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Behind the Miles of Digitalizing Public Sectors via Information CommunicationTechnology: Applications from Local Government Perspectives

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Abstract

This study has explained the rationalesbehind the miles of digitalizing public sectors via information communication technology application from local government perspectives based on evidences collected from Gedeo zone administration, Southern Nations Nationalities and Peoples Regional State of Ethiopia. Mixed research methods (quantitative approach; that is, coefficient &multiple linear regression model, and qualitative approach; that is, key informant interview and observation) were applied. The study found predicting variables, namely, information communication technology infrastructures, institutional capacity, and perceptions/attitudes and demographic factors of local residents have positive relationship with digitalizing of local government. The study also identified absence of clear roadmap of applying information communication technology and building digital economy at local levels. This indicated that poor understanding of digital economy for creating smart societies and smart business, leadership constraints at local constitutes and digital illiteracy appear to be major contributing factors for failed digital connectivity and renovate ICT platforms of public services at grassroots level. Based on the findings, the study recommends the local government implement in public sectors integrated (national and local; inter and intra sectorial) information communication technology and digital platforms which both identify the role of federal, regional and local governments concisely. To solve digital illiteracy, building digital economy should be given due attention with formulation of ICT policy competing with ever-changing technology and digital society nowadays.

Keywords: Digital Economy; Digital Consumerism; Local Government; Public Service and ICT

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Introduction

The development of Information Communication Technology (ICT) plays a prominent role in realizing of public sector reform through aspirations of government relationship with various stakeholders. It also facilitates the creation of decent global public services in order to provide reliable and trusted services with different options, and thereby to achieve national as well as local government policy objectives (Nath, 2003).A growing number of national and local governments are setting up ICT policies aimed at putting services online automating administrative processes and interacting with their citizens.Digital services and tools have become an important part of human lives and they

determine citizens' success in the present and future. Digital connectivity and technology-driven service deliveries will lead to introduce new changes of public service deliveries, inject new behaviors, provide new opportunities and improve public and governance service delivery at large (Kitaw, 2006; Maddens, 2016; Yang, 2017; Kiflie&Filmon, 2019). ICT and digital economy platforms are of paramount importance to improve public service qualities. It has been noted that ICT is fundamental to bring about public sector reform, offer a variety of possibilities for efficient and effective public administration, and to ride over the bureaucratic tenets of centralization andbreak up lengthy hierarchical complexities (Guma, 2013; Kiflie, 2017).

Nowadays, digital economy has been considered as front of public sector transformation both at federal and local government contexts where cases of maladministration and corruption are inextricably linked with administration's operational shortcomings in providing quick efficient/effective public services delivery (Maddens, 2016). Digital economy is the digitalization of socioeconomic activities (production, distribution, and consumption of goods/services) of a given society by digitalizing main production factors using information communication technology platforms to create knowledge-based society as the basis of policy decision and digital consumerism (US Department of Commerce, 1999; Kim *et al*., 2014).

Delays in processing citizens' request may be caused by public servants, but usually are the result of the complexity and inflexibility of the bureaucratic machinery; however, such problems can be effectively solved through ICTtransformation tool. More importantly, digital public services have been considered as devices for emergence of smart cities, smart local government public service delivery, and smart societies of digital consumerism (Egessa and Musau, 2016; LCE, 2017), and they have greatly benefitted people, businesses, and government organizations in social and economic terms (Egessa and Musau, 2016). Digital consumerism has led to the expansion of a number of digital service providers with multiple choices via single stop service center (Logicalis, 2014; Maddens, 2016; Kiflie, 2017).

E-government and digital services contributes for local government (integrating and interoperating inside local administration, between local administration and local constituents residents), national level (working together basedon interoperability between local and federal administration economically),

international level (international co-operation based on interoperability between local authorities and correspondent constituents) as well too connected together (Mauher and Smokvina, UD;LCE, 2017).The advent of the information age and its acceleration effect on globalization are leading the world to a new economic order driven by information and knowledge based economies. Many African countries are facing new challenges as a result of the emerging information age. The introduction of digital access and E-government has brought about a new trajectory in the world countries, particularly in developing countries, towards building sustainable knowledge-based economies and fostering up digital business at the grass root level (Kolsaker and Kelley, 2008; Hikwa and Maisiri, 2014).

In developing country context, governments are seen crucial in strengthening the performance of public administration through applying ICT renovation in public sectors. This is also a common trend in Sub-Saharan African countries where governments are more responsible that the public sectors to modernize and transform public services with the reaming technological pole. In this regard, it has been stated that digital governance has contributed a lot to solve administrative problems, enhanceservice qualities, improve statistical and information processes, finance management systems in line with global public administration scenarios (Nath, 2003; Schuppan, 2009).Sectorial collaboration and interoperability has led to the growth of digital collaborative economy and E-government platforms mounted to quality services, innovation and growth, and new paradigm of public service delivery(Maddens, 2016; Worku, 2017). Likewise, United Nations General Assembly Resolution titled as "*The Future We Want***"** stated the following:

The goal of sustainable development is to ensure the promotion of an economically, socially and environmentally sustainable future planet and for present and future generations. Sustainable development emphasizes a holistic, equitable and far-sighted approach in decision-making at all levels. It rests on integration and a balanced consideration of social, economic and environmental goals and objectives in both public and private decision-making. It emphasizes intergenerational and intergenerational equity.

According to UN (2016) and Maddens (2016), information communication technology platforms are at the core of UN

sustainable development goals success. For example, UN goal three states the need to ensure healthy lives and promote wellbeing for all at all ages by creating pollution free living via paper free public service deliver. Goal four requires ensuring inclusive and equitable quality education and promoting lifelong learning opportunities by creating E-learning and digital education platforms accessible to all digital literates, Goal nine states the need to build resilient infrastructure, promote inclusive and sustainable industrialization and innovation by enabling individuals to use their technologically innovative skills. Goal seventeen also aspires to strengthen and revitalize the global partnership by providing opportunities of interoperability service deliveries and collaboration of different stakeholders using the information communication technology platforms. Moreover, the Ethiopian government information communication technology policy stated that the government shall actively collaborate with the private sector, civil society organizations and communities to promote and encourage the use of ICT towards transforming Ethiopia to a knowledge and information age to connect with digital world (MCIT, 2018).

Nowadays, we live in a connected society where digital platforms, such as mobile, broadband internet services, digital media and cloud computing are transforming the fabric of smart societies. While, the Internet of everything is a dominant topic of interest to policy makers and regulators, billions are still unconnected, and this affects their ability to participate in the digital economy socially, financially, and economically (Maddens, 2016). In this regard, Isabel and Bailoa (2016); Rahman (2010); Logicalis (2014); Yang (2017) argue that regardless of great opportunities offered by ICT specifically E-government platforms, application, potency, and precision for public sectors' transformation of those platforms remain underutilized. Especially, digital governance continues uncharted scenario in developing economies in terms of implementing digital platforms at the local governance system. This problem may be attributed to local governments' lack of proper incentives, shortage of adequate resources, absence of satisfactory management and skills, and poor standardized framework of public service delivery.

Previous studies had little attempt to investigate the rationale behind why local governments failed to get connected via the technological confluence. This was the motivation for the present study. It has been noted that little research has been devoted

to investigating implementation of E-government platform in Ethiopia as the management of the digital platform service has hitherto been limited to the federal government (Worku, 2017). In this light, the present study focused on investigating implementation of digital platforms at the local government level, particularly in Gedeo Administrative Zone of Southern Nations Nationalities and Peoples Regional State of Ethiopia. The study had thus the objectives stated below.

1. To assess the reason(s) for the local government's failure to implement digital government platforms.
2. To examine the association between the local government environments and digitalizing local government public service delivery.
3. To explore the digital public sector delivery systems vis-à-vis the local government readiness of adoption.

Methods and Materials

The study was explanatory research type to explain the cause and effect relationship between study variables using an inductive research philosophy which begins with the problem at hand, and then proposes research objectives or questions followed by data collection and evidences to draw conclusions based on the evidences. In doing so, the study explainedobservable situations and/or certain behaviors of phenomenon then sought answers to why and how by identifying causal factors and outcomes of study variables. Primary data were collected from four *woredas* and one city administration of Gedeo Zone.

Gedeo zone is found 369 km from Addis Ababa, Ethiopia, to south on Addis Ababa-Moyale international road and 90 km from Hawassa (capital city of the regional state). Gedeo zone lies approximately between 50 53'N to 60 27'N Latitude and from 380 8' to 380 30' East, Longitude with the total areas of 1,210.89 square kilometers (CSA, 2014). The zone is bounded by the Sidama zone of the Southern Nations and Nationalities and Peoples Regional State (SNNPRS) to the north and the Borana and Guji zone of the Oromia Regional State to the south, east and west. Dilla, is the capital of the zone and its constituents are six *woredas* and two city council administrations.

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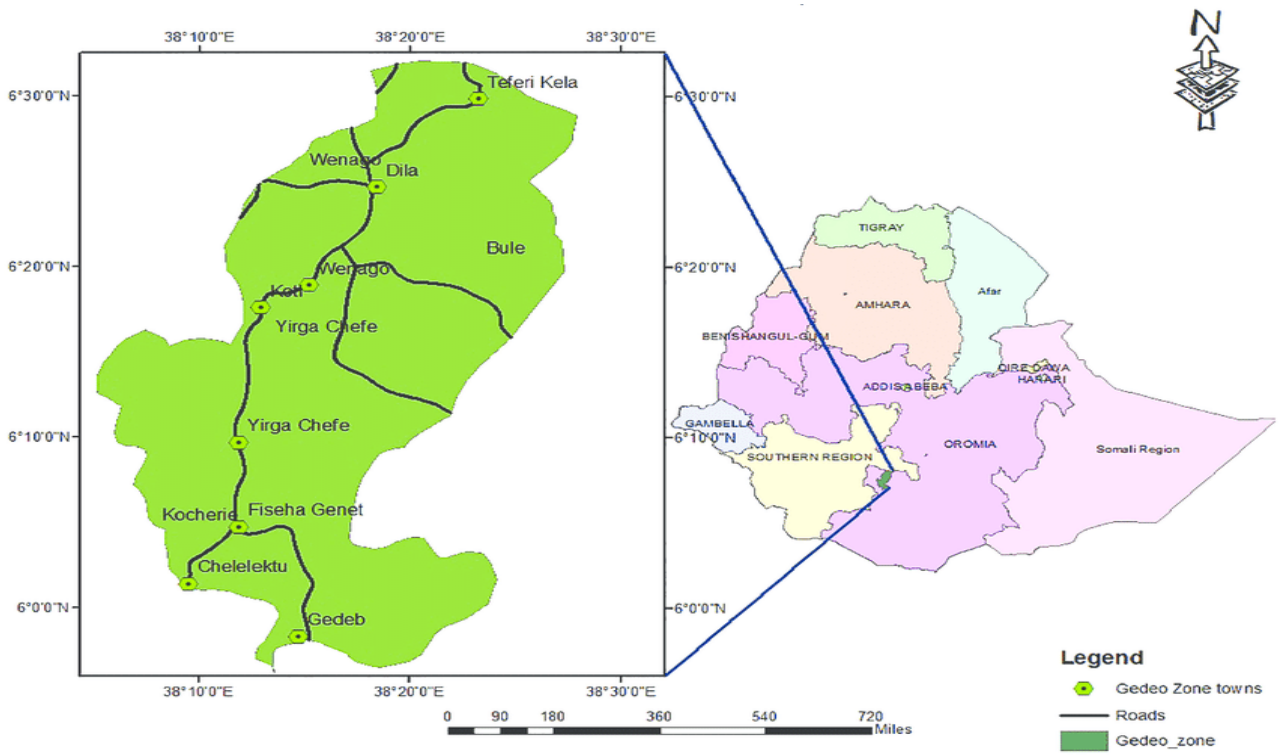
Map of the Study Area



Source: Dilla Town Administration Office (2019

Primary data were collected through survey questionnaires from four *woredas* and civil servants one town administration. Primary data were also gathered through hold interview with team leaders and senior experts and observing the existing service delivery modalities of public sectors.

In order to determine the sample size for this study, Yamane's (1967) formula was used as shown below.

$$n = \frac{N}{1+N(e)^2} \text{ ---------- (1)}$$

Where,

n = the sample size to be determined

N = the total study population

e = precision level or error at 95% confidence interval, the researcher will use e = 0.09

$$n = \frac{7710}{1 + 7700(0.09)^2} = 122$$

The total sample size of the study was (n=122). All the 122 participants involved in the survey study. Proportional techniques of study participants were allocated to the four *woredas* and one city council using (Kothari, 2004) proportional formula as shown below.

$$nx = \frac{Nx.n}{N} - - - - - - - - - (2)$$

Where

nx- sample size in x woreda

n - Estimated final sample size

Nx– Total number of civil servants x woreda

N – Total number of civil servants of the Zone

A total of 106(87%) questionnaires were returned and 97 questionnaires were entered into Statistical Package for Social Sciences (SPSS) software and used for analysis. Quantitative data analyses were performed to examine the relationships between (independent and dependent) variables. For this, Pearson Correlation and multiple regression analyses models were used as shown below.

The model specification used in the studywas:

$$\gamma = \beta_{0+}\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \ldots\ldots (3)$$

Where

Y= Digitalizing Local Government Public Sectors (Dependent Variable)

β= Beta values at each Independent Variables

$X_{1=}$ Perceptions/attitudes

$X_{2=}$ Demographic factors

$X_{3=}$ Institutional Capacities

$X_{4=}$ ICT Infrastructures

e= error terms

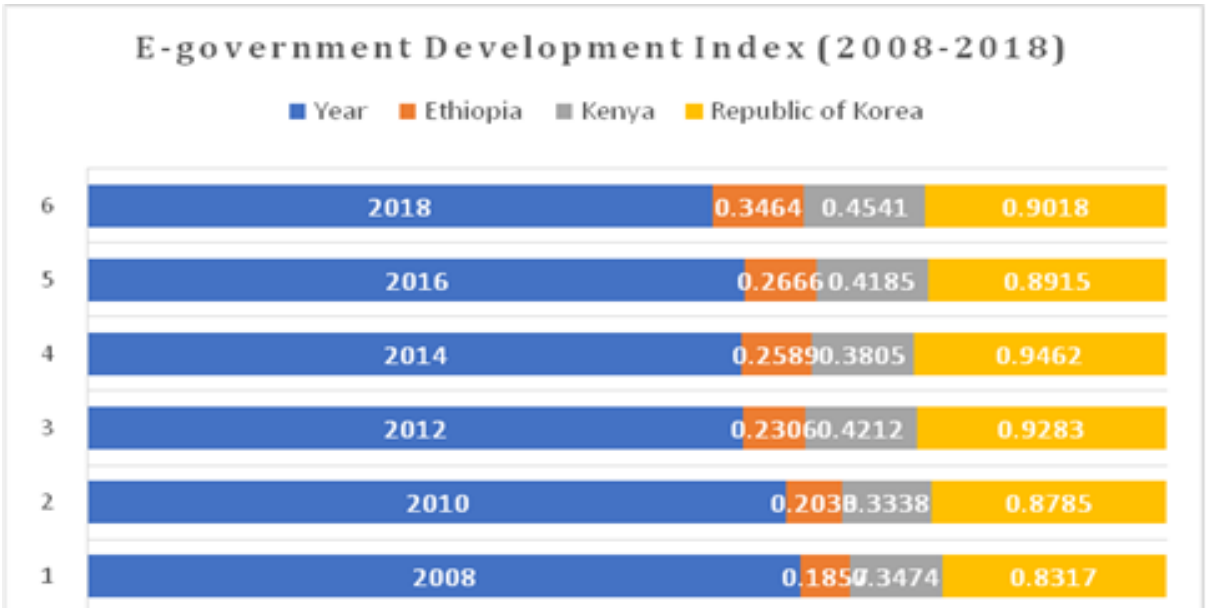
Digitalizing local government was the dependent variable measured by E-business (government communicate with business societies), E-government (government communicate with local residents), E-services (local government service provision using digital media), and E-administration (local government communicate with inter &intra public sectors). And, ICT infrastructures, institutional capacity, demographic factors and perceptions/ attitudes were theexplanatory variables used to explain the digitalizationof local government public sectors. Moreover, qualitative data were analyzed using thematic analysis and triangulated with the quantitative data scrutinized.

Results and Discussions

The government of Ethiopia has launched the total of 219 E-services identified and prioritized for implementation using different platforms (29 E-agricultural, 18 E-trade, 14 E-health, 13 E-education 25 E-court, 11 E-passport, 62 E-municipality). Generally, 79 informational and 140 transactional systems (that is a total of 219 E-services) were designed by different platforms (Kiflie, 2017). The government has designed specific E-government strategies with four key objectives: (1) to bring the government closer to the people, (2) to improving public service delivery, (3) to facilitate effective governance, and (4) to speed up socio-economic growth of the country through collaborative, interactive and interoperability through deployment of digital governance (MCIT, 2011).

The government of Ethiopia has made remarkable contributions of digital service delivery by launching #888 toll free central call center of public sectors in order to enable them to provide information necessary to maximize citizens'/customers' satisfaction. For example, some of the digital service delivery achievements registered in public sectors are document authentication and registration agency (online Electronic Queue Management System (EQMS), portal office (DARIS), mail exchanges, electronic time keeper /E-attendance/, online registration of attorney services, and system based selling activities (car, share, house, building) and DARA one-room shop services, online trade registration, licensing system and changing business licenses (Ministry of Trade), E-visa and E-passport (Ministry of Foreign Affairs), and Mobile-agriculture (Ministry of Agriculture (Kiflie, 2017; Alemayehu, 2018).

According to the United Nations Report (2019), global E-government development indexes measured by the overall digital development indicators values between (0= minimum and 1= maximum). In doing so, republic of Korean ranked as (1st) the world leading country by digital governance, our neighbor country Kenya is ranked (122nd) and Ethiopia is also ranked (157th) of 190 countries. As the 10 years (2008-2018) digital development journey displayed in the graph below, Ethiopia has achieved remarkable progresses. However, as Ethiopia compared with the neighboring countries such as Kenya and Republic of South Korea, it is far away from the global digital development scene.



Source: United Nations E-government Knowledgebase Data (2019)

Empirical Result Analysis

The analysis of empirical results started with running regression coefficient model as shown in Table below. This analysis established evidence for values of local government environments and explained digitalizing local government, based on observations conducted on the practice of digitalizing local government, the linear relationship with local government environments (ICT infrastructures, demographic factors, institutional capacity and perceptions/attitudes).

The association has shown statistically significant to explain digitalizing local government public sector and sectorial transformation by institutional capacities 0.430 (43%) at 95% confidence interval p-value < 0.001, ICT infrastructures at 0.286 (28.6%) at 95% confidence interval p-value < 0.001, demographic factors 0.151 (15.1%) at 95% confidence interval p-value < 0.05 and perceptions/attitudes 0.144 (14.4%) valid with at 0.05 (95%) confidence interval and p-value < 0.05.

Table (1) Coefficient Result of Local Government Environment Variables on Digitalizing of Local Government

Models	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.294	.417		.705	.483		
ICT infrastructures	.269	.062	.286	4.325	.000	.147	6.814
Demographic factor	.150	.063	.151	2.376	.020	.159	6.303
Institutional Capacities	.436	.090	.430	4.837	.000	.081	12.331
Perceptions and attitudes	.145	.055	.144	2.640	.010	.215	4.646

a. Dependent Variable: Digitalizing Local Government
b. Independent Variables: ICT infrastructures, Demographic factors, Institutional Capacities and Perceptions/attitudes

Table (2) Model Summary of Local Government Environment Variables on Digitalizing Local Government

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.970[a]	.942	.939	1.235	.942	367.851	4	91	.000
a. Predictors: (Constant), : ICT infrastructures, Demographic factors, Institutional Capacities and Perceptions/attitudes									
b. Dependent Variable: Digitalizing Local Government									

Source: Own Survey (2018)

The overall association between digitalizing local government and local government environments (ICT infrastructures, demographic factors, institutional capacities and perceptions/attitudes) has shown with the adjusted **R^2** value of 0.939 (93.9%) at0.05 (95%) confidence interval where p-value < 0.001 (table-2, above). The association ofdemographic factors (digital illiteracy, old aged and somehow gender, tribunal local people languages, poverty, culture, and digital divide) have potentially hampering digitalizing local government spectrum. ICT infrastructures (computer hardware and software configuration, data centers, hubs and routers, accessories, telecom facilities and database management) have significant contribution on local government digitalization. Again, the study found that the institutional capacities (availabilities of legal framework, public sector documentation systems, uneven reform implementation, readiness to adopt ICT advent, centralization and lengthy hierarchical procedures, leadership commitment, strategic initiatives, staff/expert compositions, poor awareness on digital consumerism, and political orientation) of local government play a paramount role to digital local government and sectorial transformation.

Al Athmay (2013) provided evidence that the usage government website by citizens is not only determined by the interoperability, functionality, trust, reliability and resourcefulness of the websites, but also the perceptions of citizens toward the e-government services might be influenced

by the demographic characteristics and citizens who use e-government and have internet access to file applications or using e-services in their work(UN, 2016; Kolsaker& Kelley, 2008).Based on the evidences triangulated through qualitative and quantitative data, citizens/customers and digital consumers perceptions/attitudes are the major contributing factors for digitalizing local government, ICT acceptance model (perceived usefulness and ease of use, accessibility, willingness to listen to citizens, representing citizens' views, closeness to citizens, and approachability, value/importance of using, trust/privacy. Thus, digital consumerism at local contexts of Gedeo zone is undermined not only by the local resident (business communities & peoples), but also by public sectors themselves, sectorial managers, civil servants and even by IT experts. This has evidenced by (MCIT, 2018), the ICT policy objectives and policy outputs are quite different.

Creating and developing digital society and citizens, enabling them adapting to digital devices and the Internet using e-services is a challenging task for public sectors at local government level. Meanwhile, the evolution of technologies has simplified e-services procedures to the point that people can handle the operations with efforts to access public services will familiarize themselves with digital economy (Yang, 2017;Maddens, 2016;Isabel andBailoa, 2016) reported that that public sectors to use technology for public governance requires coherent and strategic planning of policies for the availability of digital technologies in all areas and at all levels of public administration as well as the framework whereby digital skills can be enhanced across local business societies and residents. Globally, lack of awareness is currently holding back usage in some local areas, underdeveloped ICT infrastructures, institutional capacities/ readiness constraints, socio-economic conditions of societies, and demographic factors of residents have significant correlation with digitalizing local government operation (Rodousakis, 2008; Connolly et al, 2008; Schwester, 2009).

As the key informants indicated, local government leadership and civil servants lacks to understand the national E-government and ICT policy/ and they don't pay considerable readiness to build digital economy regardless, Ethiopian government has given due attention by Growth and Transformational Plan (GTP) with a clear vision. The digitalization has significantly influenced by awareness of new e-services, behavioral intention to use, satisfaction

levels, and culture to e-services, socio-economic factors, and demographic scenarios are the crucial factors, and institutional capacities as well. Therefore, local government digital consumerism and public sectors transformation are far miles not from global digital economy but also from the national context of Ethiopia.

The persistent prevalence of old traditional tendencies is not only an indication but also a statement of the challenge that e-government practice in Africa faces particularly at grassroots/local government. This, arguably resonates with the fact that only *less* than one third of public-sector reforms attempted in Africa achieve satisfactory outcomes (Guma, 2013; Worku, 2017). Most importantly, understanding of local needs and conditions of the countries and/or societies as the imperative of local needs in implementing digital initiatives cannot be understated. In other words, it should be borne in mind that conditions will be different in any local context and that there is no standard ICT performance that cuts across broad of localities.

Conclusion and Recommendations

It should be noted that better implementation of local digital services and utilization of ICT-assisted services are important totransform the accessibility, quality, and cost effectiveness of public services and to revitalize relationshipsamong businesses, customers/ citizens and government. Planned digital government and appropriate use of ICT at the local level can enhance economic and social development via networked and interactive channels for efficient, transparent, responsive, and accountable public services delivery. The emerging smart societies and cities, and living conditions and knowledge-based economy are all more highly influenced by digital government development at the grass root level than the central government, as local governments are closer to the citizens. From this perspective, Gedeo Administration Zone, which is the research setting of the present study, is far from reaching to the emerging digital economy due to impeding factors,such as underdeveloped ICT infrastructures, poor institutional capacities, demographic problems (related to business, citizens and residents), and poor perceptions/attitudes of digital consumers to the digital connectivity and digital economies of 21st century.

Therefore, a clear roadmap is necessary for identifying the role of the federal government in implementing national digital governance policy, building ICT infrastructures, establishing digital literacy

centers, empowering regional governments to implement digital service delivery within their contexts.It is important that in order for local governments to implement digital platforms, they should realize the importance of making sustained human capital investments to fix digital illiteracy and improve institutional capacities and readiness. Moreover, local government leaders should view that ICT and digital platforms should be brought primarily at the development and implementation phases of sectorial transformation in comprehensive and dynamic E-government applications where technology is ever changing.Finally, more research is needed on the topic under study as ICT is increasingly supporting *government* activities in response to *service delivery* challenges currently underpinning developing countries, like Ethiopia.

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