put into context an understanding of the degree to which digitalization influence public policy processes, with particular attention to the integration of UNDP's SDGs policy programs in Kenyan public organizations and similar organizational contexts.

Literature Review

Technological changes have been remarkable since the industrial revolution in the 1760s through constant upgrades and improvements (Schmarzo 2017). The revolution in the early twentieth century was characterized by the development of electricity enhancing mass production. In the 1960s, computer technology shaped the third industrial revolution with the introduction of personal computers and the internet. The fourth and final industrial revolution has been recently characterized by high levels of artificial intelligence, internet, information, networks and machine learning (Schwab 2016). The current third era of digital transformation and challenges has affected governments, the non-profit sectors, the business community, and consumers in equal measures (Rouse 2005; Schwab 2016). Schmarzo (2017) argues that this generation of digital transformation aims to improve efficiency in production, service delivery, management of risks, and uncover new monetization opportunities across the world.

More to this, Bertini (2016) asserts that the digital transformation has affected individuals' lives as well as the operations in both the non-profit and for-profit sectors. In essence, the need to achieve rapid economic growth has led to the exploitation of natural resources at an alarming rate with technological transformations being at the center of these efforts (Dang and Pheng 2015; Sachs et al. 2016). With regard to

concerns with policy effectiveness, Sachs (2016) also notes that “ICTs role in the implementation of SDGs in the era of 2016-2030 will steadily develop quickly and rapidly” (p.18). The adoption and appreciation of related digital components are still a major challenge influencing the implementation and acceleration of SDGs in public administration of developing and transitioning societies (Muro et al. 2017). The existence of unclear roadmap and framework on the integration of the strategies for implementing SDGs by most governments has resulted in critical deficits that hinder the achievement of the SDG targets in government institutions (SDGs Compass 2015). Generally, the ICT process has not been adequately recognized while drafting the SDGs. This has resulted in inadequacies in measuring the digitalization process (Huawei 2017). The challenges noted include regulation hindering the utilization and implementation of ICT, knowledge and skills advancement among public administrators assigned the role of operating information systems, and the rapid growth of internet and innovation in the telecommunication sector. To Jones et al. (2017), digitalization is faced by several constraints that the government should primarily get involved to resolve to digitalize and align SDGs targets.

With particular reference to SDGs, numerous challenges are faced during digitalization in the public sector, mainly, because it is not easy to recognize the relationship between SDGs and digitalization from the onset (Sachs 2016; Huawei 2017). Sachs (2016) state that inadequate ICT infrastructure, and digital resources for policymakers and administrators in the public sector, usually hinder the effectiveness of implementing the digitalization of SDGs. The disconnect between ICT domain knowledge and skills among policymakers also constrain implementation (Sachs et al. 2016). Adequate awareness about digitalization and skills among administrators in public administration should be considered during policy-making programs. In Kenya, limited skills for the implementation of complex ICT infrastructure and processes have been established. In this regard, Afande (2013) indicate that 57.8% of professionals graduating from institutions of higher learning have inadequate ICT skills in Kenya and therefore need further training on the same.

A report by GSMA’s (2016) shows that the acceleration of SDGs is influenced by the degree of digital connectivity. This report concluded that in Sub-Saharan Africa, inadequate funding, inadequate awareness of ICT capabilities, lack of technical skills, and the digital gap has frustrated the SDGs roll-out process (GSMA 2016). It further indicated that limited broadband capacity in Africa stems from the lack of infrastructural capability, affordability, relevance, and the significance of distribution network coverage in isolated rural areas and less networked regions. However, as argues Sachs (2016) *connecting the unconnected* is vital in achieving sustainable development (also cf., Huawei 2017). Cognizant of these developments, this study set to examine the institutionalization of digital technologies and barriers in the digitalization of SDGs in the Kenyan public sector.

The Framework of Analysis: A Transformative Approach

Attempts to analyze the integrative dynamics of SDGs may mean that digitalization of the public sector can be discerned by looking into the instrumental, environmental, and cultural repertoires of processes that order policy-programs (Molenveld et al. 2020).

According to Christensen and Laegreid (1998), the transformative approach in the public management paradigm believes that policies and related decisions or actions are subjected to the contextual forces that either transform or direct their adoption, adaptation and integration. The transformative forces of the policy context involve a complex-mix of institutional features, environmental pressures, and political variables that ultimately influence the leeway of action that political and public administrators have in policy and decisionmaking processes in public administration. Analysis of the adoption and performance of SDGs and the role of digitalization can be conducted within the perspectives of the transformative approach. This will enlighten the interrelationship between institutional or cultural, instrumental, and ideas in the way these goals are integrated into the public sector.

Structural-Instrumental Perspective In laying out ICT infrastructures, bureaucratic legislation has the potential to derail the coordination of different players due to both administrative and legal impairments among agencies concerned with the implementation of SDGs. The adoption of SDGs in public administration comes with cross-cutting policy-programs that underscore structural efficacies to allow working with both the public and private sectors at different levels of organizational engagements in the market. The prevailing legal regimes may constrain the development of ICT skills by either promoting the use of paper instead of digital-oriented operations or underscoring the existing legacy systems. For example, Kivuva (2012) reports that adoption of Information systems through Advanced Air Transport Information System (AATIS) in Kenya was frustrated by “bureaucracies in Government projects, organizational politics, slow procurement processes, schedule overruns, poor change management practices, poor requirements management, inability to retain technical staff, poor attitudes towards quality improvement, poor IT infrastructure specifically in internet services, WAN connectivity and computers, conflicts between user departments and regulatory frameworks” (p.v). These structural and legal arrangements, including the subsequent contextual dynamics of policy-programs and decision-making processes, can relate to the overall digitalization outputs, thereby, producing both positive and negative policy-outcomes. Conversely, digitalization may either fail or prevail contingent on either the degree of or effectiveness of structures of coordination that is often a problem in the implementation of cross-cutting policy-programs such as SDGs. Effective coordination of ICT policy and digital platforms within the public sector to promote the integration of SDGs need clear and updated legal guidelines that can promote innovation and decentralized decision-making processes among and between different government institutions.

A Cultural Perspective Public organizations are cultural and learning entities. It is commonplace that administrative reforms will be readily accepted if they are in tandem with prevailing administrative culture in the public sector, even though there are also higher chances that they will be modified over time (Brunsson 1989). The integration of policy-programs, therefore, take stock of internal cultural dynamics, mainly, power-relations, past lessons, personnel-relations, mutual trust and the promotion of innovative values (e.g. Onyango 2020). So, digitalization or realization of information governance in the public sector can be additionally constrained by individual, organizational and related cultural factors leading to unequal penetration of digital

transformation in the public sector. That is, organizational culture influences “what behaviour the staff and managers of the organization perceive as being appropriate” (Molenveld et al. 2020 :7). Public managers are therefore expected to inculcate norms and values that support innovation and learning among civil servants to enable digital learning and penetration. In this way, cultural composites may be either path-dependent and deeply embedded or may emanate from prevailing leadership styles, power-relations, personal experiences and individual attitudes concerning the adaptation of ICT and other facets of digitalization.

Politically, it is clear that there is extreme caution on how public administration handles the work that they do. Reforms and new roles must always have political backing and be calculated well to prevent cultural resistance and confrontational power. Inter-organizational coordination prevails under particular conditions analogous with cultural composites, power-relations, and resource endowment, among others (cf. e.g. Bouckaert et al. 2010).

Myth Perspective In most cases, administrative reforms or policies are often adopted by organizations because they symbolize modernity, rationality, efficiency and effectiveness (Meyer and Rowan 1977). However, instead of bringing to fruition the anticipated changes, these reforms or policies could remain only symbolic and myths of organizational performance. Further to this, notes Christensen and Laegreid (1998), “[a]dministrative policy rhetoric can reflect international trends or ‘fashions’, which is more likely if trends imply new concepts and models that are ambiguous and leave room for many types of interpretation” (p. 458). The foundations of the national ICT policy in Kenya and SDGs are reflective of trending fashions in the global operations of organizations or the emerging open innovation systems, and the challenges of public administration, in particular. Indeed, SDGs were adopted and integrated into institutional frameworks of most organizations after their ratification by the UN council and the realization that they were globally driven goals. Therefore, formal organizations operate within certain parameters reflected by myths instead of adopting what they know would work. This framework of analysis focuses on whether the adoption of SDGs by institutions was as a result of pressure from international institutions or were SDGs automatically considered relevant for the performance of public organizations in providing public service. A transformative approach may, therefore, provide a comprehensive understanding of how digitalization and processes of integrating SDGs in public administration take on a complex-mix of contextual variables of government institutions.

Data and Methods

This study focused on the seven key SDGs areas that included; SDG 2- Zero Hunger, SDG 3- Good Health and wellbeing, SDG 4- Quality education, SDG 6- Clean Water and Sanitation, SDG 7- Affordable and clean energy, SDG 8- Decent work and economic growth, SDG 9- Industry, innovation and infrastructure (SDG Compass 2015) within the Ministry of Information Communication Technology, Ministry of Labor, Ministry of Health, Ministry of Education, Ministry of Devolution and ASALs, Ministry of Water and Sanitation, Ministry of Energy and Petroleum. The study

targeted 50 workforces of directors, middle and senior public administrators managers which constituted the study population.

The study used a descriptive case study strategy to obtain qualitative evidence from multiple sources and gain theoretical propositions. Further, the use of multiple sources of evidence allowed triangulation of findings (Yin 2014). The case study method proved advantageous in creating deep insights and emphasized on examining rich cultural and social impacts of local adaptations to the implementation of digitalization of SDGs in public administration in Kenya. Integrated mixed methods (quantitative and qualitative method) was used to draw evidence through surveys, questionnaires, and one on one interviews organized with the 50 Staffs within seven ministries. The study was conducted for 2 months (January–February 2019). This was complemented by documentary analysis that involved extracting high-quality data, government publications, technical documents, journal supplements, articles, SDGs websites, and other existing secondary data collected. Purposeful sampling was adopted in selecting the target respondents from the ministries. Captured data from the qualitative and quantitative research were analyzed, presented, interpreted, and described systematically.

Findings and Analysis

The specific objectives of the study were to examine the institutionalization of digital technologies and barriers of adoption of digitalization of Sustainable Development Goals (SDGs) in Public Administration, Summary of descriptive statistics have been presented in tables, graphs and charts while narrative findings from documentary analysis and interviews have been qualitatively represented (Table 1).

The study managed to get a response from 34 out of the 50 respondents selected from the survey, 2 interviews for Directors out of 5 and 6 semi-structured questionnaires from Senior Managers. The overall response rate was equated to 68%. The two interviews conducted were coded and classified as MOICT_SDG1, dated 28th January 2020 and MOW_SDG2, dated 18th February 2020. The reason for this rate was because public administrators found it hard to respond to the questionnaires without necessary approvals from the Permanent Secretaries, Human Resources Managers, and immediate line Directors. Securing interviews with the directors of the relevant units also proved futile due to protocol bureaucracies as well as lack of understanding among administrative assistants within the ministries on the procedural methods of allowing the researcher to conduct interviews and administer surveys, referrals to Junior Officers

Table 1 Response rate

Strata	Target respondents	No. of response rate	Percentage Response rate
Directors	7	2	5.9
Senior Managers	14	7	20.5
Middle level ICT Managers	15	11	32.4
ICT officers/Assistants	14	14	41.2
Total	50	34	100

who have no understanding of digitalization and SDGs implementation framework and delayed bookings on appointments. However, the study managed to receive adequate responses from the other respondents and extending data collection timelines as well as employing data assistant to help in collecting filled surveys and questionnaires.

From Table 2 below, it is evident that the majority of public administrators have intermediate skills at 61.8%, followed by advanced skills at 26.5% while those with basic skills were at 11.8%. Decision-makers who are the Directors and Senior Managers in the ministries were 50% and 28.6% respectively with advanced training. It is also notable that ICT Managers who had advanced training were 36.3%. Since these are the staff that is responsible for the digitalization of sustainable development goals, it calls for review and further advance training of public administrators to match the skills required for the digitalization of sustainable development goals within the public service. This information was corroborated during the interviews where the respondents alluded that

Most public administrators do not possess advance skills to effectively use ICT tools to monitor and measure the progress of how SDGs are accelerated with the Government deployment of most sophisticated ICT tools are done by expatriates on consultancy who later trains internal staff on basic ICT on skills (MOICT_SDG1, 28th January 2020)

Respondent also noted that;

Most of the senior managers and directors are not well conversant with day to day operations of ICT as they have qualifications in other areas and do not have core technical skills in ICT since they are recruited based on experience within the organization and that they depend on ICT Officers and managers to implement most of the ICT requirements (MOICT_SDG1, 28th January 2020)

It can, therefore, be summarized that there are internalization deficits and lack of technical ICT skills within the structures and hierarchy of public organizations created out of technophobia or fear of advancement in technological skills by senior staff.

Table 2 Level Computer Skills

Position as Public Administrator	Level of Computer skills proficiency						Total
	Basic		Intermediate		Advanced		
	F	%	F	%	F	%	
Director	0	0%	1	50%	1	50%	2
Senior Manager	0	0%	5	71.4%	2	28.6%	7
ICT Manager	0	0%	8	72.7%	4	36.3%	11
ICT Officer/Assistant	4	28.6%	7	50%	3	21.4%	14
Total	4	11.8%	21	61.8%	9	26.5%	34

Table 3 Respondent length of Service at the Ministries

Position in your organization	Less than 2 years		2–5 years		6–10 years		over 10 years		Total
	F	%	F	%	F	%	F	%	
Director	0	0%	0	0%	1	50%	1	50%	2
Senior Manager	0	0%	1	14.3%	4	57.1%	2	28.6%	7
ICT Manager	0	0%	2	18.1%	6	54.6%	3	27.3%	11
ICT Officer/Assistant	2	14.3%	5	35.7%	5	35.7%	2	14.3%	14
Total	2	5.9%	8	23.5%	16	47.1%	11	32.4%	34

Hence it remains probable that the lack of interest in the advancement of digitalization by the decision-makers in the public sector has the potential to influence how other organizational staffs digitalize the SDGs.

According to Table 3, the majority of the respondents (47.1%) had worked in the organization between 6 and 10 years, followed by 32.4% that comprise of those public administrators who have worked for more than 10 years. Those who have worked between 2 and 5 years were at 23.5% while only 5.9% had worked for less than 2 years. These findings demonstrate that majority of that sample had worked in their respective organizations for more than 5 years which implies they have good knowledge of the various digitalization processes that are in place in the organizations and were well placed to make critical decisions concerning digitalization of SDGs at organizational levels and managerial levels. It can, therefore, be loosely translated that transformative approaches by decision-makers and managers within organizational hierarchy have the potential to transform digitalization and implementation of SDGs by creating reforms and new roles that prevent cultural resistance and confrontational power.

Technology Adoption for SDGs

Based on the findings, all the respondents reported that their respective ministries /government agencies were implementing the SDGs as enshrined in the global targets and information technologies were being used in the implementation and acceleration. The technology tools cited by the respondents as being used by the ministries/government agencies in the implementation of the SDGs included desktop computers, laptop computers, mobile phones, internet, e-government, automated solutions, and ICT enable solutions. The SDGs directly implemented by the ministries/government agencies that were targeted for the study included: GOAL 1: No Poverty; GOAL 2: Zero Hunger; GOAL 3: Good Health and Well-being; GOAL 4: Quality Education; GOAL 5: Gender Equality; GOAL 6: Clean Water and Sanitation; GOAL 7: Affordable and Clean Energy; GOAL 9: Industry, Innovation, and Infrastructure; GOAL 11: Sustainable Cities and Communities; GOAL 13: Climate Action and GOAL 17: Partnerships to achieve the Goal. While the government is also focused in the achievement of other SDGs such as GOAL 8: Decent Work and Economic Growth, GOAL 10: Reduced Inequality, GOAL 12: Responsible Consumption and Production, GOAL 14: Life Below Water, GOAL 15: Life on Land and GOAL 16: Peace and Justice.

Table 4 Implementation of SDGs in ministries and the use of ICTs

Ministries	SDGs	Implementation	Use of ICTs
Ministry of Education	GOAL 4: Quality Education	Yes	Yes
Ministry of Energy	GOAL 7: Affordable and Clean Energy	Yes	Yes
Ministry of Health	GOAL 3: Good Health and Well-being	Yes	Yes
Ministry of Water	GOAL 6: Clean Water and Sanitation	Yes	Yes
Ministry of Lands	Goal 15: Life on Land	Yes	Yes
Ministry of Devolution and Arid and Semi-Arid Lands (ASALs)	GOAL 1: No Poverty GOAL 2: Zero Hunger	Yes	Yes
Ministry of Information, Communication, and Technology	GOAL 9: GOAL 9: Industry, Innovation, and Infrastructure	Yes	Yes

However, the findings from the ministries sampled on the SDGs that are directly implementing SDGs were summarized in Table 2 below;

From Table 4, the findings revealed that there is a consistent implementation of SDGs using ICTs across all the ministries indicating that some digitalization was going on, however, the study did not seek to find further specific targets under the implemented SDGs.

Institutionalization of digital technologies of SDGs in Public Administration.

Concerning the influence of the institutionalization of digital technologies of SDGs in Public organizations, the respondents strongly agreed to the following statements. This is also based on the data presented in Table 5 below: Our leadership is advancing the use of information communication technologies to conduct SDGs work in our organization. (Mean = 5.00; SD = 0.000); Adoption of computer systems like emails, tablets, mobile phones, databases, and social media for SDG implementation is at an advance stage within our organization (Mean = 4.44; SD = 0.660); Employees have adopted the use of digital systems like emails, tablets, databases, mobile phones, social media, for SDGs communication (Mean = 4.74; SD = 0.448); The culture of this organization supports the use of digital systems and technology like emails, E-government, tablets, mobile phones, and social media for SDG work (Mean = 1.86; SD = 0.498). This is presented in Table 5 below.

The findings support the argument by Greve (2012) that coordination efforts of digitalization in public institutions have seen rising national initiatives for digitalizing governments including providing financial support, pooling resources for development in digital technologies, digital industrial platforms, legislative implementation, and high-performance cloud infrastructure for digitalization.

Hindrances of ICTs Adoption

The descriptive data presented in Table 6 presents hindrances of ICTs adoption by public administrators. Based on the data, the respondents strongly agreed that: Cost of accessing the internet and maintaining computers, tablets, and mobile phones affects the implementation of SDGs (Mean = 4.29; SD = 1.219). As to whether ICT knowledge,

Table 5 The influence of institutionalization of digital technologies of SDGs in Public Administration

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Our leadership is advancing the use of information communication technologies to conduct SDGs work in our organization.	34	5	5	5.00	.000
Adoption of computer systems like emails, tablets, mobile phones, databases, and social media for SDG implementation is at an advanced stage within our organization.	34	3	5	4.44	.660
Employees have adopted the use of digital systems like emails, tablets, databases, mobile phones, social media, for SDGs communication.	34	4	5	4.74	.448
The culture of this organization supports the use of digital systems and technology like emails, E-government, tablets, mobile phones, and social media for SDG work.	34	1	2	1.86	.498
Valid N (listwise)	34				

Respondent for the interviews further affirmed that; Organizational leadership and culture set up within the ministries affect the adoption of digitalization and the acceleration of SDGs. The reason why you see some ministries do better in realizing SDG goals is because of the leaders who are ICT conscious and have a good attitude towards the use of ICTs. For example, the adoption of E-citizen and *huduma* services was adopted by conscious leadership who see ICT as an accelerator of public service transformation and improvement of services to the citizens. (MOICT_SDG1, 28th January 2020).

training, and skills of Public Administrators affects the implementation of SDGs, the study revealed that (Mean = 4.50; SD = 0.761) agreed to the statement, these findings corroborates the qualitative findings by Sachs (2016) and GSMA (2016) that acknowledges that the existence of disconnect between ICT domain knowledge and technical skills among policymakers hampers SDG implementation. As for the ease of use of computer software, systems, and computers on how they affect SDG implementation, the study revealed that (Mean = 4.71; SD = 0.629) were in agreement. The study findings on poor internet connectivity and how network affects the implementation of

Table 6 Hindrances of ICTs adoption by public administrators

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Cost of accessing the internet and maintaining computers, tablets, and mobile phones affects the implementation of SDGs	34	3	5	4.29	1.219
ICT knowledge, training, and skills of Public Administrators affect the implementation of SDGs.	34	3	5	4.50	.761
Ease of use of computer software, systems, and computers affect SDG implementation.	34	3	5	4.71	.629
Poor internet connectivity and network affects implementation of SDGs	34	3	5	4.53	.662
Valid N (listwise)	34				

SDGs revealed that (Mean = 4.53; SD = 0.662) implying that the majority were in agreement with the statement. These findings further substantiate writings by Sachs (2016) that recognizes that inadequate ICT infrastructure and digital resources for public administrators hinders the effectiveness of implementing the digitalization of SDGs.

The respondents were further asked to provide the challenges they faced in their day to day activities as they used the internet, computers, and databases for the acceleration of SDGs. The challenges mentioned by the respondents included: Fluctuations in internet connectivity, cultural and organizational bureaucracy, limited funding for key technological processes in the implementation of SDGs, inadequacy of computer servers to hold and store data, limited technological skills and capacity among public servants especially on Geographical Information Systems (GIS), poor databases as well public sector information system management. The other challenges cited by the respondents during the interviews was;

Lack of adequate training among the public administrators on advanced IT skills on areas such as databases and e-government since various technologies are at their initial stages and therefore training has not been done to the public administrators, poor implementation strategies and framework by the leadership, culture, and attitude of public administrators and resistance to adopt the use of digitalization for SDG acceleration, a keen focus on Agenda Four and lack of universal framework on the use of ICTs for SDGs as well financial constraints to roll out full digitalization strategies for monitoring, acceleration, and evaluation of SDGs (MOICT_SDG1, 28th January 2020).

These findings are in line with the argument by Henard et al. (2012) that organization smart infrastructures are always complex requiring large technical, as well as financial investments. In addition, such infrastructures need effective collaborative frameworks to enhance effective adoption and adaption of cross-cutting policy-programs (Onyango 2019; Molenveld et al. 2020) As such, the usability of IT systems and digitalization processes are affected by IT penetration, coordination of ICT infrastructure, data information and security. Tsubira and Mulira (2004) also argued that several public sector entities in developing economies have the tendency of assuming the digitalization process and the related costs hindering the achievement of certain development initiatives. The findings also align with the theoretical framework that highlights how organizational structures, power play, and culture affect adaptation and adoption of ICT for achieving SDGs, as well as how organizational structure and decision-makers may lead to the public administrators not developing their skills and knowledge in digitalization processes. Based on these findings, future research may consider further illumination on hindrances to the adoption of ICTs in the implementation of SDGs in public sector organizations and the examination of the strategies used in the public sector organizations while digitalizing the SDGs.

Conclusion and Policy Recommendations

From the above discussion, we can draw the following policy implications; First, there is a need to *formulate effective and inclusive policies* to improve the digitalization of the

sustainable development goals in the public sector. This will positively influence the degree of institutionalization of digital technologies of SDGs in Public organizations and their environments. As shown in the studied context, although public managers and decision-makers were advancing the use of information communication technologies to conduct SDGs work in their organizations and have adopted computer systems like emails, tablets, mobile phones, databases, and social media for SDG implementation is at an advance stage, there are policy gaps and a general cultural mismatch that constrain internalization and institutionalization processes in public organizations in Kenya (Onyango 2018), especially, with regard to technological innovations. In Kenya, such deficiencies can be addressed and adopted alongside the existing ICT policy draft or the 2019 National ICT Policy to promote and enhance the digitalization of SDGs, which are based on the broader framework of government delivery of services citizens. Second, there is a need for *an integrated intergovernmental structural policy between the government and the United Nations Development Programme (UNDP)* to set up a central monitoring bureau for the digitalization of SDGs in the public sector of developing countries like Kenya where such integrated linkages are weaker. This will help with monitoring the progress of integration or mplementation of SDGs that is currently a challenge to governments and UNDP in developing regions. For example, such a structure would appositely help in the identification of the constraints that were established to affect the implementation of SDGs in Kenya, mainly, the high costs of accessing the internet and maintaining computers, the resistance to change by decision-makers, limited ICT knowledge, inadequate training and skills of street-level administrators and; Poor internet connectivity. Third, governments in Africa should deepen the institutionalization of the use of digital systems and tools like software, emails, tablets, and computers to deliver on the SDG targets as well as measuring and monitoring the progress of SDGs. Strengthened National Innovation Systems is likely to deepen citizen-participation through online platforms such as twitter, and content creation websites, among others that would alternatively create pressures for public organizations to effectively implement SDGs. In as far as integration of SDGs were concerned, this study found that institutionalization of these platforms was constrained in Kenyan public administration by limited funding of key technological processes, the inadequacy of computer servers to hold and store data, lack of the capacities to disaggregate, manage and use big data, limited technological skills and distrust of technological platforms among public servants, especially, on Geographical Information Systems (GIS), databases as well poor public sector information system management. Fourth, *the government needs to improve incentives and structures* to allow government officials to internalize the organizational digitalization framework. This can include ensuring that public administrators get advanced training, allowances, computer skills enhancement and professional development to improve technical skills and capacity among public servants involved in the digitalization of the sustainable development goals. Lack of such incentives recently came out during the outbreak of COVID-19, for example, besides the lack of psychological needs like counselling, most public personnel in Kenya could not effectively deliver services remotely through different technological platforms adopted by public organizations attendant to the lack of laptops or computers, as well as the lack of capacity to acquire appropriate devices and access to the internet. Fifth, and related to our latter statement, there should be *adequate allocation of funds by the government* to key

infrastructural and technological processes in the implementation of SDGs, as well as *procure key technologies tools, software, and hardware* to foster digitalization of the SDGs in the public sector.

Compliance with Ethical Standards

Disclosure of Potential Conflicts of Interest N/A

Research Involving Human Participants and/or Animals N/A

Informed Consent N/A

Data Availability or Repository N/A

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

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