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**POLICY RESEARCH** and **ANALYSIS**

# The Effect of E-Government on Government Effectiveness and Control of Corruption among UN Member Countries

Cecilia Naeku and Kenneth Juma

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POLICY RESEARCH AND ANALYSIS  
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YOUNG PROFESSIONALS (YPs)  
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# **The Effect of E-Government on Government Effectiveness and Control of Corruption among UN Member Countries**

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Kenya Institute for Public Policy  
Research and Analysis

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## **Abstract**

*E-government has been implemented by various countries with the aim to improve public sector efficiency through better service delivery, increased accountability and improved interaction between the government, citizens and businesses. E-participation increases the scope of e-government to include information sharing, collaborative decision-making and participatory service delivery. Both e-government and e-participation have numerous benefits, among them the potential to improve public services and control corruption. This is particularly important given that corruption is one of the most persistent and prevalent challenges to socio-economic development and quality public service. This study sought to assess the status of e-government and e-participation in Kenya and compare it with aspirator countries to identify areas of weakness, opportunities and lessons. It also determined the effect of e-government on control of corruption among high income countries, upper middle-income countries and lower middle-income countries. The results show that Kenya's score on the telecommunication infrastructure index was the lowest when compared to aspirator countries. The study suggested areas that Kenya could learn on e-government and e-participation in aspirator countries. Particularly, the possibility of exploring context-specific e-government initiatives such as SMS-based e-participation and mobile-based e-services was elucidated. E-government development index and E-participation index were found to have positive effects on government effectiveness and control of corruption among the three categories of countries. However, the effects were significant for high-income countries and upper middle-income countries that had higher average scores for the components of e-government development index. Therefore, lower-middle income countries such as Kenya need to continue investing on e-government and e-participation to increase their government effectiveness and control of corruption.*

## **Abbreviations and Acronyms**

AFA-IMIS	Agriculture and Food Authority -Integrated Management Information System
AI	Artificial Intelligence
DEG	Digital Era Governance
EGDI	E-government Development Index
EPI	E-Participation Index
G2B	Government to Business
G2C	Government to Citizens
G2E	Government to Employees
G2G	Government to Government
GDP	Gross Domestic Product
GEI	Government Effectiveness Index
GOK	Government of Kenya
HCI	Human Capital Index
ICTs	Information Communication Technologies
IFMIS	Integrated Financial Management Information System
IMF	International Monetary Fund
KRA	Kenya Revenue Authority
NPM	New Public Management
OECD	Organization for Economic Co-operation and Development
OGDI	Open Government Data Index
OPEN	Online Procedures Enhancement
OSI	Online Service Indices
SDG	Sustainable Development Goals
TII	Telecommunication Infrastructure Index
UK	United Kingdom
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
WCAG	Web Content Accessibility Guidelines
WGI	Worldwide Governance Indicators

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## 1. Introduction

Governments around the world have pursued administrative efficiency and autonomy through New Public Management (NPM) reforms since the 1980s. By pursuing market-oriented reforms in the public sector, efforts have been made to improve efficiency by mitigating various regulations and introducing competition. Although NPM was seen as progressive public administration, in recent years, recognition of the limits of NPM have been widening, with some reforms being reversed and the remaining expected to have little effect on government effectiveness (Dunleavy et al., 2006). There was trade-off between the cost reduction tenets of the NPM, the quality of public service provision, and equitable access to the quality services.

The shortcomings of the NPM reforms were an impetus for the Digital Era Governance (DEG), which followed and consisted of a constellation of Information Telecommunication Technologies-based reforms that are transforming public sector management (Dunleavy et al., 2006). The digital transformations of public services are believed to complement and leverage implementation opportunities in line with fundamental NPM ideas (OECD, 2016). E-government is an extension of these reforms that aim to improve public sector efficiency through better service delivery, increased accountability and improved interactions between the governments, citizens and businesses (Riley, 2007). E-government was also introduced as a tool for increasing transparency and accountability in the public sector, helping control corruption and increasing citizens' trust in government (Krishnan et al., 2013).

Although there is lack of a universally accepted definition of e-government, the World Bank defines it as “the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government” (World Bank, 2015). The Organization for Economic Co-operation and Development (OECD) defines e-government as “the use of information and communications technologies (ICTs), and particularly the Internet, to achieve better government” (OECD, 2003). E-government is generally about making public services, government internal processes and policy making available to citizens electronically (Margetts and Dunleavy, 2002). E-government is often used interchangeably with digital government as there is no formal distinction between them (UNDESA, 2020). E-government or digital government is a sub-sector of the overall digital transformation of the economies worldwide (OECD, 2016).



E-participation is defined as “the process of engaging citizens through ICTs in policy, decision-making, and service design and delivery to make it participatory, inclusive and deliberative” (UN, 2014). E-participation is sometimes conceptualized as a branch of e-government that focuses on engaging citizens for deliberation and decision in public policies (Welch, 2012). Through e-participation, ICT provides more channels to engage citizens and to increase the participatory process (Le Blanc, 2020). E-participation, thus, increases the scope of e-government to include information sharing, collaborative decision-making and participatory service delivery (Basel Institute on Governance, 2017).

Through e-government and e-participation, governments are adapting public service delivery, policy making and citizen engagement to the new digital environment that is transforming economies worldwide (Asian Productivity Organization, 2021). E-government functions can broadly be categorized into four, namely: Government to Citizens (G2C), Government to Business (G2B), Government to Government (G2G) and Government to Employees (G2E).

Government to Citizen entails the interaction between government and citizens in online service delivery and accessing information. Use of ICT to deliver public services to citizens through automation has been shown to reduce labour costs and raise labour productivity. Savings are also realized through reduction time for service realization in terms of minimized travel and time costs. Automation reduces paperwork and has been shown to save government revenue by reducing the administrative processing costs associated with paperwork (Graham, 2015). Digitization of public services has the potential of providing improved services that meet the needs of citizens (Asian Productivity Organization, 2021).

E-government can guarantee equity in access of service delivery as online services can be provided to communities in remote and hard-to-reach areas (UNDESA, 2020). The global COVID-19 pandemic has threatened access to public services through prevention measures, but it has also inadvertently reinvigorated the role of e-government (UNDESA, 2020). Particularly, the availability of online services has ensured access to public service while upholding compliance with social distancing and work from home directives.

Government to Business entails the interactions between governments and business in the areas of taxation, business registration, customs clearance, and licensing, public procurement, among others. The online provision of such services enables efficient and cost-effective service delivery, which may ease the cost of doing business. The use of ICT to deliver public services to businesses potentially reduces administrative costs and the time and effort spent by businesses to comply with government regulations (Godel et al., 2016). Digitization of Government to Business functions has been shown to reduce cases of corruption

in public procurement and taxation by reducing human interactions and scope for corruption (IMF, 2019).

The application of ICT for G2G function offers governments a unique opportunity to enhance not only their operational transparency but also their own internal efficiency and effectiveness. The interdepartmental electronic system allows for sharing of databases, information and resources between different government agencies and departments. This enables better coordination of government activities and service delivery and reduces the tendency to work in silos (Asian Productivity Organization, 2021).

Government to Employee deals with interactions between government and employees through support transactions such as payroll and pension plans. Apart from efficient delivery of service to employees, the reduction of the administrative burdens for employees using ICT in public service delivery is also achieved (Rowley, 2011).

E-participation is part of the G2C function that enables citizens to actualize their rights to freely access, produce and disseminate information on important issues such as budgetary allocations, among others. By disseminating and sharing information, the government helps reduce information asymmetry and thus empower citizens. It also makes governments more transparent and accountable to their citizens, and it is increasingly becoming a tool for good governance and attainment of the Sustainable Development Goals (SDGs). E-participation is particularly important in achieving target 5, 6 and 7 of SDG 6 on corruption reduction, accountable and transparent institutions and inclusive participation of people in decision-making (UN, 2021). Accountability in public service delivery is important in enhancing the quality of services and ensuring the poor and marginalized have access to public services (World Bank, 2007).

Two of the main benefits of e-government and e-participation are improved public services and control of corruption. Through online public service delivery, e-government reduces bureaucracy and enhances the quality of services in terms of time, content and accessibility (Basel Institute on Governance, 2017). Corruption is one of the most persistent and prevalent challenges to socio-economic development (Basel Institute on Governance, 2017).

Countries in Europe and Asia have been leading in e-government and e-participation, providing key lessons to the rest. In Africa, e-government has become a key priority due to its benefits on improving public service delivery, controlling corruption and the ability to modernize government operations. Kenya has enacted several policies and strategies to support e-government development

in the country, and all the four functions of e-government are being utilized in the country.

E-participation through interaction with citizens through government websites and social media is also growing in Kenya. E-participation has the potential to accelerate the actualization of Article 196(1)(b), 201(a) of the Constitution of Kenya 2010, which provides that counties promote participation in all processes and decision-making. Likewise, e-government and e-participation can be leveraged on for faster attainment of Article 35 of the Constitution of Kenya 2010 and the Access to Information Act of 2016. Key e-government policies in Kenya, including the e-government strategy and digital economy blueprint identified quality public services and reduction of corruption as key objectives of e-government.

This study, therefore, assessed the status of e-government and e-participation in Kenya and compared it with aspirator countries to identify, barriers, opportunities and lessons. The study further determined whether the growth of e-government over the years has had an effect on two of the objectives of digital government, namely improved citizen services and transparency and reduction of corruption. It adds to the literature on the benefits of e-government, as there are still few that have determined the effects of both e-government and e-participation on government effectiveness and control of corruption. This is particularly important given that corruption is one of the most persistent and prevalent challenge to socio-economic development and quality public service. This paper underscores the need for more investment in e-government and e-participation as tools to tackle these issues. The main objective of this paper is to determine the effect of e-government and e-participation on government effectiveness and control of corruption among lower middle-income, upper middle income and high-income countries.

The rest of this paper is organized as follows: section 2 looks at the status of e-government internationally, regionally and in Kenya; section 3 reviews theories on e-government and literature on the effect of e-government on government effectiveness and control of corruption; section 4 presents the methodology; section 5 compares the status of e-government in Kenya with those of the selected aspirator and comparator countries, section 6 looks at the study findings and discussions, while section 7 concludes and makes policy recommendations.

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## **2. Status of E-Government and E-Participation Globally, Regionally and in Kenya**

### **2.1 E-Government and E-Participation Globally**

E-government is an innovation that is transforming how the public sector operates through sharing information, engaging citizens, making decisions and delivering public services. Adoption of e-government globally has been increasing over the years, with Europe leading. A 2020 report on e-government development revealed that 65 per cent of UN member states had very high or high e-government development index (UNDESA, 2020).

The European Union members (EU), which are mostly in the high-income countries' categories have been frontrunners in the digital delivery of public services, with all the 36 countries showing improvements over the years (European Commission, 2020). While the focus for years has been on increasing the number of online public services, it is fast shifting towards improving the quality of online public services as articulated in the new EU e-Government Action Plan. The EU uses four main benchmarks, namely user-centricity, transparency, key enablers and cross-border mobility to measure the overall E-government performance of member countries (European Commission, 2020).

OECD member countries formally adopted the recommendation to develop digital government strategies in 2014 and developed principles to implement the strategies (OECD, 2016). The main objectives for implementing e-government strategies among the OECD member countries are to modernize public services, engage citizens, create an open and participatory public sector and improve the efficiency and effectiveness of public service delivery.

Estonia, an EU and OECD member country, is one of the world leaders in E-government with over 2,600 public services online, which constitute 99 per cent of government services (E-estonia, 2021). Estonia began building its e-government in the 1990s after attaining independence from the Soviet Union and has significantly increased in EGDI ranking from position 20 in 2010 to position 3 in 2020 (UN-EGOVKB, 2021). In 2000, Estonia became the first country in the world to declare access to Internet a human right when Estonian Parliament enacted the Telecommunication Act and began a massive programme to connect the country with a robust network infrastructure (Psaila, 2011). The key elements that played a role in the success of Estonia's e-government are the digitization of public registers, building X-Road platform that allowed sharing of information on different systems and the use of digital ID cards and digital signatures that allowed citizens to securely access and interact with online public services (TechRepublic, 2019).

In Asia, the Republic of Korea (South) and Singapore are world leaders in e-government development (UNDESA, 2020). Republic of Korea (South) was ranked first in EGDI in 2010, 2012 and 2014 for its success in leveraging ICT to transform its public sector and stimulate economic growth (UN, 2021). The strong political will of Korea to leverage on technology is captured in its national vision of informatization and goals of digitalization. E-Government in Korea has been highly promoted as a tool for transforming the public sector to improve the quality of government and ensure quality service delivery (KDEVELOPEDIA, 2019). South Korea and Estonia belong to the Digital 5 network of countries that are leading in digital government and share the best practices and innovation in digital government policies and methods (eGovSpace, 2021).

Singapore was ranked third on e-government in 2014, ahead of all European countries and superpowers such as the US and the UK (UN, 2021). Quality online services and highly developed ICT infrastructure such as cloud computing have largely contributed to the success (Reuben, 2018). Singapore has also excelled in ensuring that most of the government websites are accessible for people with disabilities by designing their websites to align with Web Content Accessibility Guidelines (WCAG) (Global Accessibility News, 2011).

There has been rapid development in e-participation globally, with advancement in e-participation, including consultations, feedback mechanisms, agenda-setting and participatory budgeting at local and national levels (Le Blanc, 2020). South Korea, for instance, has succeeded in e-participation by being clear about the goals of their e-participation platforms, and has increasingly strengthened communication with citizens by widening e-communication channels (Chung, 2015). One of the latest e-participation tools in South Korea are e-petition and e-consultation (Le Blanc, 2020). The city of Madrid in Spain in 2015 developed the 'Decide Madrid' web platform that used Consul, an open-source software that supported different types of participation, including citizens' proposal or ideation, e-consultation and participatory budgeting (Le Blanc, 2020).

## **2.2 E-Government and E-Participation in Africa**

E-government development in Africa is supported by the Digital Transformation Strategy for Africa 2020-2030, which advocates for policies and strategies that lead to transformative e- services and the digital revolution for service delivery (AU, 2020). The Digital Economy Blueprint for Africa also supports Digital Government and lists it as one of the economic pillars. The blueprint defines digital government as "the presence and use of digital services and platforms to enable public service delivery". The African Union Convention on Cyber Security,

which is being ratified and implemented by AU members, also strengthens ICT legislation needed for the development of E-government in Africa (Ball, 2017).

E-government initiatives in African countries have mainly been implemented with the aim of improving transparency and accountability in the public sector (Asorwoe, 2014). According to the 2020 report on E-government development, Mauritius is leading in Africa in 2020 with an E-government development index of 0.7, and is ranked position 63 globally (UNDESA, 2020), while Kenya, Nigeria and South Africa are the three most digitally advanced countries in the Sub-Saharan region, boasting impressive Internet penetration (Centre for Strategic and International Studies, 2021).

Kenya, Tunisia and Uganda have taskforces on AI and Block chain that are contextualizing AI in addressing country-specific issues. South Africa established a presidential commission mandated with developing an integrating national response strategy for the adoption of AI. Egypt has a national AI Council while Nigeria has its National Agency for Research in Robotics and AI. South Africa was the first country to use AI technology to fight poaching and gun violence. Tunisia has employed AI in public finance management, particularly in fraud detection, budget efficiencies and financial analytics (Global Information Society Watch, 2019).

The African Union Agenda 2063 goal number 10 envisions an Africa with world class infrastructure. The persistent gaps in telecommunication infrastructure development have been cited as one of the main reasons preventing African countries from attaining higher levels of E-government (UNDESA, 2020). Affordability and availability of high-speed broadband Internet is essential in enhancing access to e-government services and ensuring that citizens are not left behind as governments adopt e-government initiatives.

E-participation platforms in Africa have majorly been used for e-information sharing. Online consultation platforms are much rarer in the continent, with the 2020 UNDESA E-government survey report indicating that evidence of e-consultation was found for only 8 of the 54 African countries assessed (UNDESA, 2020). E-participation requires the citizens to take up and trust in government and also on the Internet for it to succeed (Le Blanc, 2020). However, actions by some African countries to increase government control on discussions in cyberspace can negatively affect the uptake of e-participation by citizens (CIPESA, 2020).

Tunisia and Morocco are leading in e-participation in Africa (UNDESA, 2020). Tunisia has two e-participation platforms; one for policy consultations, ideas and public debates and the other one for information, suggestions, forums, surveys, and reports on the misuse of public funds (UNDESA, 2020). South Africa, Tanzania,

Ghana and Kenya showed the most improvement in e-participation index (EPI) over the years. The EPI is an indicator of efforts by governments to promote citizen engagements in public policy design, implementation and evaluation (UNDESA, 2020). Therefore, the improvement of the index for countries over the years is indicative of the governments' willingness to engage citizens in governance. Most African countries have adopted digitalization as a tool to prevent, detect and prosecute corruption (IMF, 2018).

### **2.3 E-Government and E-Participation in Kenya**

The Government of Kenya is a key facilitator and advocate of the use of ICT in the private and public sectors. E-government was launched in Kenya in 2003, with the main aim of reducing corruption and improving public sector performance. The E-Government Strategy was developed in 2004 and the E-Government Unit was established to provide guidelines to harmonize government ICT initiatives (Riany et al., 2018). Since 2004 to date, all the four functions of E-government have been implemented at various levels in Kenya.

The Kenya Vision 2030 has largely guided the e-government initiatives through its political pillar, which aspires to have a democratic political system that is open and accountable to citizens and which also allows citizens to engage and participate (Government of Kenya, 2007). The ICT Master Plan, which is aligned to the Kenya Vision 2030, envisages Kenya as a globally competitive digital economy that has e-government services as one of its pillars (ICT Authority, 2014). The overall goal of e-government in Kenya is to make the Government more result-oriented, efficient and citizen-centred. The Kenya ICT Policy 2019 states that all governments will be efficient and open, and all government services must be available online, and that every Kenyan has online access and that government services are delivered quickly (Government of Kenya, 2019). The ICT Policy Guidelines 2020 cite public service delivery as one of the four key areas, and states that all government services must be available online (The Kenya Gazette, 2020). To leverage on emerging technologies, the Kenyan government set up a taskforce on block chain and artificial intelligence in 2018 to provide strategies and contextualize the application of these technologies in public service delivery (The Kenyan Wall Street, 2018).

Kenya's digital economy blueprint of 2019 also guides e-government development in the country as part of the overall digital transformation. The goal of digital government is to "Improve access, quality, transparency, equity, efficiency and effectiveness of government services". The outcomes of the digital government pillar elucidated by the blueprint are: improved efficiency and productivity of

government, improved citizen services, accelerated achievement of SDGs and social agenda, cost-saving, promotion transparency and reduction of corruption and the improved ease of doing business (Government of Kenya, 2019). The blueprint also laid out the strategy towards developing digital citizenship in Kenya through electronic ID and inclusive government through the use of e-participation tools to interact with citizens (Government of Kenya, 2019). The Government of Kenya began registration of citizens for Huduma Number, the Kenyan digital ID in 2019, and currently, approximately 10 million Kenyans have been issued with the electronic ID.

The public sector ICT survey conducted in 2016 by the Kenya Bureau of Statistics revealed that only 43.4 per cent of public institutions had implemented e-government initiatives (KNBS, 2016).

E-citizen is the main E-government platform in Kenya that enables Kenyan citizens and foreign residents to access government services. The e-citizen gateway is a Government to Citizen (G2C) portal that is a virtual one-stop-shop that provides services, including business name search and registration, notice of marriage, registration of marriage, driving licenses, land searches and clearances, passport and visa applications. The system allows citizens to sign up, apply for government services and conveniently pay using mobile money, credit cards, debit cards and online banking. Another key G2C platform in Kenya is the KRA itax system.

Although the global COVID-19 pandemic threatened the physical access to government services by citizens, it accelerated the provision of online public services. The Judiciary launched the electronic case management system in 2020 as a response to COVID-19, curtailing physical access to justice in the country. Currently, Kenya has 120 public services online on the e-citizen platform and on MDAs and County Government websites. Ardhi Sasa, the National Land Information Management System, and Chanjo Kenya, the COVID-19 vaccination registration and certification system are among the latest online services in Kenya launched in 2021.

For the Government to Business function, the State Department of Trade has the largest ICT infrastructural project in the country, namely the Electronic Single Window System. This regional flagship project is anchored in the Kenya Vision 2030 and aims to benefit Kenyans, and the regional economy, in savings made through enhanced efficiencies, optimized use of port space and reduced corruption (Kubai, 2015; Amoako-Tuffour et al., 2016). The Integrated Financial Management Information System (IFMIS) was launched in Kenya in 2002 to allow for more transparency in the use of public financial resources (The National Treasury, 2021). One of the latest G2B systems is the Agriculture and Food Authority - Integrated Management Information System (AFA-IMIS), launched



in 2021 that automates agricultural business processes in Kenya, including the issuance of permits and licensing (Trademark East Africa, 2021).

Under Government to Government, IFMIS is being used by both the National and County governments and has been integrated with other government agencies. One of the latest G2G system is the Uadilifu Case Management System developed by the Office of Director of Public Prosecutions (ODPP) in 2020 and integrated into the Independent Police Oversight Authority (IPOA) system and the Judiciary e-filing system to enhance the effectiveness and efficiency within the criminal justice system (Ministry of ICT, Innovation and Youth Affairs, 2020).

E-participation in Kenya is mainly through government websites that provide online information and participatory tools such as social media and emails for citizens to interact with MDAs and County Governments. As at 2016, 58 per cent of public institutions utilized social media while 57.5 per cent had websites to communicate and interact with citizens (KNBS, 2016). Therefore, MDAs and County Governments are leveraging on ICTs by publishing information on their websites and allowing citizens to make online requests for information in accordance with Article 232 of the Constitution of Kenya 2010, and the County Government Act of 2012 (Ndung'u, 2019). Article 232 (1) of Chapter 13 of the Constitution of Kenya 2010 in particular cites transparency and provision of accurate and timely information as key principles of public service (UNESCO, 2014). E-participation helps ensure transparency, accountability and participation of citizens, which are entrenched in the Constitution (UNESCO, 2014). Participation in the budgetary process is possible since the National Treasury has been publishing its financial budgets online since 2007. Similarly, the Office of the Controller of Budget regularly publishes online the corresponding expenditure figures (Ndung'u, 2019). Thus, Kenyans are able to compare budget against expensed financial figures and raise queries in case of discrepancies.

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### **3. Literature Review**

This section entails a theoretical and empirical literature review on the effect of e-government and e-participation on government effectiveness and control of corruption.

#### **3.1 Theoretical Literature**

E-government research has often been criticized for being under-theorized (Flak et al., 2007). The inadequacy of theories to explain the phenomenon of e-government has made the studying of the effectiveness of e-government implementation more challenging. This study will use two theories, namely New public management theory and the Agency theory to understand the effect of e-government on government effectiveness and control of corruption.

##### **3.1.1 New public management theory**

New Public Management (NPM) theory was developed in the 1980s due to the growing trend of applying private sector management practices in the public sector. New Public Management is a set of management approaches and techniques adopted by the public sector from the private sector (Mongkol, 2011). The NPM approach came into focus due to widespread disappointment in the management of the public sector in the UK, Canada, Australia and New Zealand. The public sector at that time was characterized by wastage of resources, bureaucracy, unresponsiveness, inefficiency, and corruption in public services (Pollitt et al., 2007).

The NPM proposed the re-engineering of government to focus on citizens as they are the 'customers' in the public sector. It calls for changes in the structure, their culture and management of public service systems by focusing on efficiency, cost-reduction, setting benchmarks and targets. The advent of NPM is a departure from rigidity lethargy, inaccessibility, and corruption that inhibited creativity and innovations (Christensen and Lægreid, 2007; Le Grand, 2007; O'Flynn, 2007). The NPM brought about waves of reforms in the public sector, which intended to enhance performance management to increase efficiency and effectiveness of public service delivery. Among the reforms included using decentralized service delivery models, using quasi-market structures, assessing performance using audits, benchmarks and performance evaluations, outsourcing services from private sector companies to deliver what were formerly public services, using

private sector-style corporate governance, such as the Board of Directors approach to strategic guidance for public organizations and using the e-government approach.

NPM has implicitly or explicitly motivated investments in e-government (Cordella and Bonina, 2012 ). E-government in particular was seen as key to transforming governments from rigid and bureaucratic institutions to ones that are responsive and efficient in meeting the needs of citizens. Scholars of the NPM argued that when e-government is applied alongside other NPM reforms, there were more benefits because, unlike in the private sector, transparency and participation are key requirements in public service delivery. Guanghua (2009), while looking at the case of China, views investment in e-government as a catalyst of public sector reforms. He argues that there is need to appreciate public sector efficiency, especially amidst the financial crises that have been prevalent in public services. This can be through rejuvenating the administrative systems that have placed African governments into focus (Burke, 2012; Serfontein and De Waal, 2015; Yeboah-Assiamah et al., 2016).

In Kenya, e-government was introduced in 2004 to improve service delivery by transforming the public sector to be more transparent, efficient, effective and responsive. Evidently, the objectives of e-government implementation in Kenya supports the NPM as they endeavour to provide better and cost-effective services, engage citizens in governance, and promote productivity among civil servants (Government of Kenya, 2004).

### **3.1.2 Agency theory**

The effect of E-government and e-participation on government effectiveness and control of corruption can be understood through the Agency Theory, developed by Stephen Ross and Barry Mitnick in 1973. This theory has been used by Naz (2009) in a study on the role of e-governance in improving service delivery in Fiji.

In this theory, the principals appoint agents and delegate decision-making and authority to use resources to the agents. However, the interests of the two parties are often not in alignment, leading to the principal-agent problem. Due to this problem principals are often not able to control the agents because of information asymmetry as the agents have more information about their activities than the principals (Laffont and Martimort, 2002). In the context of this study, public sector employees are the agents who have been delegated to use public resources on behalf of citizens (principals) and provide public services and make decisions. Accountability and transparency are often hindered by the presence of information

asymmetry between public servants and citizens (Wathne, 2021). This increases the risks for corruption and negatively affects the quality of public services.

E-government and E-participation offer a solution to the principal-agent problem by reducing information asymmetry and empowering citizens to be part of the public service delivery and public policy-making processes (Teicher et al., 2002). E-government allows citizens to make transactions on their own such as making applications, accessing better feedback mechanisms. This reduces the number of intermediaries in the public service delivery process and thus diminishes opportunities for corruption. Citizens' services are also improved as the cost and time it takes to access public services is reduced. Furthermore, E-government enhances accountability, transparency and auditing of public sector performance and processes, thus enhancing public servants' commitment to better service delivery to citizens. E-participation ensures that not all public policy-making process is in the hands of agents but that citizens are also involved in the various stages of the process. Reduction in corruption is achieved through the ability of society to analyse public data and information and through the elimination of barriers in interactions with governmental organizations. This reinforces a culture of mutual interest and trust between the principals and the agents.

### **3.2 Effect of E-Government and E-Participation on Government Effectiveness**

The motivation behind e-government is to make public service delivery efficient and effective through the reduction of administrative burdens on citizenry and businesses. E-governments have been shown to facilitate network links across public service delivery agencies, thus avoiding bureaucracy and improving effectiveness (Basu, 2011). The strategic objective of e-governance lies in its capability to support and simplify governance for the main stakeholders, which are the government, the citizens, and the businesses (Asian Productivity Organization, 2021). E-government enhances government effectiveness by contributing to public sector reforms that improve efficiency, facilitate information sharing and online service delivery (Zhao et al., 2015).

Zhao et al. (2015) established that by implementing e-government, the effectiveness of public administration has been achieved. Digitalization of public service delivery through e-government has helped modernize public sector and has improved the relationship between the government and citizens by enhancing the government's capacity to deliver public services (Bertot et al., 2008). Naz (2009) found that e-government had the potential to improve the quality of public

services.

Studies on the effect of the use of ICT in education sector administration in South Korea showed that there were improvements in effectiveness and efficiency in the work processes (Lee, 2003). Studies that investigated the effect of e-government on government accessibility, efficiency, economics, and effectiveness established that e-government had improved the efficiency of many programmes (Yand and Rho, 2007). E-government has been found to increase governance quality through the reduction of corruption due to enhancement of transparency, accountability and public participation (Singh et al., 2010).

Low telecommunication infrastructure has been highlighted by several empirical studies as a major obstacle to the realization of the governance benefits of e-government (Smith and Teicher, 2016). European countries are said to have the best telecommunication infrastructure as they developed the Digital Agenda for Europe's 2013 target of basic broadband for all by January 2012.

The effect of e-participation was established by Neshkova and Guo in their study, which found that through participation, citizens provided valuable input that contributes to efficient and effective public policies, which in turn enhance government effectiveness (Neshkova and Guo, 2012). Governments around the world are leveraging on ICT to create effective channels of communications with citizens that allow citizens to participate in public policy design (Meijer et al., 2012). Through participation, citizens are not merely the consumers of public services, but they also play a role in improving public policy and the public sector as a whole.

Thus, ICT enables citizens to participate (e-enabling), allows governments and citizens to engage each other (e-engaging) and empowers the citizens to contribute to public policy designing (e-empowering) (Wijnhoven et al., 2015). Public participation is often time-consuming and expensive, hence, with ICT, benefits in costs and time reduction can be realized. Continuous development of e-participation tools has been cited to be key in increasing the level of public impact from tools that merely relay information to interactive tools that allow governments to collaborate with citizens, thus empowering them to make decisions on public policies (UNDESA, 2021). E-participation has proven successful when the goals of e-participation are clear (Chung, 2015). The political will to engage citizens through e-participatory tools is also key for the participation to achieve its objectives (Sæbø et al., 2011).

E-participation and e-government may fail to achieve their purpose of improving public services if a considerable portion of the population fails to utilize the e-services. According to Belanger and Carter (2008), the utilization of

e-government services and e-participation platforms is largely determined by the level of trust citizens have in government. When the digital divide exists, where there is unequal access of citizens to ICT, uneven possession of skills required for using ICT would also have an effect on utilization of e-government (Friemel, 2014). Therefore, for e-government and e-participation to achieve their set objectives and outcomes, there is need for governments to bridge the digital divide.

### **3.3 Effect of E-Government and E-Participation on Control of Corruption**

Corruption is a significant obstacle to the realization of economic development and, therefore E-government has increasingly been used by governments as a tool to tackle this problem (Basel Institute on Governance, 2017). The World Bank describes corruption as 'one of the single greatest obstacles to economic development and social development'. The causes of corruption are diverse but are often summarized by the Klitgaard's corruption formulae:  $C = M + D - A$ ; Corruption equals monopoly plus discretion minus accountability (Klitgaard, 1998).

The nature of corruption relevant to e-government is commonly referred to as administrative corruption, ranging from petty to grand corruption (Basel Institute on Governance, 2017). Petty corruption involves small tips and kickbacks from citizens to bureaucrats, while grand corruption exists among higher-ranking officials who make decisions on large public contracts for their personal benefit (Dutt, 2009) Both the grand and petty scale of corruption should in theory be reduced through e-government initiatives such as e-procurement, e-customs, and trade facilitation programmes. Therefore, e-government initiatives are believed to reduce corruption by reducing in-person contact between public sector employees and individuals, businesses, thereby reducing chances of interference and discretionary decision-making (Basel Institute on Governance, 2017). E-government also allows for the digital tracing of any actions and or alterations taken, and therefore increasing transparency of actions and procedures and accountability of public officers. E-government and e-participation platforms are also part of social auditing and managerial tools that allow citizens to monitor public expenditure, increase transparency and help in reducing corruption (Wathne, 2021).

The potential of e-government to control corruption has been established by a number of empirical studies. One of the most well-known studies on the effect of e-government on corruption is by Cho and Choi (2004) on implementation of the Seoul Metropolitan Government's Online Procedures Enhancement for

civil applications (OPEN) system. The OPEN system was shown to increase transparency, reduce physical interactions between citizens and government officials and reduce corruption levels in the first five years of its operation (Cho and Choi, 2004).

The introduction of an electronic land record system Karnataka, India, was found to have saved farmers some 1.32 million workdays in waiting time and approximately Rs 806 million in bribes (Chawla and Bhatnagar, 2004). Electronic delivery of services can reduce corruption by reducing interactions with officials, speeding up decisions, and reducing human errors. Additionally, e-government eliminates discretion from the equation by removing intermediary services and allowing citizens to conduct transactions themselves (Alhammedi and Ahmed, 2018). Jamshed et al. (2012) studied the relationship between e-government and corruption in developed and developing countries and established that a 1 per cent increase in the e-government index may have resulted in a 1.17 per cent decrease in corruption.

Other studies have used country-level data to establish the effect of e-government on control of corruption. Using panel data on 149 countries and two-time observations in 1996 and 2006 on the impact of e-government on control of corruption, Andersen (2009) established that e-government could reduce corruption in non-OECD countries. Similarly, Shim and Eom (2008) using country-level data on the effect of e-government found that implementing e-government enhanced the government's managerial control, transparency, and accountability and subsequently reduced corruption.

The provision of information to the public by government agencies, and transparency of the public sector about government decisions, expenditure and actions are regarded as essential for increasing trust in government, reducing corruption and increasing democratic participation (Shuler et al., 2010). According to Roberts (2006), the use of ICT has greatly reduced the cost of disseminating and accessing government information. Therefore, there has been an upsurge in the adoption of e-government by national and sub-national governments as means to improving transparency, accountability and control of corruption (Andersen, 2009). Transparency in government that is achieved through e-government was found to negatively correlate with corruption (Lindstedt and Naurin, 2010).

Nam (2018) carried out a cross-country study on e-government maturity and established that e-government had an effect on control of corruption but disparities in political, economic and cultural conditions of countries moderated the effects. The quality of institutions, IT infrastructure, technology, and human

capital also affected the impact of e-government on corruption (Kochanova et al., 2016). Bertot et al. (2010) found that e-government alone can have a limited effect on the reduction of multifaceted corruption because of varied political, social, institutional, and cultural conditions of countries. Other studies established that e-government has proven effective against petty bureaucratic corruption, but not on political corruption, which is more grand in nature (Shah and Schacter, 2004).



## **4. Research Methodology**

This section describes the methods and procedures used in carrying out the research. The research design, target population, sampling design, data collection and analysis procedures are discussed in this section.

### **4.1 Research Design**

The first objective on the status of e-government and e-participation in Kenya and aspirator countries was addressed through descriptive statistics on the components of UN e-government index and e-participation index. The descriptive statistics were also explained by literature review and statistics. To address the second objective panel data on e-government development index, e-participation index, democracy index, government effectiveness index and control of corruption index was analyzed. The panel data analysis allows a regression analysis that takes into account both the spatial and temporal dimensions. Therefore, both the time and cross-sectional attributes of different countries are factored in. Thus, panel data takes into account the heterogeneity that exists among units (countries). The benefits of using panel data analysis as an analytical technique include the enhancement of the accuracy of the estimations. Considering  $N \times T$  where  $N$  is the number of countries while  $t$  is time period ( 2010, 2012, 2014, 2016 and 2018) over which the data collected spans, the larger the size of the sample, the lesser the error in the estimation. In addition, multi-collinearity, which is a common challenge in the time series analysis is controlled in the panel framework (Baltagi, 2013; Balestra, 2011) due to greater degrees of freedom and expanded variability (Gujarati and Porter, 2009). Therefore, the panel analytical framework allows for a better, more reliable and efficient exploration of the issues leading to government effectiveness and control of corruption as a result of developing e-government and e-participation in Kenya and other UN member countries over the time period of interest.

### **4.2 Sampling and Time Specifications**

The units of analysis for this study are countries. For the first objective of the study, for comparison of Kenya's performance on E-government and e-participation in 8 aspirator countries were sampled. Therefore, aspirator countries are countries with middle and high incomes, and they include Republic of Korea (South), Malaysia, Singapore, Brazil, India, Thailand, Mauritius and Estonia. For the second objective, all UN member countries with data on e-Government development were sampled (total number). The time period for the analysis is

from 2010 to 2018, with a two-year interval due to the availability of data on the e-government development index.

### **4.3 Data Measurement and Data Sources**

This study used Government Effectiveness Index to proxy for improved citizen services. The World Bank defines government effectiveness as “the perceptions of the quality of public services, the quality of the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to its stated policies”. Government effectiveness is measured by the Government Effectiveness Index (GEI), which is part of the six Worldwide Governance Indicators (WGI) published yearly by the World Bank for over 200 countries since 1996. The index ranges from -2.5 (weak) to 2.5 (strong) (Kaufmann, et al., 2009). The index is a macro index that allows for cross-country comparisons and tracking progress over time (Kaufmann et al., 2009).

The World Bank’s Government Effectiveness Index is a subjective measure of the entire government’s performance. This is because government effectiveness, just like other governance concepts, is socially constructed by multiple stakeholders (Kaufmann et al., 2009). Perception measures are more appropriate for capturing the complex and multiple dimensions of an entire government’s performance. Outcome indicators, which would have been more objective, are often problematic when measuring the overall performance of the public sector as public organizations as a whole are often not able to control their inputs (Scott and Gerald, 2007). Additionally, studies have shown that the use of fact-based data to measure governance issues such as corruption often captures the *de jure* situation (what is recorded) as opposed to *de facto* situation (what exists on the ground) (Kaufmann et al., 2005). Objective measures for governance indicators such as overall government effectiveness are often unavailable (Lee and Whitford, 2009; Kaufmann et al., 2009).

The World Bank’s government effectiveness index is generated from data from polls (surveys) of experts and data from cross-country surveys of residents, carried out by international organizations and other non-governmental organizations (Lee and Whitford, 2009). Among the approximately 47 items that are sought from survey of experts from about 18 organizations are perceptions on the quality of public services, trust in government, government-citizen relations, capacity of the political authorities, allocation and management of public resources, satisfaction with public services, excessive bureaucracy, resource efficiency and consensus building among many more (Kaufmann et al., 2009). The unobserved

components model to aggregate indicators to construct a weighted average of each of these rescaled data sources to arrive at an aggregate indicator of governance (Kaufmann et al., 2009).

The World Bank's Control of Corruption Index reflects the processes for accountability and transparency, openness to the public and media scrutiny, and less bureaucratic regulations, registrations, and requirements. Nam (2018) suggested that the standardized scores of the Control of Corruption Index present an advantage not only for the estimations in regression-based analysis, but also in theoretical interpretations. Therefore, this index was preferred to the more popular Corruption Perception Index by Transparency International.

E-government Development Index (EGDI) developed by the United Nations is the most reliable and commonly used index that indicates the level of e-government among UN member countries. The E-Participation Index (EPI) and Open Government Data Index (OGDI) measure the role ICT plays in enabling public participation and access to government data, respectively, and when applied together with the EGDI they are good indicators for assessing the level of e-government development in a country (UNDESA, 2020).

EGDI is a composite index ranging from 0-1 that is based on three weighted indices, one third Online Service Index, one third Infrastructure Telecommunication Index and one third Human Capacity index (UNDESA, 2020). The online service index measures the government's general ability to provide services to the public electronically. As of 2020, 84 per cent of countries offered at least one public service electronically, the registration and licensing of businesses being the most common digital service (UNDESA, 2020). Although trends over the years have established that most countries with high incomes have high Online Service Indices, there are some high-income countries with low OSI values while some low and lower middle-income countries have high OSI values.

The Telecommunication Index is an arithmetic average of five indicators, namely: number of estimated Internet users per 100 people, number of main fixed telephone lines per 100 people (dropped in 2018 and 2020), number of mobile subscribers per 100 people, number of wireless broadband subscribers per 100 inhabitants, and number of fixed broadband subscribers per 100 people. The human capital index consists of adult literacy rates, gross school enrolment ratio, expected years of schooling, and average years of schooling. This index is important as it reflects the general intellectual ability of the public to use e-government services.

E-Participation Index measures the quality, relevance, and usefulness of government websites in providing online information and participatory tools and services to their citizens (UNDESA, 2020). It measures the level of information

provided by the government to its citizens through government websites. It also considers how governments consult with citizens through online services (e-consultation) and how they reflect on citizens' opinions through websites (e-decision-making).

A country's income can affect its government effectiveness. Studies have established that much of the variance in government effectiveness is explained by the relative position of countries in the worldwide income distribution, with wealthier countries experiencing greater perceptions of effectiveness and those in the lower parts of the distribution being perceived as being less effective, hence countries were categorized in different income categories, and regression analysis was applied to the different income categories in this study. Highly democratic countries are expected to have more effective public service delivery compared to flawed democracies, hybrid and authoritarian political regimes. In theory, countries with higher democratic levels should have less corrupt governments, as public officers are expected to use their authority for public good. However, studies have shown that while countries with very high levels of democracy had effective and less corrupt governments, countries with modest levels of democracy were found to have higher levels of corruption (McMann et al., 2015). Thus, democracy index was included in the study to control for the effect of democracy on government effectiveness,

Table 1 below summarizes the measurement of e-government development and government effectiveness that was used in this study.

**Table 1: Variables of the study and their data sources**

Area	Indicators of interest	Measurable Variables	Data sources
E-Government Development			
	ICT infrastructure needed for citizens to use e-government	Telecommunication Infrastructure Index (TII) Scale 0-1	UN E-Government Survey 2010-2020 published by UNDESA, available on two-year intervals (Based on International Telecommunication Union data)
	Ability to use e-government services	Human Capital Index (HCI) Scale 0-1	UN E-Government Survey 2010-2020 published by UNDESA, available on two year intervals- (based on Human Development Reports

	Government's general ability and willingness to provide services to the public electronically	Online Service Index (OSI) Scale 0-1	UN E-Government Survey 2010-2020 published by UNDESA, available on two year intervals (based on data from Member State Questionnaire by UNDESA)
	Ability and willingness of Governments' to electronically share information with citizens, interact with citizens and engage citizens in decision-making processes	E-Participation Index (EPI) Scale 0-1	UN E-Government Survey 2010-2020 published by UNDESA, available on two year intervals
Democracy	Measures electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture	Democracy Index Scale 1-10	Democracy Index Reports by The Economist Intelligence Unit 2010-2018

#### 4.5 Estimation Model

This study seeks to determine the effect of e-government on government effectiveness and control of corruption. This will be achieved through running a regression using macro level panel data on e-government development index, e-participation index and government effectiveness index for UN member countries, including Kenya in 2010, 2012, 2014, 2016 and 2018. The year 2020 was dropped due to lack of availability of data on government effectiveness.

The panel regression model is estimated below

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \dots + \beta_k XK_{it} + u_{it} \quad 1$$

The dependent variable for this study is government effectiveness while e-government development index, and e-participation index are the explanatory variables of interest while democracy index is the control variable. The open government index was dropped as it was only available for 2015. The components of the e-government development index, namely the Online Service Index (OSI), Telecommunication Infrastructure Index (TII) and Human Capital Index (HCI) were factored into the model. The analysis for countries in different income categories was carried out to control for the effect of income on government effectiveness. The Error Component Model (ECM) is as specified below:

$$GE_{it} = \alpha + \beta_1 OSI_{it} + \beta_2 TII_{it} + \beta_3 HCI_{it} + \beta_4 EPI_{it} + \beta_5 DI_{it} + u_i + \varepsilon_{it} \quad 2$$

$$CoC_{it} = \alpha + \beta_1 OSI_{it} + \beta_2 TII_{it} + \beta_3 HCI_{it} + \beta_4 EPI_{it} + \beta_5 DI_{it} + u_i + \varepsilon_{it} \quad 3$$

Where  $GE_{it}$  is government effectiveness index for country  $i$  at time ( $t$ )

$CoC_{it}$  is control of corruption index for country  $i$  at time  $t$

$\alpha$  is the constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  are the coefficients of the independent variables

$OSI_{it}$  is the Online Service Index for country  $i$  at time  $t$

$TII_{it}$  is the Telecommunication Infrastructure Index for country  $i$  at time  $t$

$HCI_{it}$  is the Human Capital Index for country  $i$  at time  $t$

$\beta_2$  is the coefficient of E-participation Index

$EPI_{it}$  is E-participation index for country  $i$  at time  $t$

$DI_{it}$  is the Democracy Index for country  $i$  at time  $t$

$u_i$  is the fixed effect error term

$\varepsilon_{it}$  is the idiosyncratic error

#### 4.5.1 Robustness and diagnostic tests for the model

Although a Fixed effects model was preferred as it can greatly reduce the chance that a relationship is driven by an omitted variable, it however greatly reduces the number of degrees of freedom due to the inclusion of dummy variables. The ECM, on the other hand, is prone to correlation problems as the error term may be correlated with the explanatory variables, which will result in inconsistent estimation of the regression coefficients. Hausman specification test is usually used to determine the best fit model choice between fixed effects (FE) and error components model (ECM) (Hausman and Wise, 1978). The null hypothesis for the Hausman test is that the FE and ECM model do not differ significantly. Therefore, if it is rejected, signifying that the random effects are correlated with one of the explanatory variables, this study will use the Fixed effects model.

#### 4.6 Descriptive Statistics

The summary statistics across the three categories of countries reveal that the average score for E-Government Development Index (EGDI) for High-Income Countries is 0.750, Upper Middle Income being 0.542 and Lower Middle-Income

countries having a score of 0.430. Therefore, while the average EGDI for Higher-Income countries was much higher than the other categories, the average for the Upper Middle-Income countries and Lower Middle-Income countries were close. This is indicative of higher investments in e-government by high-income countries.

Looking at the three components of EGDI, it is clear that the biggest disparity between the three categories of countries lies in the Telecommunication Infrastructure Index (TII). The average TII for High-Income countries is at 0.650, which is almost twice the scores of Upper Middle-Income countries score of 0.36 and more than twice that of Lower Middle-Income countries at 0.220. There is a low disparity in the average scores for the Human Capital Index and Online Service Index across the three categories of countries.

The average scores for e-participation index were 0.650 for high-income countries, 0.430 for upper middle-income countries and 0.381 for lower middle-income countries. The average e-participation index for high-income countries is almost twice that of lower middle-income countries.

**Table 2: Summary statistics**

High income countries	Variable	Observations	Mean	Standard Deviation	Maximum	Minimum
High income countries	E-government Development Index	220	0.750	0.110	0.950	0.460
	E-Participation Index	220	0.650	0.260	1	.0430
	Online Service Index	220	0.730	0.190	1	0.250
	Human Capital Index	220	0.880	0.080	1	0.660
	Telecommunication Infrastructure Index	220	0.650	0.140	0.940	0.210
	Democracy Index	220	7.480	1.990	9.930	1.710
Upper middle Income countries	E-government Development Index	175	0.542	0.120	0.300	0.790
	E-Participation Index	175	0.430	0.270	0.014	0.970
	Online Service Index	175	0.501	0.210	0.065	0.920
	Human Capital Index	175	0.780	0.094	0.480	0.999
	Telecommunication Infrastructure Index	175	0.360	0.152	0.055	0.696
	Democracy Index	175	5.530	1.670	1.940	8.284

Lower Middle Income countries	E-government Development Index	150	0.430	0.110	0.200	0.690
	E-Participation Index	150	0.381	0.233	0.014	0.961
	Online Service Index	150	0.440	0.170	0.093	0.950
	Human Capital Index	150	0.640	0.162	0.296	0.964
	Telecommunication Infrastructure Index	150	0.220	0.114	0.033	0.540
	Democracy Index	150	5.170	1.534	1.722	7.941



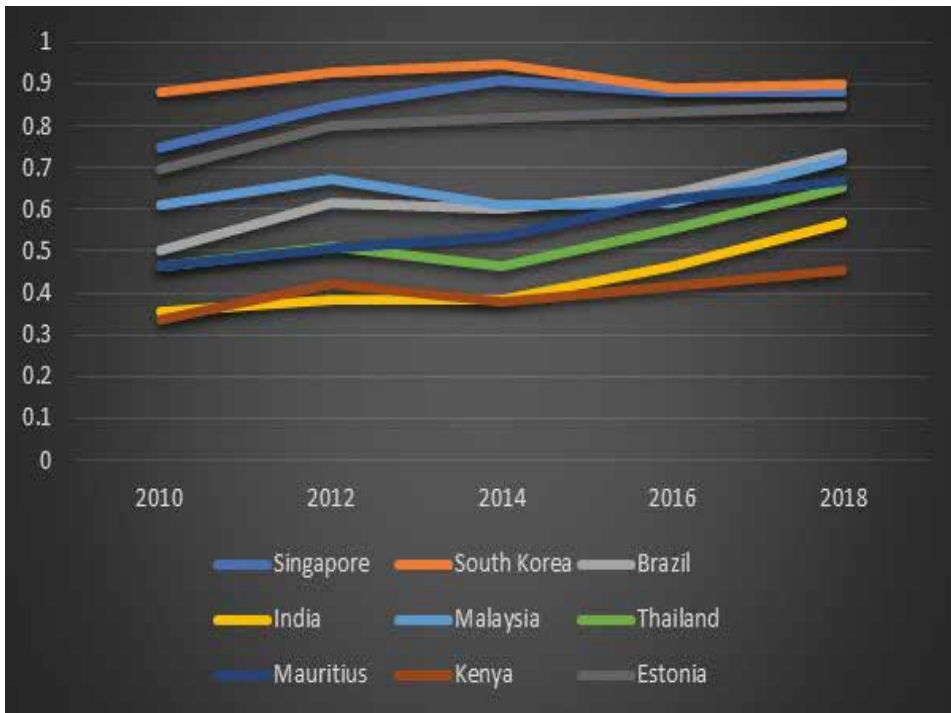
## **5. Comparing Kenya's Performance on E-Government and E-Participation with Selected Aspirator Countries**

Kenya's performance on the different components of e-government development index were compared with aspirator countries to assess Kenya's position and performance. Kenya's performance on different components of e-government development index (Online Service Index, Telecommunication Infrastructure Index and Human Capacity Index) from 2010 to 2018 were compared with the selected countries. Similarly, Kenya's performance on e-participation was compared with the selected aspirator countries over the time period.

### **5.1 Comparing Kenya's Performance on E-government Development Index with Aspirator Countries**

When compared to aspirator countries, Kenya's performance on the E-Government Development index (EGDI) is low. Singapore and South Korea had the highest scores in 2010 at 0.751 and 0.880, respectively, when compared to Kenya's score of 0.330. South Korea and Singapore also lead among the aspirator countries in 2018, having scores of 0.901 and 0.880, respectively, compared to Kenya's score of 0.454. South Korea has been one of the top performers in EGDI since the early 2000s and has been consistent in its e-government goals and objectives (Centre for Public Impact, 2016). Singapore has the Government Technology Agency, in charge of developing and implementing inter-agency e-government strategies, plans and services. The country also has a one-stop-shop government portal that allows access to all government services, interaction and feedback mechanisms for citizens (UNDESA, 2020).

**Figure 1: E-government development index for Kenya and aspirator countries**



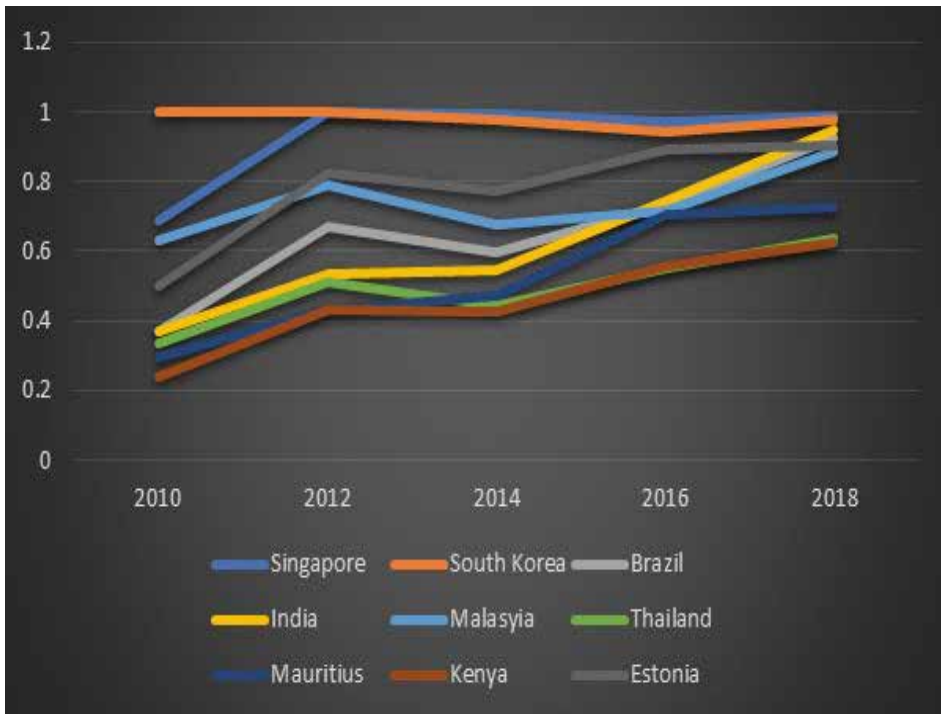
*Source: Authors' own construct based on UN E-government surveys, 2010- 2018*

### 5.1.1 Comparing Kenya online service index with aspirator countries

The online service index is one of the components of the E-Government index. It measures the government's general ability and willingness to provide services to the public and communicate with its citizens electronically. This measures four stages of the online availability of national authorities (UNDESA, 2020). The first stage, emerging information service, measures if the government's website provides information to citizens in a user-friendly way, and if it provides links to ministries and other branches of government. The second stage, the enhanced information service, basically tests whether a government's website enables one-way or simple two-way communication between authorities and citizens (UNDESA, 2020). The third stage, transactional services, measures the extent to which two-way communication between national administration and citizens is possible, including the possibility of handling a wide range of public services online, and requesting and receiving inputs on government policies. The fourth

stage, connected services, measures the government’s ability to be proactive in web 2.0 applications, and whether the government provides a wide range of tailor-made e-services for different segments of citizens.

**Figure 2: Online services index for Kenya and aspirator countries**



*Source: Authors’ own construct based on UN E-government surveys, 2010-2018*

Although Kenya’s score on OSI was lower than the scores of aspirator countries, this score was the highest when compared to the other components of the e-government development index. Kenya has approximately 200 digitized services mostly offered through Huduma Centres, and through the online self-service e-citizen platform (The Presidency, 2021). These e-services are mostly application services such as business registration, passport application, birth and death registration (ICT Authority, 2021). The latest data on the number of users of e-services is currently not available but as at 2017, it is reported that the e-citizen platform had more than 4 million registered users with more than 300,000 transactions per month (Willie and Masinde, 2017). Kenya has also digitalized tax filing through the iTax system, with over 4.4 million Kenyans using the system in 2020 alone (Kenya Revenue Authority - KRA, 2020).

Kenya has also began digitalizing basic services such as health and education. Kenya National eHealth Strategy 2011-2017, Kenya Standards and Guidelines on mHealth Systems April 2017, Kenya National eHealth Policy 2016-2030 and the Health Information System Policy 2010-2030 were developed in a bid to pave way for the use of ICT in delivering healthcare services (Manya, 2019). Although Kenya has enacted eHealth and mHealth policies, the digitalization of health services is still in the formative stages and available e-health and mHealth platforms have been developed by donor-funded non-governmental organizations and a few are aligned with national priorities (IDRC, 2018). Digital solutions targeting learners in Kenya have mainly been developed by start-ups and social enterprises (Fingo, 2021).

The ICT Policy of 2016 articulates on ICT issues in the country and stipulates that “ICT environment in the country should enable persons with disabilities to take full advantage of ICTs” (Government of Kenya, 2016). However, e-government websites in Kenya are yet to be designed to allow for optimal access and usage by people living with disability (CIPESA, 2019). People living with visual disability are especially the most affected as Kenyan Government websites do not have voice assistive technology. Kenya can learn from Singapore and South Korea on this aspect to ensure that online public services are accessible to all.

Among the aspirator countries, Singapore and South Korea had perfect scores (1) for Online Service Index in 2012 and had high scores over the years. South Korea has been leading in the world in terms of OSI. The country has the Intelligent Government Master Plan, which has provided a framework for the utilization of Artificial Intelligence (AI) and open data for public administration (UNDESA, 2020). South Korea success in e-government can be traced back to the 1960s when it became one of the first countries to use science and technology in government (Centre for Public Impact, 2016). India has shown the greatest improvement in the Online Service Index among the aspirator countries from a score of 0.330 in 2010 to 0.951 in 2018. Persons with disabilities have been identified as one of the groups that are marginalized in accessing online public services in many countries (Latif and Masrek, 2010). Through the Korean Agency for Digital Opportunity and Promotion, vulnerable groups such as persons with disabilities have been considered when increasing access to digital public services.

The Indian government in 2009 launched the national biometric digital identity programme termed Aadhaar and enrolled approximately 1.2 billion people, thus creating access to digital services for citizens. Additionally, the Government of India launched the ‘Digital India’ campaign in 2015 to improve online infrastructure and increase Internet connectivity to make online services available to citizens (McKinsey Global Institute, 2019). Currently, India has the largest

digital ID programme in the world and is the second-fastest digital adopter in the world (McKinsey Global Institute, 2019). The country is also to leverage AI-based conversational platforms such as Amazon's Alexa or Google Assistant to deliver e-governance services to the public (The Week Magazine, 2021).

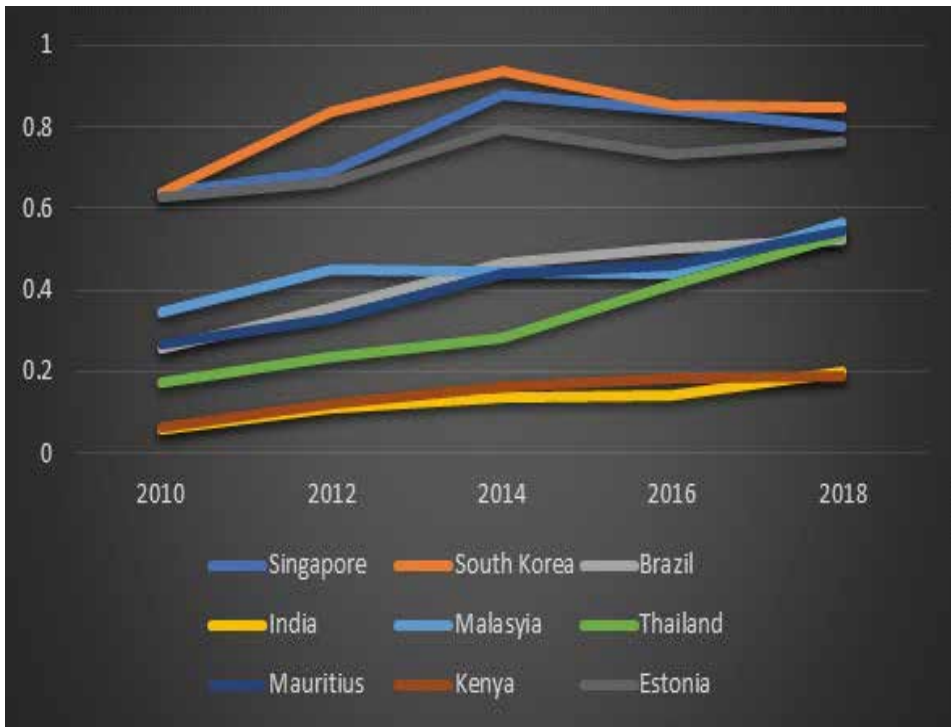
Estonia is a world leader in online provision of public services, with over 2,600 online public services constituting 99 per cent of public services (e-estonia, 2021). The country is currently leading in eHealth services as each person in Estonia who has visited a doctor has an eHealth record (EU, 2018). The eHealth system has been a success as 99 per cent of prescriptions are digitalized while billing is 100 per cent digitalized (EU, 2018). Access to digital public services is through the digital ID as all citizens of Estonia have been issued with a mandatory digital ID (e-estonia, 2021). Estonia's education system is largely digitized as efforts to introduce e-learning began in the 1990s (National Centre on Education and Economy, 2020). E-education is being supported by the Estonia Education Information System and various e-school systems (e-estonia, 2021). Prior to the COVID-19 pandemic, 85 per cent of schools were using the e-School platform (National Centre on Education and Economy, 2020). Other innovative platforms that support e-education are the e-schoolbag, a nationwide online library of more than 20,000 educational resources that teachers, guardians and students can access for free.

Singapore has also been a top performer in using ICT for public service delivery. The efforts started in the 1980s through the Civil Service Computerization programme that aimed to enhance the efficiency of internal operations through automation and paperwork reduction (Chan et al., 2008). Singapore has been in the frontline in ensuring that its e-government websites are accessible for people living with disabilities (Global Accessibility News, 2011). Accessible websites support Assistive technology and Haptic devices, which are designed to help disabled users (Abanumy and Mayhew, 2005). The importance of including vulnerable persons in the design of online delivery of public service ensures that they are not left behind as governments embrace digitalization.

### **5.1.2 Comparing Kenya's telecommunication infrastructure index with aspirator countries**

The telecommunication infrastructure index measures the existing infrastructure required for citizens to participate in e-government. This index consists of the estimated number of Internet users, the number of main fixed telephone lines, the number of mobile subscribers, the number of fixed Internet subscriptions, and the number of fixed broadband facilities, each per 100 inhabitants.

**Figure 3: Telecommunication infrastructure index for Kenya and aspirator countries**



Source: Authors' own construct based on UN E-government surveys, 2010-2018

Kenya's performance on this index was very low when compared with aspirator countries. South Korea and Singapore had high scores in 2010 and improved over time to emerge as the leading countries among the aspirator countries. In 2018, Singapore and South Korea had scores of 0.881 and 0.849 against Kenya's score of 0.190. Therefore, this index is the lowest for Kenya and significantly affects E-government development in the country. Inadequate telecommunication technology infrastructure can potentially lead to failure of e-government initiatives.

Singapore's success in telecommunication infrastructure can be attributed to efforts to increase access and affordability to e-government services by bridging the digital divide since the early 2000s. Such efforts include providing cash subsidies to purchase personal computers and Internet access kiosks at community centres (Tanuwidjaja, 2005). Singapore has also invested heavily to ensure ICT infrastructure is robust and scalable (Chan et al., 2008). South Korea has also been proactive in reducing the digital divide; in 2001, the country passed

the 'Digital Divide Closing Act' and carries out digital divide surveys each year (National Information Society Agency , 2019).

Estonia is third among the aspirator countries as shown in Figure 3 above. The fixed broadband market has a coverage of 89 per cent, with most of the households having access to speeds of 100 Mbps or above (EU, 2018). 4G mobile coverage is at approximately 96 per cent and mobile broadband take-up with 125 subscriptions per 100 people (EU, 2018). In Estonia, the digital divide is not significant, with 90.8 per cent of urban households having Internet access in 2019, compared to 89.6 per cent of rural households. Additionally, 93 per cent of Estonians are e-government users (Statistics Estonia, 2020). Currently, Estonia is ranked 30th on the inclusive Internet index an overall score based on availability, affordability, relevance and readiness (Economist Intelligence Unit, 2021). Estonia's success is attributed to efforts to increase connectivity in the country. In 2000, Estonia became the first country in the world to declare access to Internet a human right when Estonian Parliament enacted the Telecommunication Act and began a massive programme to connect the country with a robust network infrastructure (Psaila, 2011).

In Kenya, the number of fixed broadband subscribers in 2020 was 674,191, which is 1.254 subscriptions per 100 (World Bank, 2021). Kenya has been ranked 71st on the inclusive Internet index, scoring poorly on Internet affordability indicators globally and when compared to her neighbours (Economist Intelligence Unit, 2021). The cost of mobile broadband subscriptions as a percentage of gross national income as of 2020 was 11.8 per cent in Africa, 0.8 per cent in Europe, 3.3 per cent in the Americas and 2.6 per cent in Asia (International Communication Union, 2020). The cost for Africa is significantly higher than other parts of the world, thus contributing to the digital divide (UNDESA, 2020). The 2019 Kenya Population and Housing Census showed that only 8.8 per cent of Kenya's 12 million households reported having either a desktop computer, laptop or tablet (KNBS, 2019). This also contributes to the digital divide as computers are essential in accessing online web-based services. Additionally, Internet penetration in Kenya stood at 40.0 per cent as at January 2021 (Datareportal, 2021). According to KNBS statistics, there are around 10 million Internet users in Kenya, in a population of 47.6 million people, which translates into an Internet usage rate of 20-25 per cent (KNBS, 2019). This raises concern over the inclusiveness of e-government and e-participation given that a substantial population do not possess ICT devices, and can neither afford the cost of Internet nor use Internet in Kenya.

However, Kenya is excelling in mobile phone penetration and mobile data subscription. The number of mobile subscribers in 2020 was 61,408,904, translating to mobile (SIM) penetration of 114 per cent as many people have

more than one mobile connection (World Bank, 2021). Mobile data subscriptions in Kenya in 2020 accounted for 99 per cent of data/Internet subscriptions. Therefore, the delivery of online government services through mobile phones (M-government) presents a huge potential for Kenya for enhancing public service delivery. Given the Kenyan context, m-government can enable Kenya to leapfrog and enhance service delivery given the phenomenal growth of mobile use (Farooq and Kustor, 2021). Kenya can draw lessons on m-government from South Korea, which is leading among the aspirator countries in the Telecommunication Infrastructure index. In 2011, South Korea launched 160 mobile applications to integrate m-Government that would supplement e-government (Raja and Melhem, 2012).

### **5.1.3 Comparing Kenya's human capital index with aspirator countries**

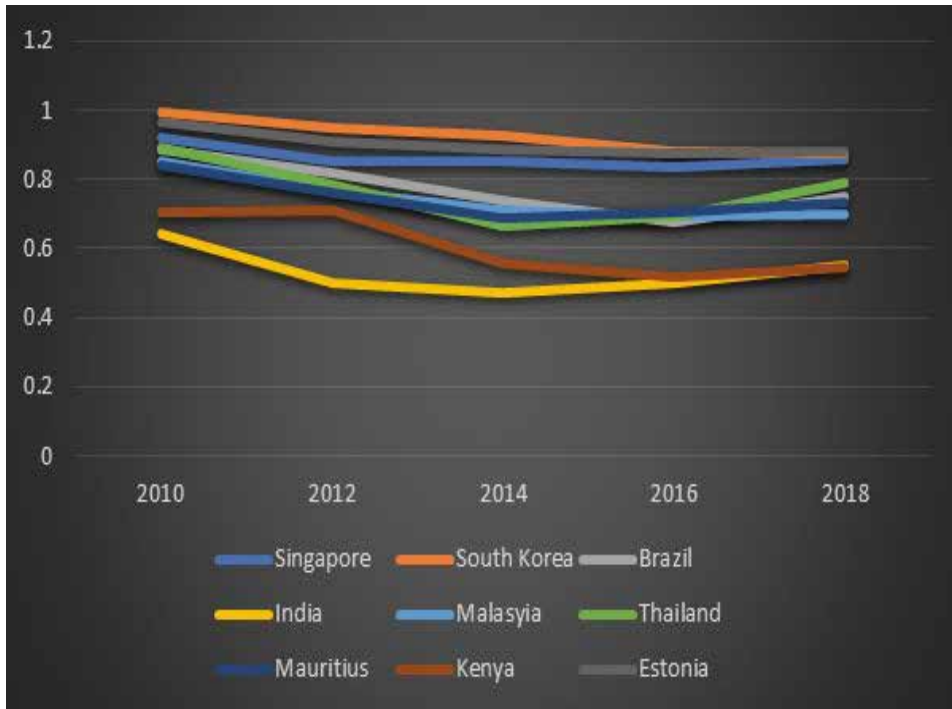
The human capital index is used to measure citizens' ability to use e-government services. This index is a compound of the literacy rate and a combined primary, secondary and tertiary gross enrolment ratio.

The aspirator countries were relatively uniform in terms of the Human Capital Index (HCI) over the periods under study. Although the HCI has declined over the years, the scores for aspirator countries have remained higher, with South Korea leading at 0.874 and Singapore following closely at 0.855 in 2018. Kenya and India lag behind in this index when compared with aspirator countries at 0.547 in 2018.

The ability of citizens to use e-government is determined by the possession of some level of digital skills and digital literacy. A digitally illiterate population is unable to take advantage of the benefits of digital government (UNDESA, 2020). Therefore, it is important to increase citizens' digital literacy either through specialized programmes for the digitally marginalized or at the basic education level for the younger generation (UNDESA, 2020).



**Figure 4: Human capital index for Kenya and aspirator countries**



*Source: Authors' own construct based on UN E-government surveys, 2010-2018*

Kenya has made several efforts to increase the digital literacy of her citizens. The Kenya Digital Literacy Programme was launched in Kenyan schools in 2016 with the aim of digitalizing education and imparting learners with digital skills (ITU, 2018). Projects targeting youth to impart digital skills for digital jobs are also increasing digital literacy in Kenya (AfDB, 2019). Despite these efforts, digital literacy is still low in Kenya particularly for people living in rural areas, the poor and the older generation (Kinyua, 2021).

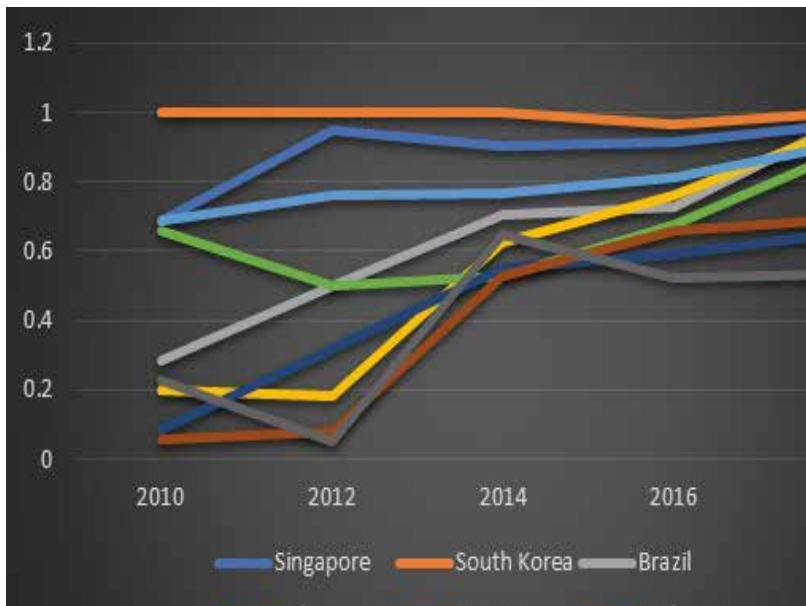
Kenya can learn from Singapore in the consideration of the digitally marginalized groups, such as the elderly, when rolling out e-government initiatives. Singapore established programmes to equip the elderly with digital skills to access and use e-government services to ensure they are not left behind (UNDESA, 2020). The high mobile phone subscription even in rural areas and among the poor provides an opportunity for using more suitable and easy to use technologies such as USSD, SMS, interactive voice services.

### 5.1.4 Comparing Kenya's e-participation index with aspirator countries

This index focuses on the use of online services to facilitate the provision of information by governments to citizens (“e-information sharing”), interaction with stakeholders (“e-consultation”), and engagement in decision-making processes (“e-decision making”). The e-participation index is calculated for every country by adding the values for each of the selected features and dividing the total by the maximum possible value for normalization (UNDESA, 2020). These features include availability of online tools to invite and obtain public opinion, evidence of the engagement of individuals in consultations/communication relating to socio-economic and governance issues, evidence of the connection between government decisions made and the results of online consultations with the public on socio-economic and governance issues, and evidence of governments’ publication of outcomes of policy consultations online (UNDESA, 2020).

Kenya experienced improvements over the years, with the highest score being in 2016, the country had the lowest score among the aspirator countries (0.533) in 2018. South Korea has had a perfect score of 1 for all the years under review except for 2016. Estonia and Singapore have also had high scores over the years. India had the most improvement from a score of 0.184 in 2010 to 0.955 in 2018.

**Figure 5: E-participation index for Kenya and aspirator countries**



Source: Authors’ own construct based on UN E-government surveys, 2010-2018

MDAs and County Governments in Kenya have been using social media platforms and websites to engage with citizens. A survey on ICT in the public sector in Kenya conducted in 2016 revealed that 58 per cent of public institutions used social media while 57.5 per cent used websites (KNBS, 2016). Although social media offers a more interactive platform, there is concern with their suitability for rational discussions that meet the criteria of deliberative democracy. An emerging concern is the growing use of social media to disseminate fake news and to polarize the public debate (UNDESA, 2020).

The Judiciary, Independent Electoral and Boundaries Commission (IEBC), and Kenya Revenue Authority have their own e-participation platforms. The Judiciary has the Service Desk system, which allows interaction with the Judiciary ombudsman and is meant for e-consulting (Judiciary, 2021). This tool is mainly used for corruption reporting, complaints handling and whistle blowing. The IEBC has the Results Transmission System used for e-information sharing of election results. KRA's iTax system has an e-information and e-consultation platform that allows for feedback from citizens. The Parliament website has a bill tracker tool that allows the public to track the progress of bills in the National Assembly and Senate (The National Assembly, 2021).

E-participation in Kenya is mostly for e-information sharing and e-consultation scales. The higher participation scales on e-decision making that involves collaboration between citizens and government in decision-making and e-empowerment that involves citizens in agenda-setting are yet to be explored in Kenya. County Governments in Kenya are yet to leverage on ICT to increase public participation, despite having e-participation in county strategic plans (Ndiege, 2020). Nyambura (2016) in a study on e-participation in Nairobi revealed that majority of respondents were not aware of e-platforms that allowed interaction with the government. Therefore, low take-up of e-participation is a concern. The digital divide in Kenya is also a potential threat to inclusive e-participation. Additionally, to utilize more advanced e-participation mechanisms such as e-consultation, e-decision making and e-empowerment, a certain level of digital literacy is required (UNDESA, 2020).

Given the high mobile subscription in Kenya and the low levels of digital literacy, an SMS based e-participation would be more impactful in the Kenyan context. At the start of the COVID-19 pandemic, the Government of Kenya utilized SMS for information sharing. Therefore, the potential of using the same technology to increase participation is high in Kenya. Civic education and creating awareness on the importance of participation is also critical for successful take-up and sustained use of the platforms (UNDESA, 2021).

South Korea uses a one-stop-shop communication system termed South Korea-e-People citizens' relation management platform (ACRC, 2015). This e-participation platform has integrated all government agencies' communication channels and is connected to portal websites of major government agencies. The features of this platform include a complaint filing system, "wasted budget reporting" for reporting on any inappropriate execution of government budget and a "whistle blowing function" (ACRC, 2015). The platform is also used for e-decision making and e-empowerment through the "People's Idea Box" function that allows citizens to share their ideas about public issues and the "e-People Policy Participation" function for collaborative and inclusive public policy making (ACRC, 2015).

South Korea is clear about the goals of its e-participation platforms and has increasingly strengthened communication with citizens by widening e-communication channels (Chung, 2015). It has been established that for e-participation initiatives to succeed, countries have to have clear objectives for e-participation and an understanding of what motivates stakeholders to engage with the government (UNDESA, 2020). South Korea has also developed the E-people Complaint Handling Guidelines that guide the filing of complaints and follow-up measures, including the outcomes of the complaints (ACRC, 2015). Globally, there have been concerns on whether feedback from e-participation is taken into consideration by bureaucrats (Le Blanc, 2020). Therefore, for e-participation initiatives to be successful, there is need to clearly define and publicize the process by which inputs and feedback from citizens will be considered (Asher et al., 2019). E-participation initiatives need to be linked with formal institutional processes so that the benefits of participation are realized (UNDESA, 2020).

## 6. Results and Discussions

### 6.1 Introduction

This was determined through panel data regression for three categories of countries namely High-Income Countries, Upper Middle-Income Countries and Lower Middle-Income Countries. The analysis for Low-Income Countries was not possible due to unavailability of data for the year 2010. Additionally, some countries were dropped off from the analysis due to unavailability of data for the E-government Index and Democracy Index.

### 6.2 Effect of E-Government and E-Participation on Government Effectiveness and Corruption

To determine the model to use between Random Effect Model (RE) and Fixed Effect Model (FE), the Hausman test was carried out for the three categories of countries. The results of the Hausman test for High-Income Countries showed that difference in coefficients was not systematic but failed to meet the asymptotic assumptions of the Hausman test, thus a pooled OLS was preferable. The results for upper middle-income countries was 0.862, therefore we fail to reject the null hypothesis; the Random Effects Model was preferred. Breusch and Pagan Lagrangian multiplier test for random effects was 0.00, and the RE was therefore preferred to pooled OLS. For the lower Middle-Income countries, it was 0.000, and the null hypothesis was therefore rejected, hence the Fixed Effects Model was the best fit model.

**Table 3: Regression results for the effect of e-government and e-participation on government effectiveness**

Income category	Number of Observations	Government Effectiveness Index	Coefficient
High Income Countries	220	E-Participation Index	0.480* (0.170)
		E-Government Index	3.376*** (0.470)
		Democracy Index	0.113*** (0.016)
		_cons	-1.872*** (0.231)

Upper middle-income countries	175	E-Participation Index	0.124 (0.079)
		E-Government Index	0.599** (0.268)
		Democracy Index	0.179*** (0.027)
		_cons	-1.489*** (0.207)
Lower middle-income countries	150	E-Participation Index	0.140 (0.090)
		E-Government Index	0.176 (0.320)
		Democracy Index	-0.065** (0.033)
		_cons	-0.217 (0.205)
*** p<0.01, ** p<0.05, * p<0.1; std error in parenthesis			

After controlling for time effects, the e-government development index was positive and significant at 1 per cent while the e-participation index was positive and significant at 10 per cent for high-income countries. For the upper middle-income countries, e-government development index was positive and significant at 5 per cent while e-participation index was positive but not significant. For the lower middle-income countries, E-government Development Index and E-participation Index were positive but not significant.

These findings corroborate with Chen et al (2019), Singh et al (2010) and Zhao et al (2015) who established that e-government had a positive effect on government effectiveness. The difference in the significance levels of the independent variables across the three categories of countries could perhaps be explained by the difference in the average scores of the E-government development index and E-participation index. The high-income countries had higher scores for both the E-government development index and E-participation index. This corroborates with observations made by UNDESA (2020) report that there is a positive correlation between the E-government development ranking and a country's income level (UNDESA, 2020). Additionally, the UNDESA reports noted that high-income countries had the highest prevalence of e-participation portals while lower-middle-income countries had the lowest prevalence of such portals, hence explaining the difference in the significance of the effects (UNDESA, 2020).

**Table 4: Regression results for the effect of e-government and e-participation on control of corruption**

Income category	Number of Observations	Control of corruption index	Coefficient
High Income Countries	220	E-Participation Index	0.679* (0.245)
		E-Government Index	4.504*** (0.680)
		Democracy Index	0.134*** (0.023)
		_cons	-2.782*** (0.334)
Upper middle-income countries	175	E-Participation Index	0.053 (0.070)
		E-Government Index	0.486** (0.237)
		Democracy Index	0.147*** (0.025)
		_cons	-1.411*** (0.193)
Lower middle-income countries	150	E-Participation Index	0.137** (0.084)
		E-Government Index	0.056 (0.299)
		Democracy Index	0.088*** (0.030)
		_cons	-1.083*** (0.192)
*** p<0.01, ** p<0.05, * p<0.1; std error in parenthesis			

After controlling for time effects, the findings show that e-government development index was positive and significant at 1 per cent while e-participation index was positive and significant at 10 per cent for high-income countries. For upper middle income countries, E-government Development Index was positive and significant at 5 per cent while e-participation was positive but not significant. E-government Development Index and E-participation Index were positive but not significant for lower middle-income countries.

These findings are similar to Alhammadi and Ahmed (2018), Nam (2018) and Chen et al (2019), who found that e-government had an effect on control of corruption. There was a difference in the significance levels of the independent variables across the three categories of countries. This can be explained by the disparities

in their income level and the different average scores for the components of EGDI and EPI index as indicated by summary statistics.

This difference corroborates with Nam (2018), who did a cross-country study and established that e-government had an effect on control of corruption but disparities in political, economic, and cultural conditions of countries moderated the effects. Bertot et al (2010) carried out a meta-analysis of e-government studies and established that e-government alone can have a limited effect on the reduction of multifaceted corruption because of varied political, social, institutional, and cultural conditions of countries.

The limited effect of e-government on control of corruption in lower middle-income countries can be explained by findings by Shah and Schater (2004), who found out that e-government has proven effective against petty bureaucratic corruption but not on political corruption, which are more grand in nature.

The E-participation index did not have a significant effect on control of corruption for middle-income countries when compared to high-income countries. This could be explained by Le Blanc (2020), who observed that there was rapid growth in e-participation in high-income countries, but developing countries faced barriers such as inadequate access to technology and limited digital skills. Moreover, the 2020 UNDESA report on UN E-government survey, observed that high-income economies offered more e-participation portals, with advanced search options, chats, and corruption flagging features than lower middle-income economies (UNDESA, 2020).



## **7. Conclusion and Policy Implications**

### **7.1 Conclusion**

Kenya's score on the components of E-government Development Index, namely Online Service Index, Telecommunication Infrastructure Index and Human Capital Index were low compared to the scores of aspirator countries used in this study. The Telecommunication Infrastructure Index (TII) measures the existing infrastructure that is required for citizens to participate in e-government was the lowest. The number of fixed Internet subscriptions, which forms part of the TII was found to be particularly low for Kenya at 1.25 subscriptions per 100 inhabitants. This can be attributed to the low number of people with desktop computers, laptops and tablets and Kenya's poor score on Internet affordability. Kenya can learn from Singapore's efforts to bridge the digital divide by providing cash subsidies to purchase personal computers and Internet access kiosks at community centres. However, mobile (SIM) penetration of 114 per cent as many people have more than one mobile accounted for 99 percent of data/Internet subscriptions. This provides an opportunity for Kenya to leverage on m-government while improving on telecommunication infrastructure.

Kenya's score on Online Service Index was higher than the scores for the other two components of the e-government development index. This can be attributed to the increasing number of public services that are offered digitally, and progressive policies on e-government and the initiatives. Kenya can learn from South Korea and Singapore on ways of ensuring that online public services are accessible to people living with disabilities and digitally marginalized. Kenya can also draw lessons from India on the successful rollout of digital IDs and can learn from Estonia on the provision of education and health services digitally.

Kenya also showed improvements on the e-participation index over the years as MDAs leveraged on social media and websites for e-information sharing. E-participation platforms for complaint filing and electronic relaying of information by some agencies have also contributed to the engagement of citizens digitally. Although Kenya has clear goals and objectives for e-government, the goals of e-participation are not explicit. Kenya can learn from South Korea on the implementation of a one-stop shop e-participation platform and the importance of having clear goals of e-participation. The high mobile phone ownership in Kenya offers an opportunity for the use of an SMS-based e-participation model that can complement the digital e-participation platforms.

E-government development index, and E-participation index were found to have positive effects on government effectiveness and control of corruption among High-Income countries, Upper Middle-Income countries and Lower

Middle-Income countries. The effects were significant for High-Income countries and Upper Middle-Income countries that had higher average scores for the components of the e-government development index. E-participation index was only significant for high-income countries. These results indicate that countries need to increase investments in e-government and e-participation to effectively increase government effectiveness and control corruption.

## **7.2 Policy Implications**

### ***To address the low scores on the telecommunication infrastructure index in Kenya***

Kenya needs to proactively increase access to fixed Internet by making Internet more affordable to citizens. There is also need to leverage on the high mobile subscription in the country and use m-government alongside e-government to ensure that citizens are not excluded from accessing e-services. M-government can involve the use of mobile applications that allow access to e-services that supplement and expand the conventional e-government or can be SMS-based that can be used offline.

### ***To address the issue of inclusive online service delivery in Kenya***

The online service index in Kenya is fairly high, but there is need to make the online services more accessible to people with visual disabilities. There is need for the Ministry of ICT to consider upgrading government websites to support assistive technology and haptic devices. The government also needs to consider the registration and issuance of digital IDs to more Kenyans to ensure faster and more efficient access to e-services.

### ***To improve Kenya's E-participation Index***

The government could consider developing more innovative e-participatory platforms in Kenya that would increase citizen interaction and engagement with the government, for instance, the use of a one-stop shop for e-participation that is integrated in all government agencies and ministries. There is also need to consider expanding the uses of e-participation platforms in Kenya to include e-decision making and e-empowerment, which includes the citizenry in public policy making process. The government could consider having clear goals and objectives for e-participation. It will be important for the government to consider publicizing the process by which public input is to be taken into account in decision-making, making the content of public contributions transparent and publicizing the impact of these contributions on the decisions made. The government could consider developing capacity within MDAs to manage participation processes.

The government could also consider adopting an SMS-based e-participation model to increase the number of users of e-participation platforms and reach the digitally marginalized.

***To increase the positive effects of e-government and e-participation on government effectiveness and control of corruption in lower middle-income countries***

Lower middle-income countries including Kenya need to continue investing in the three components that constitute the E-government Development Index. A context-oriented approach needs to be considered when designing e-government initiatives to ensure take-up and use of e-government services and e-participation platforms. Governments that have contexts similar to Kenya in Telecommunication Infrastructure Index and digital literacy could consider using m-government to supplement e-government.

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