DEPARTMENT OF POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

DIGITALISATION AND IMPLEMENTATION OF SUPRANATIONAL POLICY PROGRAMMES IN KENYA: A CASE STUDY OF SUSTAINABLE DEVELOPMENT GOALS (SDGs).

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DECLARATION

I declare that this research project is my original work and has not been submitted to any other university or research institution for any kind of an academic award.

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Dr Gedion Onyango

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DEDICATION

This project is dedicated to all my family members.

TABLE OF CONTENTS

DECLARATION ..... **II**
ACKNOWLEDGEMENT ..... **iii**
DEDICATION ..... **iv**
LIST OF FIGURES ..... **viii**
LIST OF TABLES ..... **ix**
ABBREVIATIONS AND ACRONYMS ..... **x**

CHAPTER ONE: INTRODUCTION **1**
1.1 Background of the Study 1
1.2 Statement of the Problem 3
1.3 Research Questions 6
1.4 Objectives of the Study 6
1.5 Variables of the study 6
1.6 Justification of the study 10
1.7 The scope and limitations of the study 11
1.8 Definition of Concepts 12
1.9 Chapter Outline 13

CHAPTER TWO: LITERATURE REVIEW **14**
2.1 Introduction 14
2.2 Digitalization and Sustainable Development Goals 14
2.3 State of digital policy and implementation of digitalization in Kenya 16
2.4 Internalization, Coordination and Institutionalization Approach. 17
2.5 Transformation of digital technologies in public administration 18
2.6 Implementation of digitalization for SDGs 20
2.7 Challenges to digitalization of SDGs in public administration 21
2.8 Theoretical Framework: Transformative Approach 22

CHAPTER THREE: RESEARCH METHODOLOGY **28**
3.1 Introduction **28**
3.2 Methodology 28

3.2.1 Research design 28
3.2.2 Case study method 28
3.2.2.1 The selection of the case study sites 29
3.2.2.2 Units of analysis 29
3.2.3 Mixed Methods approach 31
3.3 Methods of Data collection 32
3.3.1 Structured questionnaires 32
3.3.2 Semi-structured interview method 33
3.3.3 Documentary Analysis 34
3.3.4 Surveys 34
3.4 Target Population 34
3.5 Sampling Size 36
3.6 Sampling Design 36
3.7 Data Analysis 36
3.7.1 Coding and categorization 37
3.7.2 Tabulation 37
3.7.3 Thematic Analysis 38
3.7.4 Statistical Package for the Social sciences (SPSS) 38
3.8 Validity 38
3.8.1 Construct validity 39
3.8.2 Internal validity 39
3.8.3 External Validity 39
3.9 Reliability 40
3.10 Ethical considerations 41

CHAPTER FOUR: DATA ANALYSIS 42
4.1 Introduction 42
4.3 Length of service in the public sector 46
4.4 Technology Adoption for SDGs 47
4.5 Institutionalization of digital technologies of SDGs in Public Administration 51
4.6 Hindrances of ICTs adoption 53
4.7 Coordination of Digitalization and ICT Infrastructure 55

4.8 Dependence on technological processes in public sector organizations....56
4.9 Digital technologies processes....58

CHAPTER FIVE: SUMMARY AND RECOMMENDATIONS....60
5.1 Introduction....60
5.2 Summary of the findings....60
5.3 Conclusion....63
5.4 Recommendations....65
5.5 Recommended areas for future research....66

REFERENCES....67
APPENDICES....75
Appendix I: Data Collection Tools....75
Appendix II: Approval Letter....87
Appendix III: Research Permit....88
Appendix IV: Sample Data Collection Tools....89
Appendix V: Plagiarism Report....98

LIST OF FIGURES

Figure 1.0: Operationalization of the variables.....9

Figure 4.1: Gender Distribution of the respondents.....43

Figure 4.2: Age Distribution of the Public Administrators.....44

LIST OF TABLES

Table 3.1: Units of Analysis 30
Table 3.2: Response rate 33
Table 3.3: Target Population and response rate 35
Table 4.1: Response rate 42
Table 4.2: Respondents' Education 44
Table 4.3: Level Computer Skills 45
Table 4.4: Respondent length of Service at the Ministries 46
Table 4.5: Implementation of SDGs in ministries and the use of ICTs 48
Table 4.6: Internalization of Digital Technologies by Public Administrators 49
Table 4.7 The influence of institutionalization of digital technologies of SDGs in Public Administration 51
Table 4.8: Hindrances of ICTs adoption by public administrators 53
Table 4.9: The Coordination of Digitalization and ICT Infrastructure 55
Table 4.10: Dependence on technological processes in public sector organizations 56
Table 4.11: The importance of digital technologies processes 58

ABBREVIATIONS AND ACRONYMS

ICTs	Information Communication Technologies
ICT4D	Information Communication Technology for Development
NGOs	Non-Governmental Organizations
MDGs	Millennium Development Goals
UN	United Nations
SDGs	Sustainable Development Goals
DESI	Digital Economy and Society Index
IT	Information Technology
GII	Gender Inequality Index
TAM	Technology Acceptance model
GSMA	Global Systems for Mobile Association
NDPs	National Development Plans
MDAs	Ministries, Departments and Agencies

ABSTRACT

In Kenya, digital skills and connectivity that form part of the digitalization process in mainstream government have suffered serious setbacks in most government institutions with policymakers in public administration largely remaining unskilled in ICT creating a gleaming future for SDGs implementation. The study sought to examine digitalization and implementation of supranational policy or cross-cutting programmes, namely, Sustainable Development Goals (SDGs) in public administration in Kenya. It focused on the seven key SDGs areas that included; SDG 2, SDG 3, SDG 4, SDG 6, SDG 7, SDG 8, SDG 9 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 and ICT assistants which constituted the study population. The study involved both qualitative and quantitative methods with complimentary purposive sampling and snowball sampling to target respondents out of which 34 public administrators responded to the surveys, 6 responded to semi-structured questionnaire and 2 were interviewed. The findings revealed that the digitalization of SDG policy programmes with the ministries/government agencies implemented using digital technologies e.g. emails, social media, mobile and that the use of digital technologies greatly improves skills and knowledge of public administrators in rolling sustainable development goals. Subsequently, digitalization has improved access and monitoring of SDG implementations and processes, encouraged knowledge sharing and SDG data use. Some of the notable hindrances to digitalization and implementation of supranational policy programmes included the cost of accessing the internet, organizational culture, the resistance of change by decision-makers, limited ICT knowledge, poor training and skills of Public administrators, poor internet connectivity, fluctuations in internet connectivity, and limited funding for key technological processes in the implementation of SDGs. The study concluded that public administrators requires advance computer skills and training that can enable them to roll out the acceleration of SDGs work. The study, therefore, recommended that there is a need to formulate effective policies that can integrate coordination and implementation of supranational policies to improve the digitalization of the sustainable development goals in the public sector.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Recently, designing public policies at the supranational level has attracted critical concerns regarding, first, the appropriateness or translation of such designs to local contexts of member states, and secondly, the capacities of member states in Africa to effectively adapt and implement policy objectives (e.g. Fagbayibo, 2018; Onyango 2017). Turning policy commitments into actionable tools for sustainable developments is an uphill task nationally (Fyson et al, 2019). It requires governments to reorganize and rethink their working methods in practice. In reality, the governments face obstacles and challenges in overturning siloed policy-making programmes especially of international nature like Sustainable Development Goals (SDGs). Clemens and Moss, (2015) notes that the struggle by countries in addressing SDGs and implementation efforts remains elusive and disjointed from the main policy processes. Notably, SDGs are not yet introduced in governance mechanisms such as public procurement and budgeting systems (OECD, 2019). It is also considered that there are enormous gaps in leadership competencies and skills that can coherently integrate supranational policy programmes into international, private, public and domestic resources for sustainable developments (Fyson et al, 2019). Lastly, government coordinated approach is essential to allow public sector agencies, ministries and other stakeholders to monitor and share information for SDG implementation. Fyson et al, (2019) emphasize the need for governments and public institutions to work closely on SDG implementation through regional and local authorities in a subnational government structure. Consequently, digitalization and implementation of SDGs will largely depend on the leadership and digital skills of public servants to navigate complex frameworks of SDGs and ability to turn SDG policy commitments and principles into actions (Fyson et al, 2019). Civil servants will therefore need to acquire skills and knowledge sphere that allows them to operate beyond the traditional cross-disciplinary operating environment. The applications of newly acquired skills will allow them to apply mainstream government process. To ensure sustainable digitalization implementation, countries need to overcome the challenges and make considerable efforts in creating stronger partnerships for sharing best governance practices for SDGs as well as enabling strategies and action plans that consistently ensure policy coherence for sustainable development, support compartmentalized government structures

and overcoming institutional fragmented actions and silos (OECD, 2019). Further, leading SDG accelerations and policy implementation requires strong inclusive political commitment, leadership backed by policies, legislations, incentives and strategies for sustainable development. Similarly, policy integration that allows cross-sectoral collaboration that is strategic to institutional frameworks are integral in ensuring alignments of new realism in public sector innovations, experimental policy design, system thinking as well as enable them to meet complex intransigent cross-cutting policy challenges posed by supranational policy programmes like SDGs (OECD, 2019).

Digitalization process involves arrays of technological implications including applications of digital skills, digital public service, Information Communication Technology (ICT) infrastructure, connectivity and the use of the internet (OECD, 2012). Gartner (2018) views digitalization as more focused towards organization business and he goes further to describe digitalization as the process of moving to a digital business and use of digital technologies to provide innovative revenue, business model and value-producing opportunities. (Khan, 2016, Gray & Rumpe, 2015) emphasizes that 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. Globally, digitalization has seen considerable improvements in digital innovation and digital transformation in the past centuries by creating new ways of economic and social interaction (Sergey, et al., 2018). The process of digitalization in public service has provided a crucial opportunity for public administrators to track the impact of sustainable development projects (Accenture, 2015). Accenture report emphasizes that rapid developments of digitalization of most operational processes in government had greatly influenced the global economy and the continent as a whole. Specifically, the acceleration of digitalization for development has improved the benefits of the digital economy, skills, income and growth in jobs (WTO, 2018). Even though it's important to note the widespread extent of digitalization, it varies according to the strength of economies as much as it remains a transformative way in which public administration can advance the linkages and delivery of Sustainable Development Goals (UNCTAD, 2017). While the global economy is transiting through the digitalization process, least developed countries should not be left behind. Implementation of sustainable development in developing countries will largely depend on the application of digital trade

and digitalization of services that would offer the opportunity for improved participation and access in the global economy by underprivileged countries in Africa (Madelin, 2019). In Kenya, tenets of digitalization have supported progress in sustainable development including enabling digitization of financial inclusion, education, health, agriculture, public service, fintech and innovative business models. However, the developments have not progressed without challenges that include connectivity, associated regulatory challenges, market segmentation and market dominance (Ndungu, 2019). Apart from internal country challenges, the Kenyan government has met considerable obstacles in digitalization and streamlining with supranational policy programmes due to conflicting national development priority programmes as well as limited capacity in terms of resources and budgetary allocations for implementation (Banga and Velde, 2018).

According to OECD (2012), application of ICT infrastructure as part of digitalization aims at enhancing innovation, productivity and output, as well as the acceleration of SDGs, determines the success of any nation. Previous studies have revealed a positive correlation between the adoption of digitalization, expansion and socio-economic performance (OECD, 2012). The extent of application of data analytics, enterprise management software's, social media and digital payments systems in operation and business applications have created a strong boost for the implementation of development goals. Further, realization and adoption of new trending tools of digitalization in the domain of internet of things, machine learning and artificial intelligence have created a boost in business administration and provision of professional delivery of public services (Madelin, 2019). With such trends, it would be prudent and timely to explore the correlation between the digitalization process and the acceleration of supranational policy programmes using the case of SDGs in a developing country like Kenya. This research project aimed at investigating this correlative relationship in the context of public administration in Kenya.

1.2 Statement of the Problem

The execution of SDGs, as well as the adoption and appreciation of related targets, are still a major challenge influencing their implementation and acceleration in public administration (Murr et. al, 2017). Generally, the ICT process was not recognized while drafting the SDGs resulting in the inadequacy in measuring the digitalization process (Huawei, 2017). Achieving SDGs and other supranational policy programmes will not be easy if the

governments do not work across digitalization policy areas and known obstacles to boost the capacity of governments to coordinate, to act, to plan and to serve as a catalyst in support of SDGs implementation. The existence of unclear roadmap and framework on the integration of the strategies for implementing SDGs by the governments has resulted to grey gaps hindering the achievement of the SDG related targets by the public administrators and implementers (Madelin, 2019). This can largely be attributed to policy adoption challenges of public administrators revolving around policy coordination, policy reforms and politics in the public sector. At the public service and administration level especially in Kenya, SDGs implementation has become challenging to accelerate and implement as different departments have specialized in their own domains (Murr et. al, 2017). Further to this, studies have implicitly and explicitly demonstrated that public sector organization employees have rarely considered the seriousness through which they can monitor and evaluate the digitalization process of SDG in their plans. In Kenya, digital skills and connectivity that form part of the digitalization process in mainstream government have suffered serious setbacks in most government institutions with public administrators largely remaining unskilled in ICT (Mwansa, 2016).

Choi (2014) asserts that appreciating the increased adoption and acceptance of ICT usage among public administrators is far-fetched and is far from being realized. Conversely, while statistical documents show steady improvement and spread digitalization solutions in public administration, there is little existence of knowledge of the organizational process in relation to institutionalization, internalization and coordination of SDGs (Madelin, 2019). As noted by Sachs et.al (2016), "ICTs role in the implementation of SDGs in the era of 2016-2030 will steadily develop quickly and rapidly" despite the fact there are a couple of problems affecting effective and efficient adoption as well deployment strategies aimed at the digitalization of SDGs. 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. According to Jones et.al (2017), it is a fact that digitalization is faced by several constraints that the government should play a leading role in resolving to digitalize and align SDGs for digitalization. Therefore, this study intended and explored the

implementation of supranational programmes and digitalization dimensions on sustainable development goals in public administration in Kenya.

In Kenya, digitalization, on one hand, affects adoption of Sustainable Development Goals, while on the other hand, it has remained a critical issue in the public service and administration as it is anchored in development agendas. Banga and Velde (2018), attributed that the discussion between Sustainable Development Goals and digitalization has shown that digital technologies have proved to be a transformative and enabling factor of sustainable development. In Africa, Kenya has emerged a leader of digitalization. Recent evidence show that continued efforts of both private and public sectors in Kenya point to roughly 25 percent of internet penetration in the period 2001–2016 (Banga and Velde, 2018). Conversely, increasing trend of digitalization development of Kenya's digital economy has been advanced by recognition of ICT as a development pillar in the government's 2030 vision, the inclusion of digital payment systems like M-Pesa, setting up undersea fiber-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 government (Banga and Velde, 2018). Thus, taking cues from these, this project explored digitalization repertoires in implementation of supranational policy programmes, the case of SDGs in public administration in Kenya specifically narrowing down to 7 SDGs (SDG Compass, 2016) 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. The researcher narrowed down on the seven SDGs as they are prominently structured within the ministries targeted and it was also easier to get data on the proposed SDGs.

1.3 Research Questions

The study aimed to answer the following questions:

1.3.1 Main Question

How does digitalization enhance the implementation, specifically, institutionalization, internalization and coordination of Sustainable Development Goals in Kenya?

1.3.2 Specific Questions

1. How does the institutionalization of digital technologies enable the acceleration of Sustainable Development Goals in Public Administration in Kenya?
2. How does coordination of ICT infrastructure influence the acceleration of Sustainable Development Goals implementation in Public Administration in Kenya?
3. How does the internalization of digital skills influence policies for the integration of Sustainable Development Goals in Public Administration in Kenya?

1.4 Objectives of the Study

1.4.1 Main Objective

The purpose of this study was to examine the digitalization of Sustainable Development Goals in Public Administration in Kenya.

1.4.2 Specific Objectives

1. To examine the institutionalization of digital technologies and barriers of adoption of digitalization of Sustainable Development Goals (SGDs) in public administration in Kenya.
2. To examine the coordination of ICT Infrastructure on Sustainable Development Goals in public administration in Kenya.
3. To assess the influence of internalization of digital skills of ublic administrators in Sustainable Development Goals in Kenya.

1.5 Variables of the study

Dependent variable: For this study, the dependent variable was the seven Sustainable Development Goals (SGDs). The selection guidelines for the seven SDGs explored the

individual sector ministries and their related targets. The variables were operationalized and measured as follows;

i. SDG 2- Zero hunger; adequacy and sustainable global food production systems through investments in agriculture. This variable was measured by determining the number of ICT strategies such as the use of mobile for agriculture services.
ii. SDG 3- Good Health and wellbeing of all ages; this variable was measured through levels of global uptake of mobile broadband and technology in accelerating achievements for health records and data collection in health services.
iii. SDG 4- Quality education; this goal ensured lifelong learning opportunities for all and ensuring equitable quality education and was measured by the use of mobile and laptop devices for learning and application of ICTs in students enrollment
iv. SDG 6- Clean Water and Sanitation; accessibility to managed sustainable sanitation services and water. This variable was measured by knowing the ICT tools that are used to facilitate water management through monitoring and measurement of water supplies and systems.
v. SDG 7- Affordable and clean energy; in ensuring reliably affordable, modern and sustainable energy for all, this variable was measured through ICT application in transport, smart grids, buildings and smart logistics.
vi. SDG 8- Decent work and economic growth; this variable was measured by accessing the level of application and usage of ICT skills for economic development.
vii. SDG 9- Industry, innovation and infrastructure; to ensure inclusive resilient infrastructure and sustainable industrialization that fosters innovation, this variable was measured through accessing infrastructural connectivity and number of mobile subscribers.

Independent variables: is the variable that is changed or controlled in the study; the independent variable was digitalization implementation. The independent variable which is the implementation is segmented into three different constructs of institutionalization, coordination and internalization.

Implementation of Digitalization: as the independent variable, it was defined as the process of increasing efficiency and progress of digital technology transformation and integration, application of ICT, digital training and skills applications and ICT infrastructure for accelerating sustainable development. The implementation processes of digitalization were

segmented into three facets or constructs, which are internalization, institutionalization and coordination.

i. *Internalization*; is the process of understanding the digital transformation of technologies. This construct was measured through assessing the level of digital transformation, knowledge and digital skills transfer and learning of digitalization. Digital skills are the range of abilities of public administrators to use digital devices, networks to access and management of SDG information and communication applications. This was also measured by the level of digital skills of public administrators including the level of dependency of ICT in the SDG process and the percentage of public administrators with advance digital skills

ii. *Institutionalization*; this construct looked at the organizational institutionalization processes by measuring the IT usage, level of digitalization adoption and adaptation within the government ministries. Further, the measurements looked at the hindrances of adoption of digital technologies and challenges experienced while adopting digitalization of SDGs in public administration

iii. *Coordination*; is the process of integration of various agencies and organizations to implement ICT infrastructure, technologies and enhance the connectivity of the digital system. This was measured through the level of integration of ICT infrastructure and technologies. ICT infrastructure meant systems in place including hardware, networks, software and firmware for aiding digitalization of SDGs. The level of ICT Infrastructure in place for implementation of digitalization, level of connectivity, percentage of dependency of ICT in SDG processes and the number of public administrators using computers in SDG processes as well as a number using internet mobile phones to collect SDG data, the number using ICT application to process and analyze SDG data and ICT systems in place for monitoring SDG were used to measure the variable.

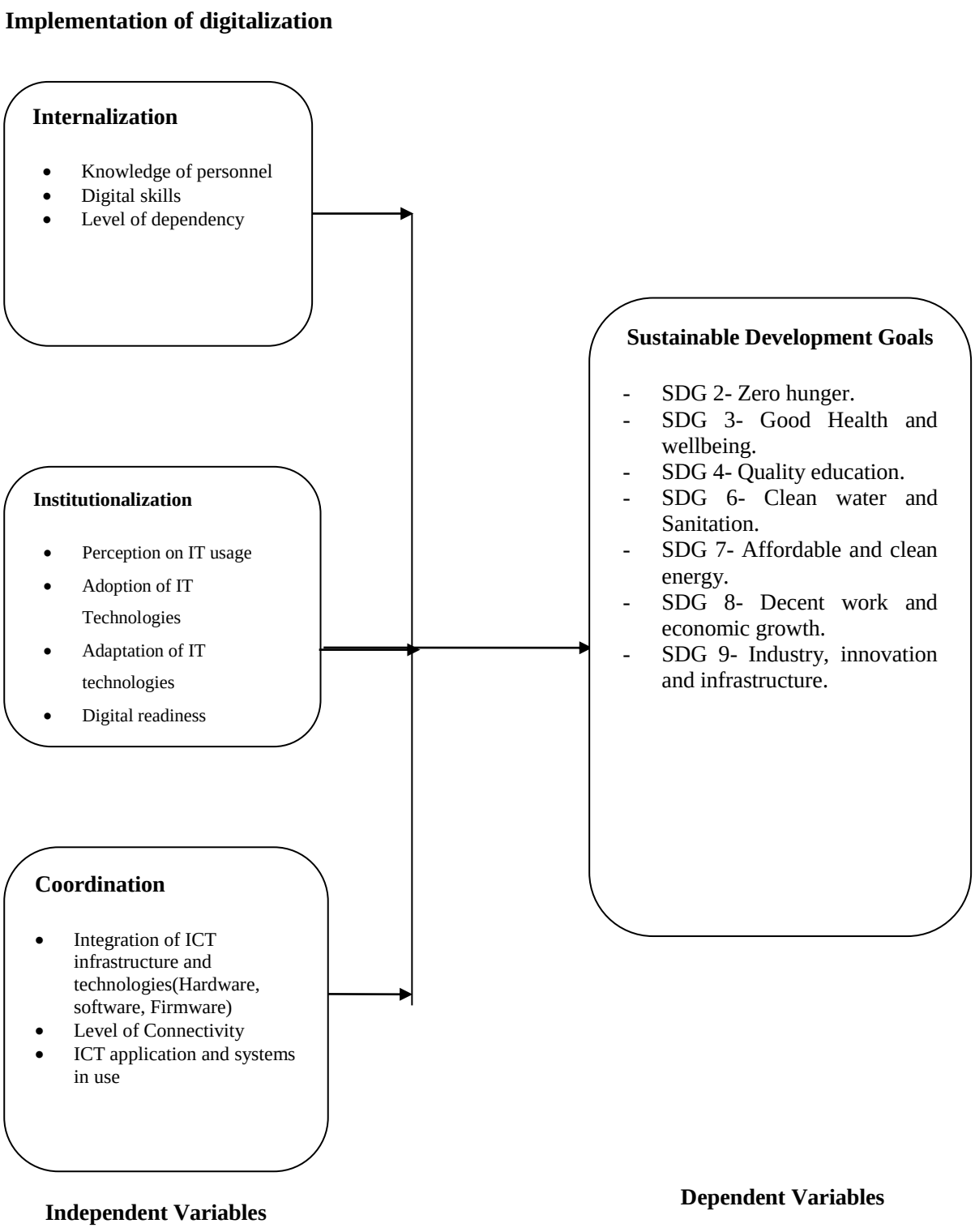

Figure 1.1: Operationalization of the variables

1.6 Justification of the study

This study was justified at two levels; academic level and policy level.

1.6.1 Academic Justification

In academic space, this study was hoped to be instrumental in equipping academicians with key references that link the Sustainable Development Goals, supranational policy programmes and digitalization in public Administration. Under the study, the findings were deemed to be useful in guiding researchers in terms of how to formulate variables that are potential for disrupting the way public sector offices are run and how sustainable development goals are linked to the programming of skills development. It is also essential that this study was to open Pandora box of public administrator and researchers to formulate key strategies on how to approach public administration studies with linkage to theoretic models of digitalization adoption in the systems of administration. It was also clear that there are few research and data as regards the study of public sector administrators and digitalization, therefore the findings of this study were to act as a reference to fill the gaps in an academic dilemma.

1.6.2 Policy justification

This study was meant to shape public policy space by linking the theoretical context and digitalization of sustainable development goals within the public administration. The realization of SDGs and integration of the principles in public administration was to gain from this study as the challenges and solutions were highlighted to enhance the acceleration of digitalization implementation. This research opened up discussions between think tanks, policy institutes and research institute in drawing experiences and empirical knowledge on the implementation of digitalization for Sustainable Development Goals. The government of Kenya and the United Nations member's states are meant to reference from the study on how to better realize the goals and subjects of SDGs particularly in governance by promoting digitalization and modernization in the public sector to further institutionalize and promote efficient, effective and participatory delivery of public services. Therefore, the study was meant to front policy formulation and direction on how public administrators can integrate the use of digitalization for sustainable development goals. This study shall also inform the review of National ICT Policy, (2019) through recognition of rapid changes in technology for

public service delivery administration, management of public affairs as well as inform the need for regulatory response and adaptive policy. Therefore, moving forward, the government will accelerate key strategies ideal for achieving Kenya's national development goals and targets through rolling out of new generation mobile, secure high speed and modern technology-enabled systems for rolling out SDGs.

This study was also meant to be instrumental for Digitalization and ICT professionals to relook at the key levels of implementation of SDGs in public administration. IT professionals, scientists, public policy shapers and governments have the opportunity to critically assess the findings and recommendations for adjusting integration and acceleration of digitalization processes in public administration. Specifically, UN organs are meant to use this study to relook at indicators that drives and measures the implementation of digitalization and SDGs in public administration. Policy analyst and professionals are also meant to utilize the study findings on initiating discussions about the practice of digitalization and integration of digital technologies for driving digitalization in public administration and beyond.

1.7 The scope and limitations of the study

The study focused on supranational policy programmes and implementation of digitalization and how its related components including digital infrastructure and digital Skills that accelerates SDGs within the public sector in Kenya. The study further examined associated with digitalization that hinders the full implementation of SDGs in public administration. The 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, 2016) 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.

This research was conducted within seven Government Ministries aligned with chosen SDGs, nevertheless, it would not be possible to undertake a study on the all seventeen SDGs due to time limits. It was expected that the little experience and knowledge of public administrators in the digitalization process and link between SDGs and ICT operationalization would slow down the research. SDGs indicators and goals were deemed to be many and the chosen sites of the study were not able to fully understand all the SDGs under the study however the researcher tried to minimize this through a clear selection of relevant ministries and respondents with decision making and knowledge in SDGs. The researcher also faced challenges related to protocol and bureaucratic systems within the ministries where conducting interviews and administrating surveys had to be approved by Permanent Secretaries, Directors or Senior Public Administrator. This process, therefore, delayed data collection timelines and made the whole process expensive. Most of the Directors who are decision-makers were busy to allow for interviews and referred their juniors who were not experienced to respond on their behalf. To mitigate the challenges, the researcher employed a data assistant who was instrumental in collecting filled surveys and making repeated reminders to those who were sampled to respond in order to save on time.

1.8 Definition of Concepts

Digitalization: As used in this study, digitalization is the process of technological implications including applications of digital skills, digital technologies, digital public service, Information Communication Technology (ICT) infrastructure, connectivity and the use of the internet (OECD, 2012) into the operations of sustainable development goals within public institutions specifically public administrators to provide innovative revenue, business model and value-producing opportunities. The adoption of the OECD definition of digitalization was found to be comprehensive and applicable within the context of public administration by the researcher.

Sustainable Development Goals (SDGs): The definition is directly adopted from the universal definitions from United Nations blueprint and collection of seventeen key goals that guide the continental and global development, equitable distribution of resources and sustainable world (SDG Compass, 2016). However, this study focused on the adopted SDGs in line ministries as part of the National Development Plans (NDPs).

Public Administrator: as used in this study, Public Administrator is the official of the state government dealing primarily with administration of government functions in public office.

Transformative Approach: Transformative approach is the theory that has been used in the study. It describes how public actors who are involved in reform processes are constrained and influenced by sets of factors or contexts of historical institutional context, polity features, and environmental pressure as seen through cultural, structural instrumental, and environmental perspective respectively (Christensen and Lægreid 2001a, 2007b).

Supranational: A supranational organization is an administrative structure that goes beyond the boundaries of states. In this study, it has been used to project the influence that goes beyond the boundaries.

1.9 Chapter Outline

These chapters are addressed in the following criteria,

Chapter one focuses on the introduction of the study, objectives, research questions, statement of the research problem, variables of the study, limitation of the study and justification of the study.

Chapter two looks deeply into the literature review and theoretical frameworks of the study.

Chapter three presents the methodology that was adopted in the study.

Chapter four gives a summary of the findings and data presentations and analysis. These findings critically link to the study objectives and research questions used in the study.

Chapter five represents the summary of findings, conclusion and give further recommendations of the study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviewed reputable literature on supranational policy programmes, digitalization and its role in the acceleration of SDGs within the public administration. This chapter focuses on the general state-of-the art and understanding into issues of supranational policy programmes, state of digital policy implementation in Kenya, public administration transformation, SDGs, digitalization implementation, barriers of ICT adoption in public services and broader issues in internalization, coordination and institutionalization approach. This section also assists in the identification of an appropriate theoretical framework based on the critical issues about the digitalization of sustainable development goals in the within public service.

2.2 Digitalization and Sustainable Development Goals

Heads of United Nations (UN) representatives, United Nations Council, member nations, and the crowns of state gathered on the 25th September 2015 and settled on the seventeen Sustainable Development Goals to override and replace the earlier proposed Millennium Development Goals (MDGs) in UN represented the council in the year 2000 (SDG Compass, 2016). These seventeen SDGs include SDG 1-No poverty, SDG 2- Zero hunger, SDG 3-Good Health and wellbeing, SDG 4- Quality education, SDG 5-Gender equality, 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 10- Reduce inequality, SDG 11- Sustainable cities and communities, SDG 12- Sustainable consumption and production, SDG 13-Climate action, SDG 14-Life below water, SDG 15- Life on Land, SDG 16- Peace, justice and strong institutions, and SDG 17- Partnership for the goals were prompted to inspire action in the succeeding fifteen years to transform the pathway of humanity (SDG Compass, 2016). This project took stock of the central presumption that since the public administration plays a high priority role in integrating and implementing SDGs into National Development Plans; it was essential to guide acceleration of SDG in Public Administration through digitalization process.

Before transition to SDGs in 2015, MDGs were declared to promote global partnership to reduce extreme poverty with specific time-bound 8 targets ending in 2015. Even though many countries made extraordinary progress in improving citizens lives, developing countries faced significant challenges and missed on the set development targets by large margin over weak governments and institutions that are accountable to their citizens, corruption, lack of transparency and accountability and weak governance (Clemens and Moss, 2015). Similarly, Amin (2006) and Bond (2006) critically discussed the uneven progress of MDGs and unearthed the underlying political characteristics of MDGs suiting rich states and interest of corporations in what is termed as neo-liberal globalization. The realization of uneven progress and weak implementation targets gave rise to the 17 Goals of SDGs which are institutionalized within the government development structures and are mainly implemented by the Public Administrators among other intergovernmental structures and development organizations. Looking at the implementation challenges recognized during MDGs and institutionalization of SDGs in the current global development dispensation, it was therefore important to critically assess the digitalization and implementation process of the current targets.

The Digital Economy and Society Index (DESI) was technologically advanced by The European Commission to measure a country's achievement in the digitalization levels. The Digital Economy and Society Index (DESI) summarize the indicators linked to digital competitiveness and performance. It is summarized as a set of indicators associated with the digital policy framework having a three-layer structure (European Commission, 2017). It is noted that the first level has five principles that are Digital Public Services, Digital skills, Connectivity, Use of Internet and the integration of digital technology while the second level comprises of 12 individual indicators while the third level has 31 indicators.

An economy's digital development can only be achieved through the interconnection of these factors (European Commission, 2017). During the processes of technological change, the index changes and as of 2016 for instance, the changes included 4G coverage. The final DESI score computation weighting system share the following: Human Capital and Connectivity as having the leading impact with 25% each, while the Integration of Digital Technology follows with 20%, the application and use of the Internet and Digital Public Services recorded the lowest control of 15% (European Commission, 2017). According to Murr et.al

(2017), digitalization processes and tools increases efficiency and improve data transparency. Therefore, digitalization influences the future work concepts over the next years through the application of algorithm as decision-makers, use of data and the use of bots (Sergey N. et al., 2018).

2.3 State of digital policy and implementation of digitalization in Kenya

Frantic efforts have been made to place Kenya on the global map as an innovative market place for digital revolution systems. The Kenyan learn and test approach to implementation and coordination of digital revolutions has gained national support from the Kenyan government in recent times. To streamline the sector, the government has in quick successive regimes rallied e-government platforms and instituted necessary legal and statutory legislative rules that have spurred improved service delivery through integrated Huduma one-stop shop service delivery in all 47 counties. Additionally, Kenya has instigated innovative MPESA financial mobile payment systems that feature globally. In fact, Kenya features prominently in the global sphere because of the vibrancy in technological financial markets that services both informal and formal markets in Kenya including the larger East Africa region. Generally, digital platforms have revolutionized the way payments, tax administrations, health financing is made through reducing paperwork and ensuring efficient delivery of services. Through e-citizens, government platforms supported by ministries, Kenyans have been able to apply for government's services through payments via e-citizens agents, mobile money and debit cards. Digital platforms have also facilitated the monthly voluntary payments and facilitate access to the delivery of health and education services. Wasunna and Frydrych (2017) note that the transition of mobile money has reduced leakages and facilitated timely payouts to health and insurance service providers hence improving health systems which are SDG target goal. The education sector has also seen a remarkable improvement in relay and delivery of results as noted by The Collaboration on International ICT Policy for East and Southern Africa (CIPESA) (2015). Examination results dissemination processes and the adoption of online system for national primary and secondary school examinations as well as receive instant feedback has fed into decision-making platforms for Kenya Universities and Colleges Central Placement Service (KUCCPS) to enable students to select and apply for colleges and universities. In social protection, great strides have been advanced where single registry systems, digital identification schemes,

electronic incomes payments and targeted transfers to senior citizens, orphans and vulnerable persons and persons with disabilities get their grants. The platform has extended to offering grants and public works payment opportunities for youths and other beneficiaries. Digitalization has therefore supported effective delivery of payments, reduced double registration, increased accountability and transparency, enhance the quality of operations, and provision of real-time big data (Aker, 2017). Even though significant progress has been recorded in adopting e-citizen and e-government services for targeting SDGs goals, it is evident that public still faces numerous challenges like limited accessibility of public data, low process automation levels, siloed services by government agencies, and the limited capacity of counties and national governments to roll out government services (Ndungu, 2019). This can be corroborated by a study conducted by Kenya National Bureau of Statistics (KNBS, 2016) and Communications Authority in Kenya (CAK) on the availability of ICT infrastructure, access and use in the public sector. The study surveyed 1,030 respondents from ministries, national and county governments departments, state corporations, learning institutions, hospitals, independent offices and constitutional commissions. The study revealed that 43.4 per cent of the public institutions implemented e-government initiatives and 20.7 per cent received mobile phone payments for services offered. The study found out that ICT infrastructures by public institutions were highly supported by the internet, computer, Local Area Network (LAN) and telephone but was low for facsimile and intranet (KNBS, 2016).

2.4 Internalization, Coordination and Institutionalization Approach.

Greve, (2012) confirms that for more than a decade, digitalization has transformed local administration into dynamic and flexible organizations' in what is called 'digitalization reformation'. As such, the digitalization process (Greenwood et.al 2008) can be described as the process of creating social structures based on values and norms in what is summarized as institutionalization. Emerging empirical analysis, statistics and academic research projects have summarized the digital maturity of local administrators, the capability to master digitalization as an organizational, strategic and technical issue. However, there is a significant absence of focused information linked to the institutionalization of digitalization in organizations and insights on how the perception of IT role in digitalization influences institutionalization process (Greenwood et.al 2008).

Digitalization has the potential to respond to the growing implementation of public service however, there remains little awareness of what ICT can offer across physical borders and local scale (Henard et al. 2012). Digitalization space provides an opportunity for virtual processing, the building of personnel skills and knowhow (internalization) by overcoming traditional barriers to institutionalize access through what is known as democratic access as well as facilitating partnership for the joint design of public service and enlistment of foreign experts (OECD, 2012). In public organizations, internalization has taken a smarter angle through international value chains as digital systems interlink operations within public administration (Henard et al. 2012). More advanced technologies and applications have automated public administration services through E-governments and integrated smart infrastructure to automate coordination and flow across national borders (OECD, 2012; Onyango, 2017). Further, Onyango, (2017) highlights that e-citizen platform is not accessible to many citizens seeking services due to lack of ICT skills and financial resources, however; he opines that digital public service and one-stop-shop kiosks in Kenya have improved public service deliveries and technical environments in Ministries, Departments and Agencies (MDAs). Henard et al. (2012) note that organization smart infrastructure are always complex and requires large investments. Moreover, the usability of IT systems and digitalization processes are affected by IT penetration, coordination of ICT infrastructure, data information and security. Therefore ICT can be instrumental in articulating internalization processes in public institutions and has the potential to create qualitative change as well as reforming coordination of ICT connectivity (Henard et al. 2012).

Lastly, 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 (Greve, 2012).

2.5 Transformation of digital technologies in public administration

Technological capabilities influence the economic environment and keep track of contemporary development becoming crucial to both macro and micro levels. The characteristics in society today are influenced by the industrial revolution that occurred three centuries ago. The revolutions took place at a time when technological changes influence social structures and economic systems (Schwab, 2016). Technological changes have been

remarkable since the industrial revolution in the 1760s through constant upgrades and improvements (Schmarzo, 2017). The revolution in the early 20th 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 was characterized by high levels of artificial intelligence, the internet 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 (Schwab, 2016). According to Schmarzo (2017), this era of digital transformation aims to improve efficiency in production, service delivery, manage various risks and uncover new monetization opportunities across the world. On the other hand, Bertini (2016) asserts that the digital transformation has affected individuals' live as well as the operations in both the non-profit and for-profit sectors. According to Dang and Pheng (2015), the need to achieve rapid economic growth has resulted in the exploitation of natural resources at an alarming rate. Both the society and science have considered sustainable development priority in both public and private sector (Levi Jaksic et al., 2018b). According to Brundtland Commission (1987), the concept of sustainable development suggests that humanity's wellbeing can be achieved only if the following has synergy: social equity, economic growth and sustainable environment. Further, the complex nature of society has been seen as the fourth dimension of sustainable development (Commonwealth Secretariat, 2007; Hawkes, 2001). Critics of Brundtland Commission's definition of considering five determinants of sustainable development includes, persons, time, space and permanence (Seghezzo, 2009). This concept is however abstract in the application and has not been explored and confirmed scientifically.

In a study conducted by Benner (2017) on the influence cultural acceptance on digitalization on Germany's GDP using data obtained from Google and social media platform Facebook, it was established that digitalization is influenced by a positive cultural acceptance. In another study by Hegyes et al. (2017) to examine the challenges affecting digitalization and sustainable development in Hungary and other countries in Europe, findings revealed that digitalization indeed influences sustainable development. However, the study failed to provide a whole perspective on the impact of digitalization on the components of sustainable development. Zhao (2011) sought to establish how national culture influences e-government

development in 84 countries globally. It was established from the study that long-term orientation, power distance and individualism influence e-government.

A study by Khalil (2011) on the link between practices to e-government readiness and culture established that principles of nationwide culture and practices have a positive influence on e-government readiness. An integrated model encompassing the technology acceptance model (TAM) with Hofstede's nationwide culture proportions, was developed by Al-Hujran et al. (2011) to evaluate how nationwide culture influence e-government adoption. Favourable cultural factors such as political freedom, religion and ethnicity were established as driving factor towards the support of technological process (Coccia, 2014).

2.6 Implementation of digitalization for SDGs

Digitalization may facilitate the achievement of the Sustainable Development goals. For instance, the sustainable goal number one promoting the elimination of poverty through connectivity to financial services hence financial inclusion reducing their levels of poverty (Mwansa, 2017). To achieve SDG 2 (Zero hunger), the implementation of e-agricultural services can reduce and eradicate hunger (Jones et al., 2017). Similarly, to achieve SDG 3 (good health and wellbeing), ICT can be leveraged for better connectivity and admission to e-health services as well as the involvement of health knowledge and information (GSMA, 2016). Several digitalization initiatives can be put in place to enhance gender equality. Various e-platforms and e-governments can be used in the elimination of gender insecurity issues among women. Effective and efficient public administration is necessary for the realization of SDGs in developing countries. However, to enhance universal attainment of the Sustainable Development Goals, the public administrators must play a significant role by developing new digitalization partnerships with the private sector, other state agencies and institutions as well as civil society organizations (UNDP, 2018).

Hilti and Aebischer (2015) categorized the ICT influence in terms of use and application by recognizing that digitalization is a factor that enhances the development. The qualifying factors tend to be derivative from either negative or positive effects arising from the use or application of technology. Hilti and Aebischer (2015) further note that computer technology, when applied to the sustainable environment, contributes to the realization of maintainable ICT. Ericson (2015) outlined how technology can be used to enhance the attainment of

sustainable development goals. According to Ericson (2015), this can be realized since ICT: Can enable the saving of costs; trigger research, innovation and discovery; improve flows of new applications; enhance low-cost learning and education. Further, Adamali and Safdar (2006) assert that technology enhances the building of synergies across goals helping in the realization of positive results hence removing the barriers to the achievement of the sustainable development goals. Digitalization presents an opportunity for countries to effectively address the issues relating to poverty and economic growth (Bello, 2014). According to Bello (2014), countries have considered themselves superior as a result of effective implementing ICT strategies aimed at achieving long-term sustainable development hence contributing to an improved gross domestic product.

2.7 Challenges to digitalization of SDGs in public administration

Numerous challenges are faced during the implementation of digitalization in the public sector (Sachs et al. 2016). Analytically, it is not easy to recognize the relationship between SDGs and digitalization in the first instance (Huawei, 2017). Various factors hinder the adoption of digitalization and their components in the acceleration of SDGs. According to Sachs et al., (2016) inadequate ICT infrastructure, as well as digital resources for policy makers and administrators in the public sector, usually hinders the effectiveness of implementing digitalization for the use of SDG. The existence of disconnect between ICT domain knowledge and skills among policymakers also hamper implementation (Sachs et al. 2016). Sachs et al (2016), recognizes adequate levels of awareness about digitalization as well as skills among administrators in the public sector should be considered during supranational policymaking programs. In Kenya, there is a lack of skills necessary for the implementation of complex ICT infrastructure as well as processes (Afande, 2013). The results of a study conducted by Afande (2013) indicated that 57.8% of professionals graduating from institutions of higher learning have inadequate ICT skills and therefore need further training on the same.

As stated by Tusubira and Mulira, (2004), 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 (Tusubira and Mulira, 2004). The simplicity of using technology shows that ordinary citizens and public officers having

the full mandate of implementing ICT strategies tend to shy away from executing their roles due to the perception that the application of ICT in development processes is complex (Davis, 1989). Davis (1989) argues that the perceived simplicity of using ICT depends on how flexible an individual or an organization is to adopt technology in various processes. As such, it may be established that the rollout of the process of digitalization may enhance the acceleration of SDGs that have not been achieved. According to David (1993), the perception of simplifying of the use of infrastructure for Information and Communication Technology (ICT) has influenced the process for digitization

GSMA (2016) report shows that the acceleration of SDGs is influenced by digital connectivity. In Sub-Saharan Africa, inadequate funding as well as low levels of awareness about ICT capabilities, lack of technical skills as well as digital divide has hampered SDG roll-out process (GSMA, 2016). The GSMA (2016) report further indicates that inadequate broadband capacity in Africa results from lack of infrastructural capability, affordability, relevance and articulated the significance of distribution network coverage to isolated rural areas and less networked regions. Besides, Sachs et al. (2016) stressed that 'connecting the unconnected' is considered a vital area that would ensure the achievement of sustainable development in the public sector (Huawei, 2017).).

2.8 Theoretical Framework: Transformative Approach

The study was anchored on the transformative approach perspectives to public administration. This theoretical approach was advanced by Tom Christensen and Per Laegreid who strongly highlighted the interplay of cultural, environmental, values and norms, power relations, perceptions and attitudes of adopting and adapting new systems in the organizational context. This theory provides better interplay in the structural public administration where hybrid and complex mixture of the polity features, environmental pressure and institutional history context are factored including recognizes the institutional decision-making a power play, cultural setting and organizational environment within public administration and better explains the context of adoption, internalization, institutionalization, adaptation and coordination link in digitalization of SDGs. Christensen and Legreid (2018), notes that public administration is becoming complex and multifunctional with emerging challenges in globalization, internationalization, societal security and digitalization.

Therefore, this theory takes into context that one cannot understand the operation and delivery of public administration decision making without analyzing the operational and organizational modes of public administration (Christensen and Legreid, 2018). Organizational decisions in public administration can be at two levels; first, the decisions could be directed towards citizens or enterprises but they can also affect the allocation of burdens between groups. Secondly, decisions can be made towards internal organization through vertical or horizontal recruitment and career advancement (Augier M. et.al 2005). The key dependent variable of decision making by public administrators is to ensure the distribution of responsibilities among actors and the organization political dominance system (Christensen and Legreid, 2018). It is therefore essential to link whether the decision made by public administrators conforms to the needs, wishes and demands of the population (Augier. et.al 2005). Therefore, a transformative approach to public administration as described by Christensen and Legreid (2018) proposes three perspectives: structural-instrumental, environmental and cultural-institutional perspectives.

Structural-instrumental perspective

Recognizing that public administration is anchored on political science and administration, there are existing power relations and organizational arrangements that are entrenched by rational calculations, instrumental control and leaders (Christensen and Legreid, 2018). 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 in order to prevent cultural resistance and confrontational power. Inter-organizational coordination has been conceptually confused with integration, cooperation, coherence and collaboration while in essence, they are different (Onyango 2018). Conversely, coordination has been defined as the administrative mechanisms and instruments to voluntary or forcefully create organization tasks that reduce managerial redundancy and process overlaps in the public sector. Similarly, Christensen and Laegreid (2011) argue that coordination is a multilevel interaction of vertical and horizontal alignment in the implementation of policy reforms within inter-governmental and inter-organizational structures.

Structural and instrumental perspectives towards administration and organizational design coalesce around formal structures and organizational designs that are bureaucratic and non-

receptive to new phenomena. It is also assumed that public administrators tend to score high on rational calculations (Christensen and Lægreid 2011). Therefore, it remains critical to see how rationalization and digitalization for SDGs are taking place to reform the public administration. In particular, Organizational structures and managerial designs are valued such that they are religiously used to inform decision making by political and administrative leaders. While this is the case, the realization that digitalization process and digital transformation across the public sector is taking place, many organizational designs largely affect and constrain the effective implementation of SDGs. Loosely or tightly discretional powers within the organizational hierarchy may negatively or positively influence or affect the integration of SDGs and digitalization in the organization. As instrumental norms defined by both substantive and procedural coordination of activities, public administrators and staffs should support new decisions and activities geared towards digitalization. Much as structural-instrumental view present individuals with a narrow understanding of their duties and roles at the organizational level, they should not allow gaps that derail institutionalization, coordination and internalization of SDG processes within the structures of organizations. For instance, organization structures and bureaucracy will affect the adoption and adaptation of SDG goals as well as making an organization digital-ready. Conversely, the individual attitudes in the administration and organization structure may lead to the public administrators not developing their skills and knowledge in the digitalization process as they would see this and disruption of their norms. In laying out ICT infrastructures, bureaucratic legislation has the potential to derail coordination of different players due to cultural nature of not working with the private sector or other players in the market (see, Onyango, 2019), thereby, affecting overall digitalization process. It is therefore clear that transformative approach uses central instruments from institutions to form and make decisions in public administration were hybrid and complex mixture of the polity features, environmental pressure and institutional history context are factored in (Christen and Legreid, 2018).

Environmental perspective

For an organization to establish legitimacy and relevance, they are forced to operate within institutional environments both internal and external pressures such as the adoption of SDGs. This theory supports the realization of SDGs through digitalization in their institutional programming is critical. In most cases, SDGs were adopted and integrated into institutional

frameworks of most organizations after the ratification of SDGs by the UN council and the realization that they were global driven goals. Therefore, formal organizations operate within certain parameters reflected by myths instead of adopting what they know would case. This theory brings the discussions on the forefront of whether adoption of SDGs by institutions was as a result of exerted pressure from international institutions. It also brings another argument backed up by Olsen (1992), who indicated that organizations may participate in forming a natural environment or the international environment as a form of pressure or norm. Critically, the digitalization process centred on environmental factors and embedded on the strong realization that without technology and digital skills transformation, then the organization will bear the brunt of being left out of prestigious clubs. The ICT infrastructure and wave of digital skills improvement in the organization has been majorly influenced by the environmental pressure to adopt and adapt IT transformation. Nevertheless, improvement in ICT infrastructure is likely to be occasioned by international influences by laying out sophisticated internet cabling around the world including introduction of 5G.

On other fronts, digital readiness coupled with a positive perception of the role of digitalization in organizations is mainly influenced by the leaders may curiously use the environment as an instrument to influence and maintain internal judgment processes by protesting the constraints of that methodological and institutional environment decision making and weakens public administration leadership in organizations thereby creating new organizations' realignment where public administrators have the opportunity to implement new strategies for desired outputs. From Johan Olsen's arguments, it is possible to deduce that many public organizations and public administrators introduced SDGs into their organizational systems as a form of international ratifications by UN governing council in 2015. As a result, public administrations have adopted and operationalized international norms and internalized them in their operations. Another argument fronted by March and Olsen (1989) between environmental factors and culture is that strong cultural integration within the organization may influence the adoption of technical constraints and make them valuable (Christen and Legreid, 2018). Meyer and Rowan (1977) differentiated the technical and institutional environment; the technical have resources related characters while institutional environments are geared towards symbols and myths. Olsen, (1992) identified two environmental determinism where public organizations adapt to the country, national and international organizational norms. Olsen stressed that organizations have adopted national

and international systems under pressure and that this has created more technical problems (Olsen 1992). The theory formulation is linked to the ratification and adoption of SDGs into government programming in the year 2016 within public service for implementation. However, the theorist notes that this adaptation has the potentiality to create pressure and technical problems in public administration since they have become myths and doctrines (Meyer and Rowan, 1977; Christensen and Legreid, 2018). In digitalization processes, the transformational approach recognizes that the theory cements the digitalization process in public administration through institutionalization, internalization (learning), and coordination of SDGs in public administration.

Cultural-institutional perspective

Concerning cultural and institutional view, the theory recognizes that decision making in the organization are products of national and local historical institutional contexts (Christensen and Legreid, 2018). The duo further argues that institutions have their dependent path, history and culture of doing things in a cultural environment and that introduction on new technologies is likely to disrupt the norms and cultures of the organization (Christensen and Legreid, 2018). Public administrators tend to coalesce around historical experiences, past lessons, practices and traditional methods of conducting their duties, therefore reluctant to the adoption of new elements that may distort cultural environments, myths and historical dependence (Christensen and Legreid, 2018). As such, the actions of administrators and decision-makers are constrained by organizational complexities, environmental factors and cultures (Onyango, 2017). As far as SDG implementation is concerned, the cultural perspective of organizations has been geared towards the realization of sustainable development indicators. Digitalization processes are the organization has also been premised on the cultural aspects that organizations must adapt to IT transformation and influence individuals to acquire advance knowledge and skills in IT. This affects the integration of new ICT infrastructures and adaptation of its systems for the digitalization process. Organizational culture and norms directly derail the digital readiness and perception of IT use in organizations. The legacy systems, for example, and culture surrounding them may make it challenging to replace old systems at the organizational level because of cultural orientation.

A transformative approach to public administration, therefore, presents a holistic framework for organizational analysis and evaluation of potential change options for legacy systems within public administration (Alexandrova et. al, 2015). Brooke, (2001) notes that government organizations' are heavily reliant on legacy systems to support critical functions and business processes and proposals to replace the existing systems always face legacy problems. Alexandrova et. al, (2015) notes that overcoming legacy problems or what is referred to wicked problems is difficult because of the organizational culture, complex interrelationships, information technology, government agencies normative environment and general culture resistance (Alexandrova et.al, 2015). Similarly, Onyango (2017) observes that the complexity of institutional environments is the reasons for wicked problems such as corruption that bedevils public organizations in Kenya.

It is noted that the transformative approach highlights that myths in organizational perspective greatly influence the cultural settings which eventually facilitate how decision making happens and it may be difficult for an organization to introduce borrowed or external systems for implementation without cultural resistance (Alexandrova et.al, 2015). It is, therefore, possible to realize that introduction of SDG systems and digitalization process faces resistance as they distort cultural orientation. Therefore, strongly entrenched institutional and organizational cultures also affect the perceptions and attitudes of public administrators and are bound to make them have fixed minds on how they should deliver their roles, in effect, initiating new reforms operations will dismantle the organizations' norms and modify political-administrative cultures (Christensen and Legreid, 2018). This frame notes that organizations have their traditional cultures and political leadership and systems for decision making. And adapting new strategies to the systems requires reorganizations since organizations have their way of decision making and hierarchy of leaderships that creates strong homogenous structures which produce hybridity and complexity of coordinating digital technological transformations and institutionalization of SDGs (Alexandrova et.al, 2015). Therefore, myths surrounding initiated changes may influence the internal decision making and create negative connotation of planned changes in the digitalization process.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the description of the research methodology and design employed to conduct the study. This section outlines the case study design, selection of study sites, the unit of analysis, qualitative and quantitative methods, data analysis, data collection, and data analysis methods.

3.2 Methodology

3.2.1 Research design

The study used descriptive design since it is considered the most applicable given that studies can yield rich data that leads to important recommendations. Descriptive design was also helpful in identifying key variables that were established since data collection allowed the assembly of multifaceted in-depth information in the form of qualitative and quantitative surveys (Creswell, 2013). Therefore, descriptive design enabled the researcher to acquire an accurate sample for a larger number of the population using small sample thus exploring the relationship between variables. It also enabled the explorations of the relationship between the variables. Lastly, descriptive design was able to help the researcher determine the nature of prevailing conditions, the present status of the phenomenon, attitudes, practices and scouting adequate descriptions. However, Jackson (2009) notes that descriptive methods are not well suited for making accurate predictions as well as determining cause and effect.

3.2.2 Case study method

Looking at the nature of the study question of assessing the digitalization of SDGs in public administration, it is believed that the case study method was the most appropriate to obtain qualitative evidence from multiple sources and gain theoretical propositions. This presented an opportunity to the researcher to investigate and conduct an empirical inquiry by investigating digitalization of SDGs in public administration phenomenon. Further, the use of multiple causes of evidence allowed triangulation of findings. The case study also enabled the researcher the benefit of studying cases and phenomenon in details by the use of study variables.

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. However, (Miles and Huberman, 1994) subjected case studies to criticism since it lacks generalizability and it is non-representative, further, the complexity and richness of data collected is subjected to different interpretations and research bias. Miles and Huberman, (1994) notes that despite lack of detailed iterative data analysis in case study data and inability to provide generalizability, it is still believed that they are useful in refining and generalizing concepts. Yin (1994) posits that case studies are usually for analytical generalizations in which the researcher generalize set of results to far-reaching theoretical propositions. The researcher, however, experienced a practical challenge with case study since it was demanding and required in-depth access to case sites that created complexity in multiple data collections. Another limitation experienced was the generalizability of single cases which created selection bias in the study towards favoured theories. Nevertheless, the researcher overcame the challenges through creating case study strategies and employing validity methods on data collection and analysis.

3.2.2.1 The selection of the case study sites

By adopting interpretative methods of uncovering the truth to understand real-life context through understanding the phenomenon, a multiple case study approach was used to describe digitalization of SDGs in public administration within seven ministries (Ministry of Information Communication Technology (ICT), Ministry of Labor and Social Services, Ministry of Health, Ministry of Education, Ministry of Devolution and ASALs, Ministry of Water and Sanitation, Ministry of Energy and Petroleum). Over 2 months was required for conducting the studies. The selection of these government ministries was advanced because they were directly involved in implementing the chosen SDGs which was the focus of this study.

3.2.2.2 Units of analysis

The researcher employed the use of multiple case study design which contained several units of analysis. This is where one issue is isolated but the researcher selected multiple case studies to illustrate and inform the study (Yin, 2003). The units of analysis consisted of ICT departments in government ministries and IT officers/ assistants, ICT Managers and

supervisors and Directors as public administrators. The units of analysis were categorized according to the original intentions of the study on where the sources of evidence would be collected. The events of the study including where the interviews were conducted was established and taken into considerations by ensuring that questions and interviews protocols were adhered to through quality control. In this context, the study organized ministries according to their relevance to the SDGs chosen. This ensured the valid selection of the Government ministries in the first instance, secondly, the study parameters determined that within the ministries, ICT departments were the most crucial in providing relevant information and data as regards to the digitalization of SDGs within ministries. To narrow on the strata within the ICT department, the study categorized staff based on Directors, Senior Managers, ICT Supervisors and Managers and lastly ICT Officers/ Assistants since they were the most appropriate individuals to clearly understand digitalization processes in the acceleration of SDGs. The chosen units of analysis in this study provided a clear context for analysis, study validation and description of the case studies.

Table 3.1: Units of Analysis

Case studies	Units of analysis	Justification
Ministry of Labor and Social Services	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants
Ministry of Health	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants
Ministry of Devolution and ASALs	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants

Ministry of Education	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants
Ministry of Information Communication Technology (ICT)	SGD acceleration Centre	The study majored on Senior Managers and ICT officers within the Centre
Ministry of Water and Sanitation	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants
Ministry of Energy and Petroleum	Department of Information Communication Technology (ICT)	Within this department the study focused on Directors, Senior Managers, ICT Managers, and ICT Officers/Assistants

3.2.3 Mixed Methods approach

Creswell (2012) argues that qualitative research may be used to record data that cannot be inscribed in words such as ideas, emotions, and feelings while quantitative research records data is a way of numerical and numbers. Creswell (2011) notes that integrating both qualitative and quantitative design enjoys the advantage of providing more methodological flexibility to elucidate more information that is not possible to obtain via the quantitative method, it also provides an opportunity to understand contradictions between quantitative findings and quantitative results with the ability to collect comprehensive and rich data. The researcher employed both qualitative and quantitative research methods to collect data from public administrators. Surveys, questionnaires and one on one interviews were organized with the staff within ministries. The researcher noted that the integration of the data was time-consuming and labour-intensive including realizing challenges in integrating quantitative and qualitative data during analysis. The choice of this method was however motivated by the

fact provided opportunity to answer research questions that neither qualitative nor quantitative could answer as well as gaining a better understanding of contradiction and connections across the research processes.

3.3 Methods of Data collection

3.3.1 Structured questionnaires

The study employed the use of structured questionnaires that were administered to all prospective target groups within the government ministries that includes Directors, Senior Managers and ICT Officers. The structured questionnaires were designed to covers exploratory information to better understand the subjects as well as collect quantitative information that tests a specific hypothesis. The questionnaire design was both open-ended and closed-ended. The choice of open-ended was to aid respondents in giving their valued opinion in an elaborate manner and highlight responses that they would not respond to in closed interviews. Closed questionnaire acted to collect mostly quantitative information. Using structured questionnaires, purposive sampling was used to collect data from the randomly sampled staff of the ministries. Kothari, (2004) notes that structured questionnaire provides the advantage of reaching a wider population promptly and that the respondents have ample time to think through before responding and filling the questionnaires as well as making it easy for the researcher to code and analyze questionnaires statistically.

It is projected that open-ended questions allowed respondents to riposte questions in their own arguments without influence however, some expected challenges were expected to arise where respondents did not articulate proper responses while some did not give full answers as they might have forgotten important points. However, questionnaires method was marred by low responses. To avoid this, the researcher lobbied senior management to facilitate the administration of the questionnaires and to give the researcher opportunity to explain to the respondents the importance of the study. The researcher gave unbiased and complete information, keeping the interview brief to the point, meeting research objectives and ensuring that respondents fully understood the questions. Through close supervision and monitoring, the researcher managed to collect a considerable number of questionnaires from the respondents. In cases where the respondent did not have time to respond, we revisited them and booked appropriate time for interviewing. However this was slow and time-

consuming, it gave the researcher opportunity to reach some minimal target of sampled responses as summarized in the table below

Table 3.2: Response rate

Method of data collection	Target Population	Responses
Survey	50	34
Semi-Structured questionnaires	10	6
Interviews	5	2

3.3.2 Semi-structured interview method

Therefore, the researcher designed interview guides for face-to-face interviews and administrated open-ended questionnaires to selected respondents to ensure dependability and accuracy of the answers by further probing. Snowball sampling was used where the respondents were referred by other staff members as they were projected to be conversant with digitalization processes and acceleration of SDGs within the department of SDGs. Purposive sampling was applied in the selection of Directors and Senior Managers as they were directly involved in the management within the department of ICT. Semi-structured interviews were conducted through face-face to selected Directors and Senior Managers within the hierarchy of ministries to gain an in-depth understanding and taking of notes for the responses. The researcher had expected to yield a higher response rate since it would be difficult to refuse to ignore the interviewer however, most of the respondents were -non-responsive even after follow-ups citing unavailability of time. The researcher managed to conduct two interviews which were recorded and were used to corroborate the information collected from the surveys and questionnaires. Data collecting through this method proved to be demanding and was coded manually consuming a lot of time. In as much as the researcher spent more time and resources to ensure the success of one on one interviews, challenges arising from booking, approvals and appointments to conduct interviews made the whole propose difficult and time-consuming.

3.3.3 Documentary Analysis

Existing high-quality data, government publications, technical documents, journals supplements, university records, articles, SDGs websites, and other existing data collected by others that consists of relevant information were reviewed and secondary data extracted to inform the report. Valuable insights from Draft National Information Communication Technology Policy, 2016 and SDGs were drawn. Document analysis was able to afford the researcher opportunity to inquire and investigate research questions and variables while saving resources and time. Document analysis aided in getting technical details, cross-checking official information as well as referencing historical decisions. Another advantage noticed by the researcher was that the researcher could review documents repeatedly hence covering a wide range. However, the researcher noticed that with this method, some sources of data may lack depth and it could be harder to measure anyone construct deeply. In this study, information and data collected regarding the study topic were scarce hence low retrievability however, the researcher had familiarized with the original study and data as well as checking other sources for updated data.

3.3.4 Surveys

Face to Face survey was employed to collect data from the publication administrators. The survey involved asking key questions that relates to their daily interaction and knowledge of various variables of the study. In Isolated cases, it was prudent to leave the surveys with the respondents so that they could fill at their own pace. This arose where some staff were either held up and busy or needed personal time to understand the questions themselves. This method proved favourable for most respondents at it was fast and easy to understand.

3.4 Target Population

The study was conducted in seven government ministries and targeted a total number of 50 Directors, Senior Managers/ Senior IT staff for a survey, 5 Directors for interviews and 10 semi-structured questionnaires for senior managers.

Table 3.3: Target Population and response rate

S/N	CATEGORY	TARGET RESPONDENTS-SURVEY	Target NO.	Responses
1.	Ministry of Information Communication Technology	Directors Senior Managers ICT Managers Digitalization/ICT Officers	1 2 3 2	6
2.	Ministry of Labor and Social Protection	Directors Senior Managers ICT Managers Digitalization/ICT Officer	1 2 2 2	5
3.	Ministry of Health	Directors Senior Managers ICT Managers Digitalization/ICT Officers	1 2 2 2	5
4.	Ministry of Education	Directors Senior Managers ICT Managers Digitalization/ICT Officers	1 2 2 2	5
5.	Ministry of Devolution and ASALs	Directors Senior Managers ICT Managers Digitalization/ICT Officers	1 2 2 2	6
6.	Ministry of Water and Sanitation	Directors Senior Managers ICT Managers	1 2 2	3

		Digitalization/ICT Officers	2	
7.	Ministry of Energy	Director Senior Managers ICT Managers Digitalization/ICT Officers	1 2 2 2	4
	Total Survey		**50**	**34**
	Semi-Structured	Senior Managers / ICT Managers	10	6
	Interviews	Directors	5	2

3.5 Sampling Size

The sampling of the study was drawn from Senior Managers, Directors and ICT officer at the Government ministries. In descriptive research, a researcher may use 10% or 20% of the accessible population (Mugenda & Mugenda, 2003). The government of Kenya has twenty-one ministries of which seven ministries will be under the study. Consideration of seven SDGs out of seventeen was the focus of this **s**tudy. In this case, critical sampling was employed to collect cases that would give out the most information about the study. Purposive sampling gave the researcher opportunity to make generalizations about the sample.

3.6 Sampling Design

The study adopted purposive sampling in selecting respondents from the ministries. This technique gave the researcher opportunity to entirely choose respondents with characteristics and desire of the target population. Specifically, the study purposively targeted Directors, Senior ICT Managers and ICT officers within the government ministries.

3.7 Data Analysis

Captured data from the qualitative and quantitative research were analyzed, presented, interpreted and described systematically. To ensure accuracy and consistency, qualitative responses were identified broadly where concepts, ideas and phrases were assigned codes to

help structure and label data. Conversely, in quantitative data analysis, descriptive analysis was conducted for quantitative data analysis methods to help summarize the data and find patterns using measures of central tendency, averages, modes, standard deviation, median, variability that was followed by interpretations for presentation in graphs and tables. Specific data analysis methods employed included coding and categorization, tabulation, thematic analysis and use of statistical package for the social sciences (SPSS Version 23). Specific data analysis methods employed included;

3.7.1 Coding and categorization

According to Kothari (2004), coding denotes the method of assigning other symbols or numerals to enable responses to be put in classes and categories. This method involved transcribing data sources including raw data, interviews and field notes after which they are categorized into themes and patterns. The researcher conducted coding of transcribed data from the field notes and interviews. Once this was done, the comparative method of text was constantly checked by assigning codes that reflected units of data and various categories (Yin, 2003). Kothari (2004) highlighted that categories should be exhaustive, sensitive to category context, reflect the purpose of research and be mutually exclusive. The codes were developed with clear and concise meaning. The researcher was guided by the frequency and number of the mention by respondent's uniqueness of the category and the audience. The process was iterative where line-by-line code was carefully examined to extract phrases, sentences and words relevant to research. Scanning of paragraphs was done to logically group them into categories. The last step was to establish relationships conceptually in sub-categories. The coding process began with the researcher theory and formulation of indicators of evidence to support the theory. The last approach of coding was data-driven coding based on data collected.

3.7.2 Tabulation

This is the process of arranging data in a concise and logical order (Kothari, 2004). The researcher was able to summarize raw data and display it in the form of statistical tables for further analysis. This method has been chosen since it enabled conservation of space and reduction of descriptive statements to a minimum level as well as facilitating the process of comparison and detection of omissions and errors. Hand tabulation was preferred in this

study as a small number of questions were involved and was done using direct tally from the questionnaires.

3.7.3 Thematic Analysis

This is the process of understanding overall themes in data sets rather than break it into small abstracted sections by identifying patterns and themes. The researcher read and re-read through collated themes and extracted data for further analysis. This method is advantageous as it is not tied to a theoretical perspective or epistemological hence making it a flexible method. The process was helpful for the researcher in identifying themes and patterns that are important to address the research question. Conversely, the researcher familiarized with the data, generated initial themes, and review themes against data sets to determine if they answer research questions. Lastly, the researcher familiarized with the data generated labels and codes that identified important features of the data, generated initial themes, reviewed themes against data sets to determine if they answer research questions, naming themes and the write up an analytic review.

3.7.4 Statistical Package for the Social sciences (SPSS)

SPSS is a revolution software used by research scientist to help process critical data in simple steps (Mugenda and Mugenda, 2003). The collected data entered in SPSS version 23, coded and cleaned to ensure credible and data quality. The data was then analyzed through descriptive tendencies that included measures of variability including frequencies, averages, mode, median and standard deviation and measures of central tendency. The analyzed data was then converted into graphical representations of bar pie charts, graphs and statistical tables that are easy to understand and interpret. SPSSs as a method may, fell short of clear and impressive graphical capabilities and is equally expensive to install. SPSS also provided better data handling procedure by providing the ability to merge files, variables and different subjects that the researcher found useful while providing broad coverage of statistical routines and formulas.

3.8 Validity

Jackson (2011) defines validity as an indication of whether the instrument of the study measures what it claims to measure. According to Zohrabi (2013), validity should be

emphasized and checked right from the beginning of data collection to analysis and interpretation.

3.8.1 Construct validity

To ensure the construct validity of the study, the researcher linked the theory and measurements of the study by establishing operational measures for the concepts being studied while relating them to the original intentions of the study. The researcher employed specific methods of using multiple sources of evidence from the case studies to improve on data inquiry during data collection. Another method used at data collection stage was to establish a chain of evidence from start to conclusion by indicating the place and time of the interview, referencing document sources to show that data collection practices were followed and lastly ensuring that measures and questions enclosed in the case study protocol were captured. This, in essence, ensured quality control during data collection and processing.

3.8.2 Internal validity

Yin (2003) alludes that internal validity denotes to the degree to which the researcher has taken into account an alternative explanation for any causal relationship of their study. To ensure internal validity is adhered to, a pre-test was administered to the respondents followed by a post-test to get the difference in test scores that informed measure of the treatment effect. Differential selection as a method was solved by getting a random sampling of public administrators from different ministries. The researcher ensured that inference to a particular interview or the case study documents had the right evidence to deal with the threat to internal validity. Pattern matching was also used in the case study analysis by comparing on empirically-based pattern predicted variables to help strengthen internal validity. To conduct further internal validity, the researcher employed logical models to assess recurring cause-effect- case- effect designs whereby dependent variable at early phase becomes independent variable and causal event in the next stage (Yin, 2003). Further, the researcher ensured internal validity by matching empirically perceived events to thematically expected events.

3.8.3 External Validity

Yin (2003) notes that external validity entails establishing the domain to which study findings can be generalized. In this study, the researcher ensured cross-case synthesis by having more

than one case to strengthen the findings. External validity explored the problem of knowing whether study findings were generalized beyond the case study during research design. The researcher employed statistical generalization and analytical generalization to ensure that a specific set of results to wider theory was achieved. This ensured that if the theory is replicated in another study, then similar results would be produced.

3.9 Reliability

To ensure high reliability, the researcher made many steps as operational as possible such that if a later investigator follows the same procedure as documented, then the same findings should be arrived at. The specific methods of ensuring reliability included the test-retest techniques where the same instruments would be administered to the same group of respondents by correlating the scores from both testing periods and keeping all initial conditions constant to obtain coefficient stability and reliability. For internal consistency of data, the researcher determined the scores obtained from a solitary test administered to respondents. Then obtained scores shall be correlated with other scores obtained from other respondents using Cronbach's alpha general form K-R20 formulae (Mugenda and Mugenda, 2003) whereby a high coefficient implies that the items correlate highly and there is interest in measuring the concept of interest.

The reliability coefficient was determined using Cronbach's Alpha that was generated by SPSS.

$$\alpha = \frac{N.\bar{c}}{\bar{v} + (N-1).\bar{c}}$$

N = Number of items

$\bar{c}$= Denotes Average Covariance between item pairs

$\bar{v}$ = This denotes Average Variance

The researcher tried to minimise random error and increase the reliability of data collected to acceptable coefficient levels of 0.80 or more (Selltiz, Wrightsman & Cook, cited in Githua, 2002). On the split-half technique, the researcher assessed reliability by conducting one test with two parts to ensure correlation of one score with another. This approach ensured the elimination of chance error. Therefore, data with high split-half reliability had high correlation coefficient.

3.10 Ethical considerations

Since Interviews are considered an intrusion into respondent's privacy, time and space, Cohen et al (2007) observe that a high standard of integrity and ethical considerations should be sustained throughout the study. Therefore, to safeguard respondents on the participation on the interview process, a consent letter noting all the interest in the research, the level of participation, whom to contact, confidentiality and privacy of data was stipulated for respondent understanding and consent. This information made up the letter of informed consent that would be signed by the respondent in voluntary volition to participate freely in the interview. Informed consent letter addressed all aspects and reasons for the research and what findings are going to be used for. The researcher kept all information and data collected confidential and will not be in a position to share data without respondent's consent. The researcher therefore understands and observes highest levels of integrity coupled with highest ethical standards in the course of completed research and would strive to be guided by the outlined principles by MacDonald and Headlam, and Coolican (2014) regarding integrity and quality of the study, privacy, the confidentiality of the data given by respondents, informed consent, the anonymity of the respondent, and the independence of the research. Proper referencing and acknowledgement of other authors work were done properly by citation order. The guiding authorities in the research included the University of Nairobi that provided approval letter to conduct the research, National Commission of Science, Technology and Innovation (NACOSTI) also provided a research permit for the period of conducting the research.

CHAPTER FOUR
DATA ANALYSIS

4.1 Introduction

This chapter presents the analysis of data that was collected during the study from Public Administrators. The study sought to examine the digitalization of Sustainable Development Goals in Public Administration in Kenya. The specific objectives of the study were to examine the institutionalization of digital technologies and barriers of adoption of digitalization of Sustainable Development Goals (SGDs) in Public Administration, to examine the coordination of ICT Infrastructure on Sustainable Development Goals in Public Administration and to assess the influence of internalization of digital skills of Public Administrators in Sustainable Development Goals in Kenya. To accomplish the task, data was analyzed under the themes that reflect the objectives of the study. The findings are corroborated with the theoretical framework as well as literature reviewed in chapter two. Summary of descriptive statistics has been presented in tables, graphs and charts while narrative findings from documentary analysis and interviews have been qualitatively represented. A total of 40 surveys and 10 questionnaires were distributed and the response rate was indicated in table 4.1 below.

Table 4.1: Response rate

Strata	Target respondents	No. of response rate	Percentage Response rate
Directors	7	2	28.6
Senior Managers	14	7	50.0
Middle level ICT Managers	15	11	73.3
ICT officers/Assistants	14	14	100.0
Total	**50**	**34**	

The study managed to get response from 34 out of the 50 respondents selected from the survey, 2 interviews for Directors out of 7 and 7 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 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.

4.2 Demographic Characteristics of the respondents

Figure 4.1: Gender Distribution of the respondents

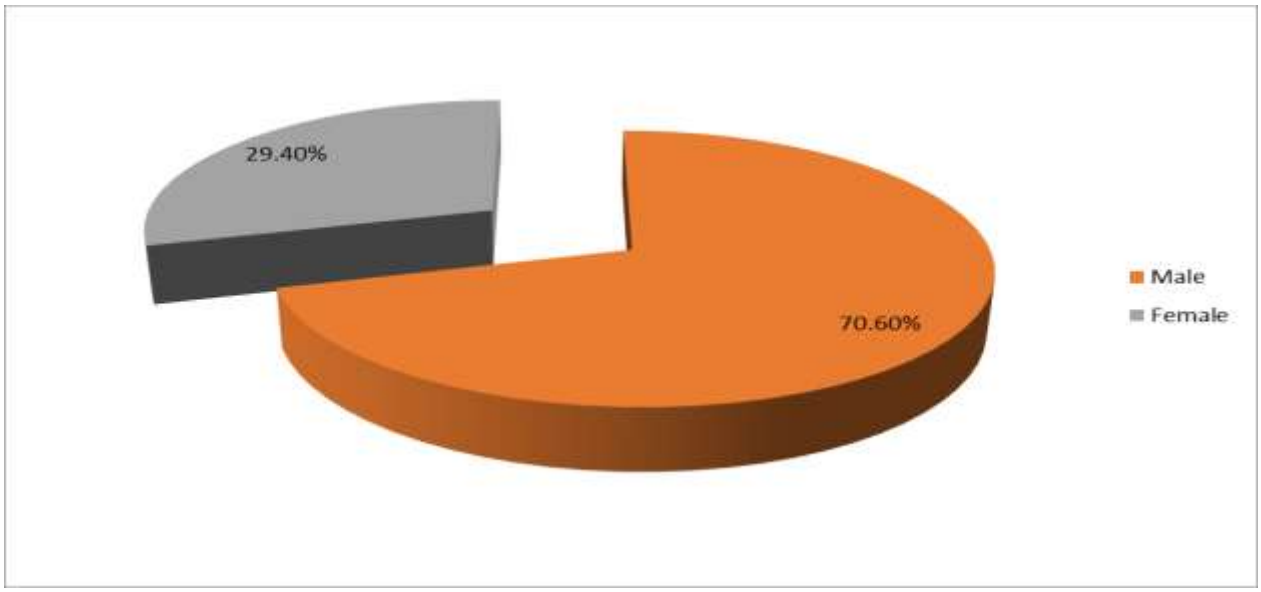

Figure 4.1 presents data gender distribution of the respondents who participated in the study, based on the data, 70.60% of the respondents were males while 29.40% were female. This implies that a greater portion of males is involved in the digitization of sustainable development goals in the public sector as compared to men.

Figure 4.2: Age Distribution of Public Administrators

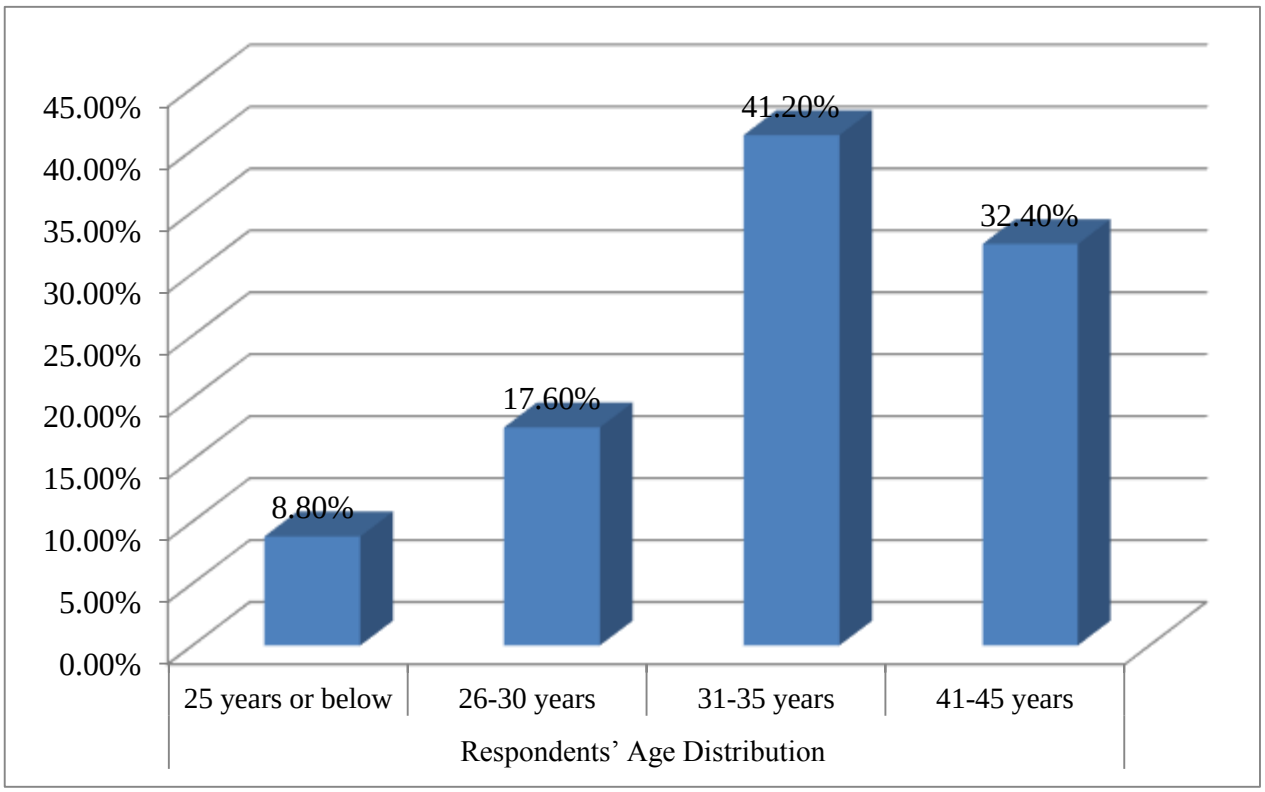

Figure 4.2 present data on the age distribution of the respondents, based on the data, a greater proportion of the respondents (41.20% were aged between 31 and 35 years which means that most of the public administrators involved with the digitalization of SDGs are within the youth bracket. This implies that majority of young people are enthusiastic about the digitalization than any other group, 32.40% were aged between 41-45 years by the virtue that they could have stayed longer in the ministries and have experience including decision making roles within the organization structures, 17.60% were aged between 26-30 years while only 8.80 % were aged below 25 years meaning that those fresh from colleges or universities are rarely placed at the digitalization of SDGs within the ministries.

Table 4.2: Respondents' Education

Level of Education	Frequency	Percentage
College Certificate	5	14.7
College Diploma	4	11.8
Undergraduate Level	18	52.9
Postgraduate Level	7	20.6
Total	**34**	**100**

Table 4.2 presents data on the highest education levels achieved by the respondents, based on the data, 18 (52.9%) of the respondents had undergraduate degrees, 7 (20.6%) had postgraduate degrees, 4 (11.8%) had college diploma while 5 (14.7%) had college certificates. This implies that accurate data was obtained for the study since more than half of the respondents had the necessary educational qualifications for understanding digitalization and sustainable development in the public sector.

Table 4.3: Level Computer Skills

Position as Public Administrator	**Level of Computer skills proficiency**						
	Basic		**Intermediate**		**Advanced**		**Total**
	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**

From Table 4.3, it is evident that majority of public administrators have intermediate skills at 61.8%, followed by advance 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 advance training. It is also notable that ICT Managers who had advance training were 36.3%. Since these are the staffs that are responsible for digitalization of sustainable development goals, it calls for review and further advance training of public administrators to match the skills required for 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, in fact, 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 organization created out of technophobia or fear of advancement in technological skills by senior staffs. 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.

4.3 Length of service in the public sector

Table Error! No text of specified style in document.**.4: 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**

According to table 4.4, majority of the respondents (47.1%) had worked in the organization between 6-10 years, followed by 32.4% that comprise of those public administrators who have worked for more than 10 years. Those who have worked between 2-5 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 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 organization hierarchy has the potential to transform digitalization and implementation of SDGs by creating reforms and new roles that prevent cultural resistance and confrontational power.

4.4 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. However, the findings from the ministries sampled on the SGDs that are directly implementing SDGs were summarized in Table 4.3 below;

Table 4.5: 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

From table 4.5, the findings revealed that there is the 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.

Table 4.6: Internalization of Digital Technologies by Public Administrators

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Use of Digital technology e.g. emails, social media, mobile phones, multimedia improves skills and knowledge of public administrators in rolling sustainable development goals	34	5	5	5.00	.000
I have advance digital technology and computer skills that can enable roll out SDGs work	34	2	3	2.91	.298
Our organization has installed computer technology tools, software's and databases for tracking, monitoring and implementing SDGs	34	4	5	4.79	.410
Use of ICT tools like emails, social media, mobile phones, multimedia has encouraged learning, knowledge sharing and SDG data use in our organization	34	4	5	4.88	.327
Valid N (listwise)	**34**				

The study sought to examine the internalization of digital skills of Public Administration in Sustainable Development Goals (SGDs) in Kenya. Table 4.6 presents the descriptive statistics of the findings. Based on the data, the study established that majority of the respondents strongly agreed with the following statements: Use of Digital technology e.g. emails, social media, mobile phones, multimedia improves skills and knowledge of public

administrators in rolling sustainable development goals (Mean=5.00; SD=0.000); It can therefore be summarized that there is a universal agreement within the ministries that digitalization processes improve skills and knowledge of public administrators in rolling sustainable development goals. However as to whether, public administrators have advance digital technology and computer skills that can enable roll out SDGs work, the study revealed that majority had moderate skills at (Mean=2.91; SD=0.298) implying that majority did not possess advance skills to steer digitalization of SDG process. On whether their organization has installed computer technology tools, software's and databases for tracking, monitoring and implementing SGDs the study found out that response was neutral with (Mean=2.91; SD=0.298) and; Use of ICT tools like emails, social media, mobile phones, multimedia has encouraged learning, knowledge sharing and SDG data use in our organization (Mean=4.88; SD=0.327) indicating a strong approval for the influence of digitalization on learning and knowledge sharing among public administrators. During the interview, the respondent indicated that;

> Public administrators have internalized the use of emails as the common digitalization skill and that most of the directors do not use social media as much as the other staff members, however, the consistency in use of ICT tools including social media and multimedia has somehow improved skills and knowledge of most public administrators in accelerating the SDGs (MOW_SDG2, 18th February 2020)

4.5 Institutionalization of digital technologies of SDGs in Public Administration

Table 4.7: The influence of institutionalization of digital technologies of SDGs in Public Administration

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Our leadership are 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 advance stage within our organization.	34	3	5	4.44	.660
Employees have adapted 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 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				

About the influence of institutionalization of digital technologies of SDGs in Public Administration, the respondents strongly agreed to the following statements. This is also based on the data presented in table 4.7: Our leadership are 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 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). Respondent for the interviews further affirmed that;

> Organizational leadership and culture set up within the ministries affect the adoption of digitalization and 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).

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.

4.6 Hindrances of ICTs adoption

Table 4.8: 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 implementation of SDGs	34	3	5	4.29	1.219
ICT knowledge, training and skills of Public Administrators affects implementation of SDGs.	34	3	5	4.50	.761
Ease of use of computer software's, systems and computers affects 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				

The descriptive data presented in table 4.8 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, 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 et al. (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's, 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 SDGs revealed that (Mean=4.53; SD=0.662) implying that majority were in agreement with the statement. These findings further substantiate writings by Sachs et al. (2016) that recognizes that inadequate ICT infrastructure and digital resources for public administrators hinders the effectiveness of implementing digitalization of SDGs.

The respondents were further asked to provide the challenges they face in their day to day activities as they use 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 due to the fact that 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 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).

The findings are in line with the argument of Henard et al. (2012) that organization smart infrastructure are always complex requiring large technical as well as financial investments, moreover, the usability of IT systems and digitalization processes are affected by IT penetration, coordination of ICT infrastructure, data information and security. Tusubira 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 a theoretical framework that highlights how organizational structures, power play and culture affects adaptation and adoption of ICT for achieving SDG goals as well as how organizational

structure and decision-makers may lead to the public administrators not developing their skills and knowledge in digitalization processes.

4.7 Coordination of Digitalization and ICT Infrastructure

Table 4.9: The Coordination of Digitalization and ICT Infrastructure

Statement	N	Minimum	Maximum	Mean	Std. Deviation
ICT infrastructures like internet, network, software's, and websites influences implementation of SDGs	34	4	5	4.82	.387
Coordination of computer services like databases and internet within our organization affects the management of SDGs.	34	4	5	4.89	.382
ICT connectivity affects how SDGs are measured and managed.	34	4	5	4.91	.288
Valid N (listwise)	34				

The study sought to assess the influence of coordination of ICT infrastructure, based on the descriptive data presented on table 4.9, the respondents strongly agreed with the following statements: ICT infrastructures like the internet, network, software's, and websites influences implementation of SDGs (Mean=4.82; SD=0.387); Coordination of computer services like databases and internet within our organization affects the management of SDGs (Mean=4.89; SD=0.382) and; ICT connectivity affects how SDGs are measured and managed (Mean=4.91; SD=0.288). Interview respondents narrated that;

> The connectivity within the ministries has improved the network and availability of bandwidth enabling progressive management and measurement of ICT services, for us who are implementing water service delivery to the citizens, we are piloting E-meters where citizens will be able to monitor and pay their water utilities through mobile phone network. This has been made possible with the coordination of ICT

connectivity and good infrastructure and our resolve is that this shall improve service delivery (MOICT_SDG1, 28th January 2020).

Another respondent also noted that;

Even though full realization of ICT connectivity and full digitalization has not happened in their ministry, they have digitized records that can be fully viewed and verified through e-government services hence improving of the realization of SDGs targets (MOW_SDG2, 18th January 2020).

These findings further corroborate GSMA (2016) report indicating that inadequate broadband capacity in Africa results from lack of infrastructural capability and affordability to achieve sustainable development in the public sector.

4.8 Dependence on technological processes in public sector organizations

Table 4.10: Dependence on technological processes in public sector organizations

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Digital technologies like mobile phones, tablets, desktops	34	2	3	2.91	.298
ICT infrastructure like internet, network, software's, and websites.	34	2	3	2.87	.396
ICT digital skills and trainings like programming and databases.	34	1	2	1.86	.498
Valid N (listwise)	**34**				

The study sought to establish the level of dependence on technological processes in the public sector organizations to implement SDGs, based on the descriptive statistics presented on table 4.10, majority of the respondents reported that that the public sector organizations were

highly dependent on the following technological processes: Digital technologies like mobile phones, tablets, desktops (Mean=2.91; SD=0.298) and ICT infrastructure like the internet, network, software's, and websites (Mean= 2.87; SD=0.396). A greater proportion of the respondents, however, reported that the public sector organization were moderately dependent on ICT digital skills and training like programming and databases (Mean=1.86; SD=0.498). The respondents were further asked to mention the success that has been realized in the public sector organizations as a result of using databases, computers, tablets and mobile phones in the implementation of SDGs, the respondents cited that the technologies have enhanced sharing of data/information making communication more effective and efficient. They also noted that the technologies have simplified the storage and accessibility of data and information during the process of implementing SDGs in the public sector organizations. The respondents also noted that the devices have greatly improved efficiency and effectiveness of public administrators as well improving implementation process of SDGs For the government to enhance the use of computers, databases, tablets and mobile phones in the process of implementing SDGs, the respondents recommended that there needs to be advanced technical training and skills development in databases and softwares for accelerating SDGs. During the interview, the respondent further cited that;

> There needs to be a secretariat that centrally monitors SDGs targets, guides ministries and public administrators in the digitalization implementation process and that there needs to be cultural acceptance among decision-makers within public administrator to steer skill development within organizational framework and equip employees with digitalization skills for SDG implementation, conversion of non-spatial data into spatial data as well as building the capacity of institutions for the sustainability of the technologies (MOICT_SDG1, 28th January 2020).

4.9 Digital technologies processes

Table 4.11: The importance of digital technologies processes

Statements	N	Minimum	Maximum	Mean	Std. Deviation
Use of ICT has improved access and monitoring of SDG implementations.	34	4	5	4.59	.500
Use of ICT has encouraged knowledge sharing and SDG data use in our organization.	34	4	5	4.62	.493
Use of ICT and related tools like internet, mobile phones, computers and software applications has improved my productivity in SDGs processes.	34	4	5	4.62	.493
Through E-government system, our organization enhances accountability and adequate service delivery to the citizens including SDGs.	34	4	5	4.94	.239
Valid N (listwise)	**34**				

Table 4.11 presents descriptive data on the importance of digital technologies processes in the ministries/government agencies. Based on the findings, a greater proportion of the respondents strongly agreed that: Use of ICT has improved access and monitoring of SDG implementations (Mean=4.59; SD=0.500); Use of ICT has encouraged knowledge sharing and SDG data use in our organization (Mean=4.62; SD=0.493); Use of ICT and related tools like the internet, mobile phones, computers and software applications has improved my productivity in SDGs processes (Mean=4.62; SD=0.493); Through E-government system, our organization enhances accountability and adequate service delivery to the citizens including SDGs (Mean=4.94; SD=0.239). In the interviews, it was also revealed that;

> Citizen participation and further rolling out of e-government services have greatly improved SDG targets like access to government services, access to water services, access to electricity, access to health, rolling out of health services, social protection cover and registration (MOICT_SDG1, 28th January 2020).

Improved digitalization and e-government including the introduction of huduma digital services have provided efficient avenues for improved citizen participation and improved access to basic services implying that the successes of SDGs can greatly be accelerated by the digitalization of public organization's service delivery.

CHAPTER FIVE
SUMMARY AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the findings concerning the study objectives and research. Data has been interpreted and the results of the findings compared with both empirical and theoretical literature. The chapter further presents the conclusion made in the study as well as the recommendations for both policy and practice.

5.2 Summary of the findings

The study was guided by the following objectives: To examine the institutionalization of digital technologies and barriers of adoption of digitalization of Sustainable Development Goals (SGDs) in Public Administration in Kenya; To examine the coordination of ICT Infrastructure on Sustainable Development Goals in Public Administration in Kenya and; To assess the influence of internalization of digital skills of Public Administrators in Sustainable Development Goals in Kenya.

Generally, the findings of the study revealed that all the ministries /government agencies were implementing the SDGs that they are concerned with and were actively using information communication technologies and digitalization processes in the SDG implementation processes. The digitalization technology tools used by the ministries/ government agencies in the implementation of the SDGs include desktop computers, laptop computers, mobile phones, internet, e-government, automated solutions and ICT enable solutions. The SDGs that are directly implemented by the ministries/government agencies intervened in Kenya include GOAL 4: Quality Education; GOAL 7: Affordable and Clean Energy; GOAL 3: Good Health and Well-being; GOAL 6: Clean Water and Sanitation; Goal 15: Life on Land; GOAL 1: No Poverty; GOAL 2: Zero Hunger; GOAL 9: and GOAL 9: Industry, Innovation and Infrastructure. In summary, the main findings include;

Institutionalization of digital technologies and barriers of adoption of digitalization of Sustainable Development Goals (SGDs) in Public Administration in Kenya:

The findings revealed that the ministries/government agencies use of digital technologies e.g. emails, social media, mobile phones to implement digitalization of SDGs. The study

concludes that the use of digital technologies greatly improves skills and knowledge of public administrators in rolling sustainable development goals. The study also concludes that several public administration staffs and key ICT personnel responsible for the implementation of the SDGs have intermediate digital technology and computer skills that can enable them to roll out SDGs work, however, advance technical skills and knowledge is required to improve the rolling out and accelerating of digitalization for SDG implementation. The ministries/government agencies have also installed computer technology tools, software's and databases for tracking, monitoring and implementing SGDs and they are effectively using ICT tools such as emails, social media, mobile phones, multimedia for continuous learning, knowledge sharing and SDG data use within ministries.

In summary, the influence of institutionalization of digital technologies of SDGs in Public Administration noted that ministry leaders and decision-makers are 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. It is also noted that employees have adopted the use of digital systems like emails, tablets, databases, mobile phones, social media, for SDGs monitoring and communication, however, the cultural perception within organizations does not fully support the use of digital systems and technology like emails, E-government, tablets, mobile phones and social media for SDG work.

***Internalization of digitalization in the acceleration of SDGs in Public sector**:*

The internalization of digitalization in the ministries/government agencies revealed that the use of ICT has improved access and monitoring of SDG implementations, encouraged knowledge sharing and SDG data use in ministries. The use of ICT and related tools like the internet, mobile phones, computers and software applications has improved productivity in SDGs processes. Notably, E-government system in the ministries enhances accountability and adequate service delivery to the citizens including SDGs. It was also revealed that citizen participation and further rolling out of e-government services has greatly improved SDG targets including access to government services, rolling out of health services, access to water, access to electricity, access to health, social protection cover and registration.

Influence of coordination of ICT infrastructure

In assessments of the influence of coordination of ICT infrastructure, it is summarized that ICT infrastructures like internet, network, software's, and websites influences and affect the management of the implementation of SDGs. Moreover, ICT connectivity affects how public administrators measure, monitor and manage SDGs.

Hindrance of ICT adoption by Public administrators in accelerating SDGs.

Hindrances of ICTs adoption by public administrators in the process of implementing SDGs were established in the study. The hindrances included the cost of accessing the internet and maintaining computers, tablets and mobile phones affects the implementation of SDGs, organizational culture, the resistance of change by decision-makers, limited ICT knowledge, training and skills of Public Administrators and; Poor internet connectivity and network affects the implementation of SDGs. The respondents further mentioned challenges that included: Fluctuations in internet connectivity, 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), databases as well public sector information system management. The other challenge cited by the respondents was lack of adequate training among the public administrators on advanced IT skills on areas such as databases and e-government because various technologies are at their initial stages and therefore training has not been done to the public administrators.

The level of dependence on technological processes in the public sector organizations to implement SDGs

It was found that public sector organizations were highly dependent on the digital technologies like mobile phones, tablets, desktops and ICT infrastructure like the internet, network, software's, and websites to accelerate the implementation of SDGs. A greater proportion of public administrators, however, reported that the public sector organization were moderately dependent on ICT digital skills and training like programming and advance databases. Public administrators cite that the technologies have enhanced sharing of data/information making communication more effective and efficient. They also noted that the technologies have simplified the storage and accessibility of data and information during

the process of implementing SDGs in the public sector organizations. The public administrators approve that the devices have greatly improved the efficiency and effectiveness of public service as well as improving the implementation process of SDGs. In summary, it was highlighted that for the government to enhance the use of computers, databases, tablets and mobile phones in the process of implementing SDGs, the public administrators need to be trained in advanced technical skills in databases development and software's for accelerating SDGs. Subsequently, there needs to be a secretariat that centrally monitors SDGs targets, guides ministries and public administrators in the digitalization implementation process as well as the need for cultural acceptance among decision-makers within public administrator to steer skill development within an organizational framework and equip employees with digitalization skills for SDG implementation.

Digital technology processes in public sector organization

Various advantages of digital technologies processes in the ministries/government agencies were established in the study. The advantages include improved access and monitoring of SDG implementations, improved knowledge sharing and SDG data use in the ministries/government agencies. It was also established that the use of ICT and related tools like the internet, mobile phones, computers and software applications has improved my productivity in SDGs processes and that through E-government system, the ministries and government agencies have been able to enhance accountability and adequate service delivery to the citizens including SDGs.

5.3 Conclusion

It can be concluded that all the ministries /government agencies implement the SDGs as supranational policy programmes within the public sector. The technology tools used by the ministries/ government agencies in the implementation of the SDGs include desktop computers, laptop computers, mobile phones, internet, e-government, automated solutions and ICT enable solutions. They also use digital technology e.g. emails, social media, mobile phones, multimedia to improves skills and knowledge of public administrators in accelerating sustainable development goals. The study concludes that public administrators have moderate computer skills and technical know-how in the implementation and acceleration of supranational policy programmes as SDGs and requires advance computer skills and training

that can enable them to roll out the acceleration of SDGs work. The ministries/government agencies have also digitalized and installed computer technology tools, software's and databases for tracking, monitoring and implementing SGDs and they are effectively using ICT tools such as emails, social media, mobile phones, multimedia for learning, knowledge sharing and SDG data use in the ministries. Therefore, it can be concluded that digitalization processes public administrators enriches access and monitoring of SDG implementations, including improved knowledge sharing and SDG data use in the ministries and government agencies. Moreover, the use of digital technology and related tools like the internet, mobile phones, computers and software applications improves the productivity of public administrators in SDGs acceleration processes and that through E-government systems, the ministries and government agencies have been able to heighten accountability and improved service delivery to the citizens including SDGs.

In conclusion, institutional culture and top rank decision making within the ministries was revealed to be a strong determinant in the implementation of supranational policy programmes and digitalization processes within the ministries and public sector at large. Hence, the culture of the ministries/government agencies in supporting the use of digital systems and technologies such as emails, E-government, tablets, mobile phones and social media for SDG work is dependent on the decision maker's cultural view of the organization. Even though some drawbacks were realized in the process of digitalization of SDGs among the public administrators, various benefits can be concluded including; improved access and monitoring of SDG implementations, improved knowledge sharing and SDG data use in the ministries/government agencies. It was also established that the use of ICT and related tools like the internet, mobile phones, computers and software applications has enriched productivity of public administrators in SDGs processes and that through E-government system, the ministries and government agencies have been able to enhance accountability and propel adequate service delivery to the citizens including SDGs. However; the study established hindrances of digitalization process in public administrators as the high cost of accessing the internet and maintaining computers, tablets and mobile phones, limited ICT knowledge, technical training, capacity and skills of Public Administrators and; bureaucratic principles and organization culture by decision-makers in implementing SDGs, poor internet connectivity and network coordination, fluctuations in internet connectivity, limited funding

for key technological processes in the implementation of SDGs, the inadequacy of computer servers to hold and store big SDG data, limited capacity among public servants especially on Geographical Information Systems (GIS), databases as well as public sector information system management (PSISM). The other notable conclusion is that e-government, databases and various technologies within the government are at initial stages, therefore, the public administrators have not been trained on usage as training has not been given a priority by the government. Lastly, to develop proper governance structures to accelerate the achievement of SDGs, governments need strong political commitment and leadership, policy integration strategies as well as long term strategic vision

5.4 Recommendations

i. Based on the findings of the study, the following recommendations can be made. There is a need to formulate effective policies that can improve the digitalization of the sustainable development goals in the public sector. This can be adopted alongside existing draft Kenya National ICT Policy 2019 to promote and enhance digitalization of SDGs which are based on the larger framework of government delivery of services citizens.

ii. Specifically, each ministry should formulate a framework and adopt internal policies for public administrators to acquire E-government and digitalization skills development to enhance the capacity of staffs in implementing and accelerating SDGs.

iii. The intergovernmental structural policy between the government and United Nations should be crafted to set up a central monitoring bureau for digitalization of SDGs in public sector, to help monitor progress of implementation of SDGs targets and wider supranational policy programmes. The government should focus on coordinating infrastructure, e-government, internet connectivity and reducing digital divided among public administrators in order to enhance the implementation of supranational policy programmes and digitalization of Sustainable Development Goals in the public sector.

iv. The government should institutionalize leadership and culture to use digital systems and tools like software's, emails, tablets and computers to deliver on the SDG targets as well as measuring and monitoring the progress of SDGs.

v. The government needs to improve incentives, funding and structures that would allow governmental officials to internalize organizational digitalization framework. This can include ensuring that public administrators get advance training, computer skills

enhancement and professional development to improve technological skills and capacity among public servants involved in the digitalization of the sustainable development goals.

5.5 Recommended areas for future research

Based on the findings of this study, following areas should be considered for further research:

i. The findings of the study recommends further research on hindrances to the adoption of supranational policy programmes within the public sector organisations.

ii. Secondly, the study recommend further research on assessing the influence of current National ICT Policy 2019 in the digitalization of Sustainable Development Goals in the public sector.

iii. Lastly, further research needs to be conducted to ascertain the influence of organizational culture in the digitalization of Sustainable Development Goals in Kenya

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APPENDICES

APPENDIX I: DATA COLLECTION TOOLS

SURVEY DIGITALIZATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN PUBLIC ADMINISTRATION IN KENYA

Letter of Informed Consent

Introduction

I am Japheth Otieno Ondiek, a post graduate student at the University of Nairobi pursuing Degree of Master of Research and Public Policy. Thank you for agreeing to participate in this research on the **Digitalization of Sustainable Development Goals (SDGs) in Public Administration in Kenya.**

The research is conducted in partial fulfillment of the requirements of a graduate student at the University of Nairobi. Kindly sign this letter as a confirmation of your understanding of the terms and condition of my research.

Any information given is for academic purposes only and will be kept confidential.

Please be advised that your responses, views and feedback will be treated with utmost **confidentiality** and will be used for research purposes of this study only. Your name or any other detail that may identify you will **not be disclosed** in the final report.

You have the right to either participate, desist from answering any question or withdraw from this study.

Participant's consent.

Date_____ **Signature of the Interviewee:_____**

I appreciate your willingness and effort to participate in my study. Looking forward to working with you. In case of any question or clarification you can reach me on +254 735 231 645.

Yours sincerely,

Japheth Otieno Ondiek

You are kindly requested to answer the questions by putting a tick (√) against the correct choice(s).

Section A: Bio Data

1. Gender

   Male ( ) Female ( )

2. Age

   25 years or below ( ) 26-30 years ( )

   31-35 years ( ) 36-40 years ( )

   41-45 years ( )

3. What is your position in this organization? (please tick 1)

   Manager [ ]

   ICT Manager/Officer [ ]

Senior Manager [ ]

SDG Focal Point [ ]

4. What is the highest level of education attained?

   Certificate Level [ ]

   Tertiary Level [ ]

   Undergraduate Level [ ]

   Postgraduate [ ]

5. Computer Skills: What is the level of your proficiency skills?

   Basic [ ] Intermediate [ ] Advanced [ ]

6. How long have you been associated with the organization?

Less than 2 years ( ) 2-5 years ( )

6-10 years ( ) Over 10 years ( )

SECTION B: TECHNOLOGY ADOPTION FOR SDGS

1. Do you understand SDGs?
   Yes [ ] No [ ]
2. Does your ministry/state agency implement SDGs?
   Yes [ ] No [ ]
3. Which SDGs does your organisation directly implement? (State all that is applicable)
   ……
   ……
4. Do you use information technologies to implement SDGs?
   Yes [ ] No [ ]
5. What technology tools are in place for use in your organisation for SDGs? (***Tick all applicable***)

   Computer [ ]

   Laptop [ ]

   Mobile Phones ` [ ]

   Internet [ ]

   E-Government [ ]

   Automated solutions [ ]

   ICT enabled applications [ ]

   Other: _____

SECTION C:

6. **To what extent do you agree with the following statements**

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	**1**	**2**	**3**	**4**	**5**
a) Use of Digital technology e.g. emails, social media, mobile phones, multimedia improves skills and knowledge of public administrators in rolling sustainable development goals					
b) I have advance digital technology and computer skills that can enable roll out SDGs work					
c) Our organisation has installed computer technology tools, software's and databases for tracking, monitoring and implementing SGDs					
d) Use of ICT tools like emails, social media, mobile phones, multimedia has encouraged learning, knowledge sharing and SDG data use in our organisation					

7. **To what extent do you agree with the following statements**

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	**1**	**2**	**3**	**4**	**5**
a) Our leadership are advancing the use of information communication technologies to conduct SDGs work in our organization.					
b) Adoption of computer systems like emails, tablets, mobile phones, databases, and social media for SDG implementation is					

at advance stage within our organisation.					
c) Employees have adapted the use of digital systems like emails, tablets, databases, mobile phones, social media, for SDGs communication.					
d) The culture of this organisation supports use of digital systems and technology like emails, E- government, tablets, mobile phones and social media for SDG work.					

8. **To what extent do you agree with the following statements**

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	**1**	**2**	**3**	**4**	**5**
a) ICT infrastructures like internet, network, software's, and websites influences implementation of SDGs					
b) Coordination of computer services like databases and internet within our organisation affects the management of SDGs.					
c) ICT connectivity affects how SDGs are measured and managed.					

9. To what degree do you depend on the following technology processes in your organisation to implement SDGs?

Lowly dependent – 1 Moderate dependent – 2 Highly dependent - 3

Statement	**1**	**2**	**3**
a) Digital technologies like mobile phones, tablets,			

desktops			
b) ICT infrastructure like internet, network, software's, and websites.			
c) ICT digital skills and trainings like programming and databases.			

10. To what extent do you agree with the following statements on the use of digital technologies processes for Sustainable Development Goals in Public administration?

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	**1**	**2**	**3**	**4**	**5**
a) Use of ICT has improved access and monitoring of SDG implementations.					
b) Use of ICT has encouraged knowledge sharing and SDG data use in our organisation.					
c) Use of ICT and related tools like internet, mobile phones, computers and software applications has improved my productivity in SDGs processes.					
d) Through E-government system, our organisation enhances accountability and adequate service delivery to the citizens including SDGs.					

SECTION D: HINDRANCES OF ADOPTION OF ICTs FOR SDGs BY PUBLIC ADMINISTRATORS.

11. To what extent do you agree with the following statements on adoption of ICTs for SDG by Public administrators?

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statement	**1**	**2**	**3**	**4**	**5**
a) Cost of accessing the internet and maintaining computers, tablets and mobile phones affects implementation of SDGs					
b) ICT knowledge, training and skills of Public Administrators affects implementation of SDGs.					
c) Ease of use of computer software's, systems and computers affects SDG implementation.					
d) Poor internet connectivity and network affects implementation of SDGs					

QUESTIONNAIRRE DIGITALIZATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGs) IN PUBLIC ADMINISTRATION IN KENYA.

This questionnaire is purposefully designed for the study purposes, the views expressed in this questionnaire will be useful in the study and you are kindly requested to fill in all the blanks spaces if possible. **PLEASE DO NO WRITE YOUR NAME ANYWHERE!** Kindly be as objective as possible as you fill in this questionnaire. Thank you!

Section A: Bio Data

1. Gender
   Male ( ) Female ( )

2. Age
   25 years or below ( ) 26-30 years ( )

   31-35 years ( ) 36-40 years ( )

   41-45 years ( )

3. What is your position in this organization? (please tick 1)

Manager [ ]

ICT Manager/Officer [ ]

Senior Manager [ ]

SDG Focal Point [ ]

4. What is the highest level of education attained?

   Certificate Level [ ]

   Tertiary Level [ ]

   Undergraduate Level [ ]

   Postgraduate [ ]

5. Computer Skills: What is the level of your proficiency skills?

   Basic [ ] Intermediate [ ] Advanced [ ]

6. How long have you been associated with the organization?
   Less than 2 years ( ) 2-5 years ( )

   6-10 years ( ) Over 10 years ( )

SECTION B:

1. Are you aware of SDGs?

   Yes ( ) No ( )
2. Please mention some of the SDGs your organisation is currently implementing.

   _____
   _____
   _____

3. In your view, do you feel the management has prioritized the implementation of SDGs and IT support systems like databases and social media?
   _____
   _____
   _____
4. What are some of the challenges that public administrators are experiencing with information technologies in implementation of Sustainable Development Goals?
   _____
   _____
   _____
5. To what extent do you believe that many public administrators are connected to internet and are utilizing it to update matters of SDGs? Explain._____
   _____
   _____
6. Do you believe that the public administrators in your organization are well trained and advance IT skills and knowledge like databases and e government to manage implementation of SDGs? E*xplain*_____

_____

_____

7. Do you believe your organization has prioritized the use of IT systems and databases to track and monitor SDGs? *How?*

_____

_____

_____

8. In your view, what needs to be done by your ministry and Kenyan government to enhance use of computers, databases, tablets and mobile phones process for SDGs?

_____

_____

_____

9. In your own opinion, what are some of the successes that have been realized due to use of computers, databases, tablets and mobile phones process for SGDs?

_____

_____

_____

10. In your own opinion what are the challenges that you face in your day to day activities as you use internet, computers and databases for acceleration of SDG? Kindly name three.

_____

_____

_____

END

GUIDING QUESTIONS FOR THE INTERVIEWS

1. In your view, has your organization localized SDGs into your programs?.....
   .....
   .....
2. What specific SDGs (among the 17) does your organization have strengths in implementing?.....
   .....
   .....
3. What are some of the IT systems and databases that you are using to manage, track and monitor SDGs?
   .....
   .....
   .....
4. In your view, do you feel the management has prioritized the implementation of SDGs using IT support systems like databases, internet?

   .....
   .....
   .....

5. What are some of the challenges that public administrators are experiencing in implementing SDGs using computers, internets, mobile phones and databases?.....
   .....
   .....
6. To what extent do you believe that many public administrators are connected to internet and are utilizing it to update matters of SDGs?.....
   .....
   .....
7. Do you believe that the public administrators in your organization are well trained and advance IT skills and knowledge to manage implementation of SDGs? *Explain*.....
   .....
   .....

8. In your view, what needs to be done by your ministry and Kenyan government to enhance technology use for SDGs in Public Administration?
   ……
   ……
   …….
9. In your own opinion, what are some of the successes that have been realized due to use of computers, mobile phones, databases processes for SGDs?
   ……
   ……
   …….

END

APPENDIX II: APPROVAL LETTER

Charles - 0722-678533.

University of Nairobi
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Department of Political Science & Public Administration

Telephone: 318262 Ext.28171
Telegrams: "Varsity" Nairobi
Fax: 254 (020) 245566
E-mail: dept-pspa@uonbi.ac.ke

P.O. Box 30197
Nairobi, Kenya

08 November, 2019

TO WHOM IT MAY CONCERN

JAPHETH OTIENO ONDIEK-C52/12797/2018

The above named is a registered student at the Department of Political Science & Public Administration, University of Nairobi Pursuing a Masters of Research and Public Policy.

He has successfully completed the first part of his studies (Coursework) and is hereby authorized to undertake field research.

It is against this background that I request you sincerely to enable him collect relevant academic data for his studies.

Mr. Ondiek is writing on **"Digitalization of Sustainable Development Goals in Public Administration in Kenya"**

The information he collects will be purely used for academic purposes. The student is also expected during the course of his research to abide by your regulations and rules.

In case of further clarification, feel free to contact the undersigned.

Thank you for your support.

DEPARTMENT OF POLITICAL SCIENCE & PUBLIC ADMINISTRATION

CHAIRMAN

Dr. Oscar Otele
AG. Chairman, Department of Political Science and Public Administration

APPENDIX III: RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **380847**

Date of Issue: **18/December/2019**

RESEARCH LICENSE

This is to Certify that Mr.. Japheth Ondiek of University of Nairobi, has been licensed to conduct research in Nairobi on the topic: DIGITALISATION OF SUSTAINABLE DEVELOPMENT GOALS IN PUBLIC ADMINISTRATION IN KENYA for the period ending : 18/December/2020.

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NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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APPENDIX IV: SAMPLE DATA COLLECTION TOOLS

University of Nairobi
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
Department of Political Science & Public Administration

FOR: THE PRINCIPAL SECRETARY
MINISTRY OF DEVOLUTION
AND ASAL
STATE DEPARTMENT OF DEVOLUTION
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NAIROBI

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P.O. Box 30197
Nairobi, Kenya

08 November, 2019

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Mr. Ondiek is writing on **"Digitalization of Sustainable Development Goals in Public Administration in Kenya"**

The information he collects will be purely used for academic purposes. The student is also expected during the course of his research to abide by your regulations and rules.

In case of further clarification, feel free to contact the undersigned.

Thank you for your support.

Dr. Oscar Otele
AG. Chairman, Department of Political Science and Public Administration

SURVEY DIGITALIZATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN PUBLIC ADMINISTRATION IN KENYA

Letter of Informed Consent

Introduction

I am Japheth Otieno Ondiek, a post graduate student at the University of Nairobi pursuing Degree of Master of Research and Public Policy. Thank you for agreeing to participate in this research on the **Digitalization of Sustainable Development Goals (SDGs) in Public Administration in Kenya.**

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You have the right to either participate, desist from answering any question or withdraw from this study.

Participant's consent.

Date 21/07/2021 **Signature of the Interviewee:**

I appreciate your willingness and effort to participate in my study. Looking forward to working with you. In case of any question or clarification you can reach me on +254 735 231 645.

Yours sincerely,

Japheth Otieno Ondiek

1

QUESTIONNAIRRE DIGITALIZATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGs) IN PUBLIC ADMINISTRATION IN KENYA.

This questionnaire is purposefully designed for the study purposes, the views expressed in this questionnaire will be useful in the study and you are kindly requested to fill in all the blanks spaces if possible. **PLEASE DO NO WRITE YOUR NAME ANYWHERE!** Kindly be as objective as possible as you fill in this questionnaire. Thank you!

Section A: Bio Data

1. Gender

   Male (✓) Female ( )

2. Age

   25 years or below ( ) 26-30 years ( )

   31-35 years ( ) 36-40 years ( )

   41-45 years (✓)

3. What is your position in this organization? (please tick 1)

   Manager [ ] Senior Manager [ ]

   ICT Manager/Officer [✓] SDG Focal Point [ ]

4. What is the highest level of education attained?

   Certificate Level [ ] Undergraduate Level [ ]

   Tertiary Level [ ] Postgraduate [✓]

5. Computer Skills: What is the level of your proficiency skills?

   Basic [ ] Intermediate [ ] Advanced [✓]

6. How long have you been associated with the organization?

   Less than 2 years ( ) 2-5 years (✓)

   6-10 years ( ) Over 10 years ( )

SECTION B:

1. Are you aware of SDGs?

   Yes (✓) No ( )

2. Please mention some of the SDGs your organisation is currently implementing

SDG 6
Clean water and Sanitation

3. In your view, do you feel the management has prioritized the implementation of SDGs and IT support systems like databases and social media?
Yes because we are now working on mapping of the water infrastructure from the sources to the consumer and all stakeholders are involved.

4. What are some of the challenges that public administrators are experiencing with information technologies in implementation of Sustainable Development Goals?
1. Inadequate funding of this activities.
2. Much of the data/information is in non spatial form
3. Inadequate expertise on GIS systems.

5. To what extent do you believe that many public administrators are connected to internet and are utilizing it to update matters of SDGs?
Explain Public administrators make decisions based on the Pre-processed data emanating from systems which are managed by technical people on water and sanitation related issues.

6. Do you believe that the public administrators in your organization are well trained and advance IT skills and knowledge like databases and e government to manage implementation of SDGs?
Explain No ~~we~~ are still at the construction stage of the various systems. They will be trained once the systems are ready.

7. Do you believe your organization has prioritized the use of IT systems and databases to track and monitor SDGs? *How?*
Yes — e water system and the Telemetric systems being installed countywide.

5

8. In your view, what needs to be done by your ministry and Kenyan government to enhance use of computers, databases, tablets and mobile phones process for SDGs?

Conversion of ~~Spatial~~ non spatial data into spatial data. Completion of the development of e-water system and building capacity for sustainability of the system.

9. In your own opinion, what are some of the successes that have been realized due to use of computers, databases, tablets and mobile phones process for SGDs?

- It has enhanced sharing of data/information
- It has made communication more effective
- It has made the storage and accessibility to information/data easy.

10. In your own opinion what are the challenges that you face in your day to day activities as you use internet, computers and databases for acceleration of SDG? Kindly name three

- fluctuations in internet connectivity
- Inadequacy of computer servers to hold data.
- Inadequacy of skills - inadequate capacity on the staff especially on GIS databases and systems.

END

SURVEY DIGITALIZATION OF SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN PUBLIC ADMINISTRATION IN KENYA

Letter of Informed Consent

Introduction

I am Japheth Otieno Ondiek, a post graduate student at the University of Nairobi pursuing Degree of Master of Research and Public Policy. Thank you for agreeing to participate in this research on the **Digitalization of Sustainable Development Goals (SDGs) in Public Administration in Kenya.**

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Participant's consent.

Date 21/07/2021 **Signature of the Interviewee:**

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Yours sincerely,

Japheth Otieno Ondiek

1

You are kindly requested to answer the questions by putting a tick (√) against the correct choice(s).

Section A: Bio Data

1. Gender

   Male (✓) Female ( )

2. Age

   25 years or below ( ) 26-30 years ( )
   31-35 years ( ) 36-40 years (✓)
   41-45 years ( )

3. What is your position in this organization? (please tick 1)

   Manager [ ] Senior Manager [ ]
   ICT Manager/Officer [✓] SDG Focal Point [ ]

4. What is the highest level of education attained?

   Certificate Level [ ] Undergraduate Level [✓]
   Tertiary Level [ ] Postgraduate [ ]

5. Computer Skills: What is the level of your proficiency skills?

   Basic [ ] Intermediate [✓] Advanced [ ]

6. How long have you been associated with the organization?

   Less than 2 years ( ) 2-5 years ( )
   6-10 years ( ) Over 10 years (✓)

SECTION B: TECHNOLOGY ADOPTION FOR SDGS

1. Do you understand SDGs?

   Yes [✓] No [ ]

2. Does your ministry/State agency implement SDGs?

   Yes [✓] No [ ]

3. Which SDGs does your organisation directly implement? (State all that is applicable)

   Zero Hunger
   Reduced Inequalities

4. Do you use information technologies to implement SDGs?

   Yes [✓] No [ ]

5. What technology tools are in place for use in your organisation for SDGs? (***Tick all applicable***)

   Computer [✓] E-Government [✓]
   Laptop [✓] Automated solutions [✓]
   Mobile Phones [ ] ICT enabled applications [✓]
   Internet [✓] Other: _____

SECTION C:

6. **To what extent do you agree with the following statements**

   Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	1	2	3	4	5

9. To what degree do you depend on the following technology processes in your organisation to implement SDGs?

Lowly dependent – 1 Moderate dependent – 2 Highly dependent - 3

Statement	1	2	3
a) Digital technologies like mobile phones, tablets, desktops			✓
b) ICT infrastructure like internet, network, software's, and websites.			✓
c) ICT digital skills and trainings like programming and databases.			✓

10. To what extent do you agree with the following statements on the use of digital technologies processes for Sustainable Development Goals in Public administration?

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	1	2	3	4	5
a) Use of ICT has improved access and monitoring of SDG implementations.					✓
b) Use of ICT has encouraged knowledge sharing and SDG data use in our organisation.					✓
c) Use of ICT and related tools like internet, mobile phones, computers and software applications has improved my productivity in SDGs processes.					✓
d) Through E-government system, our organisation enhances accountability and adequate service delivery to the citizens including SDGs.					✓

SECTION D: HINDRANCES OF ADOPTION OF ICTs FOR SDGs BY PUBLIC ADMINISTRATORS.

11. To what extent do you agree with the following statements on adoption of ICTs for SDG by Public administrators?

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statement	1	2	3	4	5
a) Cost of accessing the internet and maintaining computers, tablets and mobile phones affects implementation of SDGs				✓	
b) ICT knowledge, training and skills of Public Administrators affects implementation of SDGs.			✓		
c) Ease of use of computer software's, systems and computers affects SDG implementation.					✓
d) Poor internet connectivity and network affects implementation of SDGs.		✓			

a) Use of Digital technology e.g. emails, social media, mobile phones, multimedia improves skills and knowledge of public administrators in rolling sustainable development goals					✓
b) I have advance digital technology and computer skills that can enable roll out SDGs work					✓
c) Our organisation has installed computer technology tools, software's and databases for tracking, monitoring and implementing SGDs		✓			
d) Use of ICT tools like emails, social media, mobile phones, multimedia has encouraged learning, knowledge sharing and SDG data use in our organisation					✓

7. **To what extent do you agree with the following statements**

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	1	2	3	4	5
a) Our leadership are advancing the use of information communication technologies to conduct SDGs work in our organization.					✓
b) Adoption of computer systems like emails, tablets, mobile phones, databases, and social media for SDG implementation is at advance stage within our organisation.				✓	
c) Employees have adapted the use of digital systems like emails, tablets, databases, mobile phones, social media, for SDGs communication.					✓
d) The culture of this organisation supports use of digital systems and technology like emails, E- government, tablets, mobile phones and social media for SDG work.					✓

8. **To what extent do you agree with the following statements**

Strongly Disagree – 1 Disagree – 2 Neutral -3 Agree – 4 Strongly Agree - 5

Statements	1	2	3	4	5
a) ICT infrastructures like internet, network, software's, and websites influences implementation of SDGs					✓
b) Coordination of computer services like databases and internet within our organisation affects the management of SDGs					✓
c) ICT connectivity affects how SDGs are measured and managed					✓

APPENDIX V: PLAGIARISM REPORT

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