A review of the status of e-government implementation in Kenya

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Abstract

Rationale of Study – Successful implementation of today's government operations requires effective policy making and system monitoring through relevant data and information. E-government offers an increased portfolio of public services in a cost-effective and efficient manner hence enabling governments to reinvent the ways through which they interact with citizens, private sector, employees and other stakeholders. Consequently, many countries have invested significant resources into collecting, processing, integrating, analysing and reporting data through information and communication technologies (ICTs). The aim of this paper is to review the status of e-government implementation in Kenya.

Methodology – In order to measure the status of e-government, two indexes were used: 1) E-government Development Index (EGDI); and 2) Network Readiness Index (NRI). The study adopted a theoretical approach by conducting a review of literature on e-government in Kenya. Fit-Viability theory was used to assess the capacity of the Government of Kenya to roll out viable e-services to its citizens.

Findings – The findings indicate that Kenya has made significant progress in e-government implementation. The benefits of e-government implementation in Kenya currently include enhanced e-participation, accountability, planning, monitoring and information sharing. However, challenges such as inadequate infrastructure, policy and human capital development hamper the effectiveness of e-government projects in Kenya. These challenges may be surmounted through increased digital inclusivity, enhanced broadband connectivity, strengthened staff ICT skills and openness to new technologies.

Implications – The findings of this study may be used by the Government of Kenya to plan, roll out and monitor e-government projects with a view to enhancing their success and impact.

Originality – A number of studies on e-government in Kenya exist. Their focus has been on the factors affecting the effective implementation of e-government in Kenya. Periodical assessment of the status of the projects is lacking. This study seeks to fill this gap.

Keywords

E-government; E-Government Assessment Schemes; E-Government Development Index; Network Readiness Index; Kenya

1 Introduction

Information and communication technologies (ICTs) currently offer increased opportunities for economic growth for developing countries. They are increasingly playing a critical role in facilitating rapid economic change anchored on improved productive capacity and international competitiveness for these countries. This way, ICTs have contributed greatly to the growth of gross domestic product (GDP) of the global economy. The global information technology report (2015) cites a positive correlation between a country's ICTs usage and its economic and social growth (Dutta, Geiger and Lanvin, 2015). To this end, governments are making investments ICTs in the public sector so as to improve the delivery of services online and enhance e-participation of citizens. Consequently, electronic government (e-government) initiatives have increased in developing countries such as Ghana, Senegal, Brazil, India, Chile, Argentina, the Philippines, and Malaysia, among others, where they are reaping the benefits of using ICTs in the delivery of public sector services (UN, 2014).

In Kenya, e-government initiatives are guided by the country's Vision 2030. This is a long-term development blueprint which is anchored on economic, social and political pillars. The economic pillar aims to ensure progression in important sectors such as environment, agriculture, health, education and water while the social pillar focuses on developing policies that will ensure equitable sharing of resources, justice and security. The political pillar endeavours to have a democratic political system that engages with its citizens in an open, transparent, accountable and ethical manner (GOK, 2007). Consequently, any e-government strategy in Kenya must endeavour to facilitate sustainable development by stimulating equitable economic growth; raise basic standards of living; and enable digital inclusivity and citizen empowerment (UN, 2014).

2 Rationale of Study

Technology acts as an enabler to achieving enhanced delivery of government services in an equitable, effective and transparent manner. Through e-government, most services are delivered through web platforms hence increasing the availability of online services. Advanced telecommunications infrastructure and skilled human resources are important in ensuring the success of e-government programmes. A facilitative regulatory framework is equally important as countries that enjoy successful deployment of online services usually have good ICT policies and strategies (Dutta, Geiger and Lanvin, 2015). Once e-government projects have been designed and implemented, it is critical to assess their progress regularly. Despite Kenya's

significant investments in e-government, little has been done to interrogate the performance of these projects.

Several studies have been conducted on e-government in Kenya. Some of these include an analysis of the factors hindering or promoting the successful implementation of e-government (Mungai, 2012; Wamoto, 2015); a review of the implementation of the bouquet of e-government services in e-Citizen (Ondego and Moturi, 2016); impact of e-government on public policy on technology adoption (Njuru, 2011; Gathungu and Mungai, 2014); implementation and integration frameworks (Maweu and Karani, 2014); and e-participation in e-governance (Omariba and Okebiro, 2015). However, there is less focus on the assessment of the status of e-government implementation in Kenya. The purpose of this paper therefore to fill this gap by assessing the capacity of the Government of Kenya to implement e-government projects. The paper also recommends strategies which may be applied to enhance the success levels of e-government projects in Kenya.

3 Research Methodology

This study was based on a comprehensive literature review of secondary sources including government policy documents published after the promulgation of the new Constitution of Kenya in August 2010. The focus was on literature assessing the development of e-government in Kenya in relation to its policy framework and the government's preparedness in rolling out e-government initiatives. The documents reviewed include the Kenya ICT Master Plan (2014), Ministry of ICT's Strategic Plan (2013-2017), Kenya Vision 2030 (2007); and the ICT Authority Strategic Plan (2013-2018).

The other documents reviewed included literature on the overall e-readiness of the Kenyan government in offering online services. These included the findings of the United Nations e-government surveys conducted in 2014 and 2016 as well as the Global Information Technology Report of 2015. The United Nations surveys applied the E-Government Development Index (EGDI) as a measurement tool while the Global Information Technology Report (2015) employed the Network Readiness Index (NRI) to assess the extent to which a government leverages digital technologies in provision of services.

4 Theoretical Framework

This study adopted the fit-viability theory in order to review the implementation of e-government in Kenya. Two dimensions of fit and viability were used to cross-examine the performance of e-government implementation in Kenya. The fit dimension looked at the suitability of the variety of online services in

relation to the vision of the government while the viability dimension interrogated the government's capability to offer services through e-government.

The fit-viability theory originated from a study by A.K. Tjan who evaluated the adoption of a range of online services based on the two concepts of fit and viability (Liang and Wei, 2004; Liang *et al*., 2007; Tjan, 2001). In his study, the fit dimension was used to measure how far new Internet technologies were consistent with the core competence, structure, value and culture of an organisation while the viability was used to measure the degree of an organisation's e-readiness (Liang *et al*.,2007). Figure 1 below illustrates the fit viability model:
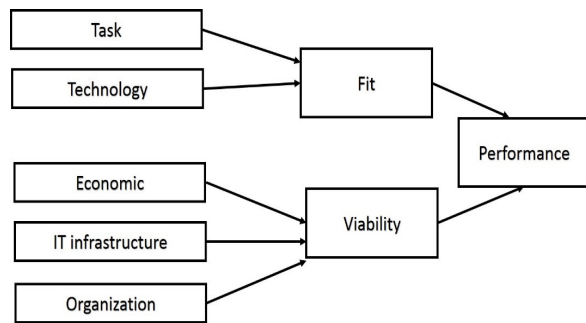

Figure 1: Fit Viability Model

Source: Liang et al., 2007

In the context of this study, the fit-viability theory was applied to assess the performance of e-government projects in Kenya with a focus on their implementation. As mentioned earlier, literature review uncovered two indices that were used to measure both the fit and viability

components proposed in the theory. These were the E-government Development Index (EGDI) and Network Readiness Index (NRI).

The EGDI was used to track the progress of e-government implementation. This index examines a variety of e-government features to check their practicality in disseminating public services in an equitable, effective, accountable and transparent manner. EGDI assesses the availability of online services, e-participation, collaborative governance, multi channel mix, digital divide, e-government usage and open government data initiatives.

The fit component evaluated the e-readiness of a country to offer online services. A recent report by the global information technology (Dutta, Geiger and Lanvin, 2015) employs the Network Readiness Index (NRI), a tool that was designed to measure the environment, readiness, usage and socio-economic impact of technologies used by countries for sustainable development. The environment sub-index examines the political, legal and business environments while the readiness sub-index examines the infrastructure, affordability and skills. Ease of usage at an individual, business and government level and socio-economic impact form the pillars of the latter sub-indices. The conceptual framework below (Figure 2) represents an adaptation of the fit-viability
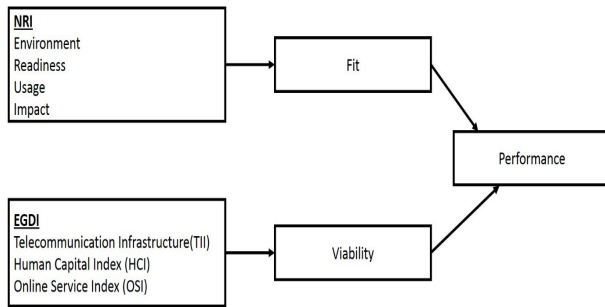
model infused with the EGDI and NRI components.

NRI
Environment
Readiness
Usage
Impact

Fit

Performance

EGDI
Telecommunication Infrastructure(TII)
Human Capital Index (HCI)
Online Service Index (OSI)

Viability

Figure 2: E-government fit-viability conceptual framework

Source: Research Data

In order to assess the likelihood of success or failure in Internet initiatives, the fit-viability theory proposes a two-dimensional strategic matrix with fit and viability components as illustrated in Figure 3.
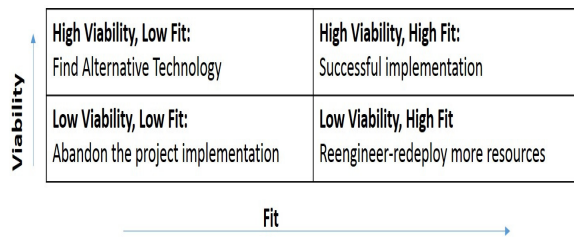

High Viability, Low Fit:	High Viability, High Fit:
Find Alternative Technology	Successful implementation
Low Viability, Low Fit:	Low Viability, High Fit
Abandon the project implementation	Reengineer-redeploy more resources

Viability

Fit

Figure 3: Fit-Viability Strategic Matrix

Source: Liang and Wei (2004)

Successful deployment of an e-government project requires a high score in both fit and viability components. If a high viability and low fit score is attained then the best strategy is to look for an alternative technology while a low viability and low fit would mean one abandons the project implementation. However, a low viability and high fit score suggests a reengineering of the institution by redeploying more resources to succeed in the implementation (Liang *et al.*, 2007).

5 Literature Review

This section contains a review of assessment schemes used to measure the status of e-government implementation of countries. These tools are used to determine the progress made in the implementation of e-government initiatives.

Various definitions of e-government exist in literature. Kumar and Best (2006) define e-government as the utilisation of ICTs by a government in its delivery of services. A much broader definition adopted in the study is the application of ICT within government, between governments and citizens, and between government and businesses to transform the efficiency and effectiveness of services rendered (World Bank, 2002). A more recent definition offered by World Bank (2015) defines e-government as the use of ICTs by governments to deliver services to their citizens thereby strengthening their performance by improving citizen participation; improving relations between government and businesses; and increasing transparency. E-government includes electronic interactions of three types: government to government (G2G); government

to business (G2B); and government to citizen (G2C). On the other hand, according to Lofstedt (2005), e-government should not only be about online service delivery by governments but about enhancing government processes through digital tools in order to bring a transformation in the economic, social and political development of a country.

Several e-government assessment schemes have been developed by scholars, government institutions as well as international bodies to measure the capacity for governments to disseminate online services. Some of these are discussed hereunder.

5.1 United Nations E-government Maturity Model

The United Nations (2012) model is used to rank the maturity levels of government websites of member states. It has four stages. The first stage is emerging services level. In this stage, the government websites serve to offer static information about the government. The second stage is enhanced information services where websites provide a two-way communication. Apart from email services, useful information can be downloaded and information searched through a search engine. The third stage is the transactional services where interaction with citizens is possible and users can be able to make online payments for services rendered. The final stage is the

connected services where all services are linked through a single portal and the web portal can be personalised according to the needs of the citizen.

5.2 E-Government Development Index (EGDI)

The EGDI measures the status of progress made by governments in dissemination of online services to its citizens (UN, 2014). It offers a tool that aids governments to gauge their global positions and benchmark using universal best practices. The index is a weighted average of three components: Telecommunication Infrastructure Index (TII); Human Capital Index (HCI); and Online Services Index (OSI).

(i) Telecommunication Infrastructure Index (TII)

TII is a measure of Internet users, fixed telephone subscriptions, mobile subscribers, fixed and wireless broadband subscriptions according to data obtained from International Telecommunication Union (ITU) (Dutta, Geiger and Lanvin, 2015). A successful e-government implementation will require the population to be online in order to access services.

(ii) Human Capital Index (HCI)

HCI evaluates the level of literacy skills that citizens possess. This is important because a successful e-government implementation will depend on a literate population to access its online services.

(iii) Online Service Index (OSI)

OSI is a measure of the number of features offered through online services including open data initiatives and citizen participation channels. According to United Nations e-government surveys (2014 and 2016), 193 UN member countries were evaluated using the following indicators:

Availability of online services

Online services like access to content, online payments, search systems, feedback mechanisms, tax filing, registration of businesses and data sharing are accessed through a website. Interactivity with government increases with increase of online services.

E-Participation

There is a paradigm shift of citizens from passive recipients of information to active producers of information (Lofstedt, 2005). Citizens are empowered and motivated to participate in public policy development and decision making. Citizens are encouraged to give their public opinion through the use of emails, short message texts (SMS) and social media.

Collaborative governance

The indicator assesses the government's ability to share data in innovative online services and inculcate trust, transparency and accountability mechanisms in its service delivery. Government institutions share data and make investments in infrastructure and towards enhancing skills in their personnel.

Availability of multichannel mix

The world is moving towards the use of technologies in ubiquitous ways where information can be accessed "anytime anywhere". Services can be rendered through mobile phones, social media, and open access facilities like local digital centres among other initiatives.

Digital divide

The technological era has resulted in digital exclusion of some vulnerable groups such as the physically challenged members of the society, those living in the rural areas, the aged and the illiterate. E-government initiatives are assessed on the innovative use of digital tools and applications that would seek to include these disadvantaged groups of people.

E-government usage

The ability to develop user friendly interfaces that are easy to use, tracking and monitoring tools, feedback mechanisms and collaborative systems help to increase the level of usage by both citizens, business community, foreign investors as well as public service officers.

Open government data initiatives

In accordance with a citizen's right to information, the open government data portals enable end-users locate data sets about sectors like education, health, agriculture, finance, social welfare and environment. This results to improved public policy making and informed publications.

5.3 Network Readiness Index (NRI)

The NRI is a tool that measures the capacity of countries to leverage ICTs for increased competitiveness and well-being. A country's e-readiness is evaluated to check if the technology fits in the vision and core objectives. In order to examine if the technology is suitable for the country, the NRI uses four sub-indices: environment, readiness, usage and impact. In environment, indicators in political, legal, business and innovation environment are used while in readiness indicators include infrastructure, affordability and skills. A country's infrastructural development is evaluated through indicators like mobile network coverage, International Internet bandwidth, secured servers and electricity provision. Usage looks at individual, business and government capacity to use ICT. The economic and social impact part of the impact sub-index that uses indicators such as the impact on poverty alleviation through cost reduction of services rendered, economic growth through innovations, and level of civil participation among others. The NRI score is based on an aggregated score of these indicators and is normally out of 7. In 2015, 143 countries from all over the world participated (Dutta, Geiger and Lanvin, 2015).

6 Findings and Discussions

An analysis of two surveys (UN, 2014; UN, 2016) and a global IT report (Dutta, Geiger and Lanvin, 2015) was carried out in order to assess the performance of e-government implementation in Kenya using fit and viability dimensions. EGDI examined the progress made in e-government implementation and this represented the viability dimension while NRI examined whether the environment was conducive for successful e-government implementation hence representing the fit dimension.

The findings revealed that Kenya had an EGDI of 0.4186 out of 1 and was placed at position 119 out of 193 countries. The NRI examined the suitability of e-government initiatives in Kenya and its findings revealed an NRI of 3.8 out of 7.0 ranking the country at position 86 out of 143 countries. The overall findings suggest that the Government of Kenya has made significant progress in creating an enabling environment for the uptake of its online services. However, more resources need to be deployed to ensure that citizens get access to these services.

6.1 Fit Dimension

The NRI examined the environment in Kenya and its suitability to implement e-government. E-government initiatives should strive to enhance a country's core vision. The quality of a country's operational environment affects greatly the success of e-government services. The Government of Kenya has undertaken various initiatives to ensure public services are delivered effectively and efficiently to citizens and other stakeholders.

Kenya's new constitution, promulgated in 2010, guarantees every citizen the right to have access to information held by the state (GOK, 2010). It is with this spirit that the government established the Information Communication and Technology Authority (ICTA) with a mandate to manage all ICT initiatives within government. The Kenya National ICT Master Plan (ICTA, 2014) has been developed with the mandate of ensuring Kenya transitions to a knowledge-based society by providing policies that would ensure universal access to public information safely through portals. It is this strategic plan that has facilitated the liberalisation of the ICT sector under the Foreign Direct Investment Initiative (FDI). The liberalisation of the sector has in turn created an environment conducive for foreign investment hence spurring growth in the telecommunications sector. According to the quarterly sector report by the Communications Authority of Kenya (2017), in the period between October and December 2016, Kenya had recorded 38.9 million mobile subscribers representing a mobile penetration level of 88.2%; and had 39.6 million Internet users representating a penetration level of 89.7% (CAK, 2017). Kenya has embraced high mobile penetration rate within its population which has had an impact in the way it uses mobile phone applications to reach out to citizens (ICTA, 2014). The establishment of Kenya Internet Exchange Point in 2002 saw the increase of Internet penetration. Furthermore, the rollout of National Optic Fibre Backbone Infrastructure and four undersea fibre cables namely TEAMS, EASSy, LION and SEACOM, have provided high capacity broadband connectivity to government agencies, national and regional institutions, commercial service providers and citizens (ICTA, 2014). According to the United Nations e-government survey (2014), most mobile phone subscribers in Kenya use this device to get connected to the Internet and as such the government can benefit greatly by interacting with citizens through services like short messaging service (SMS). In order to improve e-government usage, Kenya has focused on providing a "one-stop, non-stop e-government services" (ICTA, 2014) that will ease how individuals and firms to conduct business with the government.

Through the Huduma Kenya Initiative, the Government of Kenya has set up digital centres in major counties called Huduma centres with an aim of transforming public service into a professional and customer-cantered public service. At the Huduma centres, the citizens can access public services and information from one single location. These services include renewal of business and driving licenses, submission of online tax returns, search and registration of business names and welfare groups, reporting of public complaints, student loan application and repayment services, issuance of police abstracts, online tracking of passport and identification issuance among others. Huduma centres are coordinated by the Ministry of Devolution and Planning through the Huduma Kenya Secretariat (Ng'aru and Wafula, 2015).

Table 1 gives a breakdown of the results of Kenya's NRI performance. The impact of e-government initiatives in social and economic fronts was favourable at position 51 out of 143 countries. This was attributed to the use of innovative products like MPESA and PostaPay, which are money transfer systems, in implementing online payment mechanisms. The use of such money transfer systems has greatly reduced the cost of transacting with the government hence raising the basic living standards. Further, the use of mobile phones was a contributing factor that has led to the

bridging the digital divide since more people who have access to mobile phones can access online government services. According to the findings (Dutta, Geiger and Lanvin, 2015), Kenya was ranked position 72 in the environment index and 83 in its usage of government services by citizens, business community and within government. In e-readiness the country's infrastructural development, affordability of services and capacity of users' skills was evaluated and ranked at position 107 out of 143. The skills readiness score was 4.1 out of 7 at position 100 out of 143 member countries while the infrastructure readiness had a score of 3.1 at position 94 out of 143 countries and affordability readiness had a score of 4.1 and was ranked at position 106 out of 143 countries.

Table 1: Network Readiness Index in Kenya

Element Measured	Rank (out of 143 countries)	NRI (out of 7.0)
Kenya's overall NRI	86	3.8
Environment	72	3.9
Readiness	107	3.8
Usage	83	3.6
Impact	51	4.0

Source: Dutta, Geiger and Lanvin (2015)

6.2 Viability

The EGDI examined the progress made in e-government implementation against three

determinants namely telecommunication infrastructure, human capital and online services. According to the United Nations e-government survey (UN, 2014), Kenya performed dismally with an EGDI of 0.1612 out of 1. There was no significant improvement in 2016 with an EGDI of 0.1808. This was attributed to the low score in access to the Internet via fixed or wireless broadband connections. Most Kenyans access the Internet using mobile phones. Table 2 summarises these scores.

Table 2- Telecommunication Infrastructure Index score in Kenya

Component	Score
Overall TII score	0.1612 out of 1
% of individuals using the Internet	32.10
Fixed telephone subscriptions per 100 inhabitants	0.58
Mobile cellular telephone subscriptions per 100 inhabitants	71.17
Fixed (wired) broadband subscriptions per 100 inhabitants	0.10
Wireless broadband subscriptions per 100 inhabitants	2.22

Source: United Nations (2014, 2016)

Under the human capital category, Table 3 shows Kenya had an average EGDI score of 0.5. However, there was a slight drop of the human capital index score between 2014 and 2016. Kenya performed averagely in ensuring the availability of human capital that possesses requisite skills to take advantage of and deliver e-government services.

Table 3: E-government Development Index in Kenya

Component	EGDI (out of 1.0)	
	2014	**2016**
Kenya's overall EGDI	0.3805	0.4186
Telecommunication Infrastructure Index (TII)	0.1612	0.1808
Human Capital Index (HCI)	0.5552	0.5169
Online Services Index (OSI)	0.4252	0.558
E-participation	0.6471	0.5254

Source: United Nations (2014, 2016)

According to a report from the United Nations Development Programme (UNDP) on online service development (UNDP, 2002), Kenya with other countries in Africa such as Namibia, Mozambique, Tanzania, Uganda, Zambia and

Zimbabwe were in the second stage (enhanced stage) whereby websites have content, which is dynamic and specialised such as government registrations that are frequently updated. The findings further revealed that South Africa was the only country in Africa that was moving to the transactional stage where governments have secure transactions such as obtaining visa, passports, death records, licenses and permits online. No African country was found to have a fully integrated and seamless website. However, by 2014, Kenya had made significant progress in the implementation of e-government services (UN, 2014). All African countries lost in comparative performance around the world, except for Kenya and Morocco where Kenya gained in world ranking from position 124 (2010) to 119 (2014) out of 193 UN member states with an overall EGDI of 0.3805.

Kenya had performed well in e-participation and this was attributed to the use of mobile phones. Citizens make use of their mobile phones and social media to engage the government in discussions concerning public policies and governance. The launching of open government data initiative also helped to enhance Kenya's ranking in the global scale. This initiative was launched in July 2011 to disseminate key government data to the public through a single online portal,

www.opendata.go.ke. Through this portal services such as census information, government budget allocations and information on key public services are provided (UN, 2014).

7 Implications of the Study

Kenya has created an enabling political, legal and business environment that is suitable for the implementation of this e-government. This has increased its competitiveness in the global arena. A high score in the NRI impact component implies that the implementation of e-government has led to the realisation of benefits such as reduction of bureaucracy, round the clock accessibility of services, fast and convenient transactions, increased transparency and accountability, improved staff productivity and easy flow of information (World Bank, 2015). Kenyans are active participants and they engage the government online as indicated by the high score in e-participation index of EGDI (UN, 2014). However, this engagement is majorly through mobile phones. Inadequate ICT infrastructure like broadband connectivity and high Internet connectivity costs coupled with shortage of highly skilled ICT professionals are the major setbacks to the implementation of e-government. Moreover, there has been a great disparity between the urban and rural areas. Most e-government projects like Huduma centres have been concentrated in the urban

settings thereby denying citizens in the rural settings access to these services. The focus of rolling out e-government projects needs to be on devolving services to the local level. According to Lofstedt (2005), there exists a group of people in the rural areas who are disenfranchised as they lack skills and infrastructure to access online services offered by the government.

In light of these challenges, it is recommended that:

(i) The government needs to roll out more e-government initiatives at the local level so as to increase digital inclusivity and encourage more people to interact with the government through online services. Digital inclusivity should empower the physically challenged, women, youth, illiterate citizens, people in the lower income level and the old to participate in online activities offered by the government. Additional Huduma centres should be opened at the county level in order to reach more citizens.

(ii) The government should develop policies that promote collaboration and communication between government ministries, departments and agencies. This will discourage departments from working in isolation.

(iii) The government should seek innovative ways of reducing the cost of ICT equipment and Internet connectivity through measures such as duty waiver or outsourcing equipment. Also, improving Internet connectivity down at the county levels and enhancing the rural electrification programme will enable citizens living in the rural areas to enjoy online services from the government. A policy should be developed to ensure all central government departments and county offices are connected to the Internet using high-speed broadband connections. The government should also set up digital hubs and WiFi hotspots in the villages to encourage the use of the Internet. This will encourage video streaming and the use of social media which are useful tools of interaction.

(iv) The government should look into ways of enhancing the skills of its staff on a continuous basis due to the rapid technological changes in the ICT environment. The government should come up with more ICT literacy programmes to educate the public on the services available online in order to improve on their usage.

(v)   Online services should be improved by adding more user-friendly features. E-government initiatives should take advantage of new technologies in social media, cloud computing and mobile phone technological advancements to disseminate online services.

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