

## Evaluating Digital Public Services: a contingency value approach within three ‘exemplar’ sub-Saharan developing countries.

### ABSTRACT

This paper considers recent field evidence to analyse what online public services citizens need, explores potential citizen subsidy of these specific services and investigates where resources should be invested in terms of media accessibility. We explore these from a citizen-centric affordability perspective within three ‘exemplar’ developing countries in sub-Saharan Africa. The World Bank and United Nations in particular promote initiatives under the ‘Information and Communication Technologies for Development’ (ICT4D) to stress the relevance of e-Government as a way to ensure development and reduce poverty. We adopt a ‘Contingency Value’ method to conceptually outline reported citizens willingness to pay for digital public services. Hence, our focus is mainly upon an empirical investigation through extensive fieldwork in the context of sub-Saharan Africa. A substantive survey was conducted in the respective cities of Addis Ababa (Ethiopia), Lagos (Nigeria) and Johannesburg (South Africa). The sample of citizens was drawn from each respective Chamber of Commerce database for Ethiopia and South Africa, and for Nigeria a purchased database of businesses, based on stratified random sampling. These were randomly identified from both sectors ensuring all locations were covered with a total sample size of 1,297 respondents. It was found, in particular, that citizens were willing to pay to be able to access digital public services and that amounts of fees they were willing to pay varied depending on what services they wish to access and what devices they use (PCs or mobile phones).

**Keywords:** E-government, contingent valuation method, developing countries, citizen-centric, cost benefit

### Introduction

It is frequently argued that digital services have the potential to improve economic and societal conditions globally (Gregor et al., 2014). In particular, the opportunities to deploy and generate greater productivity gains and benefits for organisations in developing countries (Indjikian and Siegel, 2005; Overå, 2006). Aligning themselves with this view, organisations such as the World Bank and United Nations have been promoting initiatives under the ‘Information and Communication Technologies for Development’ (ICT4D) to stress the relevance of e-Government as a way to promote development and reduce poverty (Schuppan, 2009).

Despite benefits of e-government, its adoption has been slow (Ahmad et al., 2013; Al-Hujran et al, 2015; Carter et al. 2016; Kumar & Best, 2006; Lee et al., 2011), and in some cases those projects ended in failure (Elkadi, 2013, Heeks, 2003; Kumar & Best, 2006). Critics claim that many digital service initiatives in developing countries suffer from what Heeks (2003) calls a design-reality gap leading to failed e-government projects. E-Government projects fail because they focus too much on and are driven by the supply of technological solutions rather than the demand by local citizens (Walsham et al. 2007). Many of the discussions around e-Government in Africa, are driven by strategy papers and documents emerging from various donor organisations such as the UN and World Bank (Schuppan, 2009). There is a need therefore to revise “the treatment of intended indigenous beneficiaries of ICT4D projects ... and the framing of ICT4D in addressing problems (Njihia & Merali 2013, p901). It is not clear from the perspective of the citizens whether using digital online

public services is something they want, need, or will benefit them. There is a clear implication that government needs to know what citizens want from e-Government services before implementing any e-Government projects. Services need customising to meet citizens' unique and diverse requests in order to ensure successful e-Government provision (Colesca and Dobrica, 2008).

Our research aims to address this gap between e-government provision and citizen demand through a citizen-focused, contingency value approach, to understand what it is that the citizens want from e-Government service providers, explore potential citizen subsidy of these public services and how best this can be delivered by drawing on quantitative primary data collected from over 1297 citizens in three sub-Saharan African countries; Ethiopia in the East, Nigeria in the West, and South Africa. The paper includes a review of the literature focusing on e-Government services, implementation and benefits. This is followed by the methodology used for this quantitative empirical study and summary of findings. We conclude with solutions and recommendations of the study for policy makers and e-Government researchers.

### **Citizen-Centric Approach to e-Government**

E-government is the application and utilisation of information communication technologies (ICT) in the public sector for its effective delivery of operations and services (Alzahrani et al. 2017; Bélanger & Carter, 2008; Carter & Bélanger, 2005; Carter & Weerakkody, 2008; Kumar & Best, 2006) whilst enhancing transparency and accountability of informational transactions within and among governments (Al-Hujran et al., 2015; Cater & Bélanger, 2004), bridging the gap between citizens and their government (Bwalya, 2009), empowering and benefiting citizens and business through access to and use of information (Al-Hujran et al., 2015; Cater & Bélanger, 2004). E-government is considered to be particularly important as it can bring about higher levels of public sector transparency and accountability, reduced corruption and inequality, increased inclusiveness and provide more effective systems and services (Dwivedi et al, 2006; Gregor et al, 2014; Kumar & Best, 2006; UN, 2016). It provides further benefits including, allowing users to save time and money thereby avoiding physically visiting offices (Kumar & Best, 2006), providing 24/7 timely services (Dwivedi et al, 2006), reducing paper work and its related expenses, and enhancing accuracy of information provided/transaction (Alomari et al., 2014).

Many governments strive for a citizen-centric approach to e-Government services but have fallen short of achieving this objective (Reddick, 2010; van Velsen et al. 2009). According to Heeks (2003), most e-Government projects in developing countries ended in failure with 35% being classified as 'total failures' (e-government project was not implemented or was implemented but immediately abandoned) and 50% as 'partial failures' (projects' major goals were not achieved and/or there were significant undesirable outcomes.).

In an ethnographic study of a Taiwanese ICT4D project, intended to improve the education and welfare of aboriginal people, what ostensibly was reported as very successful and touted as an exemplar for similar projects, was found by researchers to be a story of marginalisation and exclusion of the aboriginal people. Lin et al. (2015) concluded that any real progress and development intended by the technology driven initiatives were being hampered by the postcolonial socio-political context. Another longitudinal study in India found that the introduction of Internet kiosks at local villages achieved initial successes of significantly reducing cost and time required for citizens to obtain certain services from their local government. However, the project ended in failure over time due to transferring of existing staff members with right skills to deal with their online requests without subsequently

appointing staff members with the equivalent skills and general resistance among officials against reducing ‘opportunities’ for bribes (Kumar & Best, 2006). Yet another longitudinal study observed the similar pattern of initial success of reducing the number of administrative steps, but corruption which is ‘inherent’ in staff values ‘fights the e-government back, since it contradicts with the staff interest’ (Elkadi, 2013, p171). Consequently, a few years later, the system stopped working as effectively as it did initially due to lack of institutional structure to manage such hunger for bribes (Elkadi, 2013). These examples suggest that various factors make project focuses shift from ensuring satisfaction of end users to managing immediate incidents, resulting in dissatisfaction among users and failures of projects (Janssen et al., 2013).

There is increasing scepticism about the active support that certain projects and schemes gain despite the failure of many of these projects and a lack of sustainable and replicable success in different contexts (Chaudhuri, 2012). Focusing particularly on specific e-Government, Chaudhuri (2012) further suggests that the self-interest of stakeholders in the eco-system that surrounds development projects and promotion schemes in developing countries (namely local and national government agencies, international organisations such as the World Bank and UN, technology vendors) builds a bubble of hyperbole and promise that has not been comprehensively or objectively assessed or realised, i.e.;

*“CT4D schemes<sup>1</sup> open up new avenues of expansion for government bureaucracies, for international organizations and NGOs to showcase their activities, for consultants to peddle their expertise, and for commercial vendors to hawk their products and services. Even academic researchers gain through publications, networking opportunities at conferences and seminars and consulting assignments sponsored by corporations, government departments and sundry organizations with deep pockets and interest in development. (Chaudhuri, 2012, p.333)*

The context specific and selective cases and success stories of schemes and projects generates a naïve optimism that drives policy which advocates e-Government as a means of creating efficiency gains, when in reality the policy is imposing a ‘primitive economic system’, which might have an adverse effect even adding an extra layer of complexity and inefficiency (Chaudhuri, 2012). In order to deliver successful e-Government projects, it is imperative for practitioners to understand the specific context within which they are operating (Dada, 2006) and set clear visions and objectives of the project prior to the implementation (Al-Azri et al., 2010). Especially for African countries, it is important to adopt a context-specific approach taking into account institutional, cultural and wider administrative contexts, when considering implementation of e-government and be aware of the potential unintended effects of transferring e-Government solutions and relating organisational concepts from developed to developing countries (Schuppan, 2009). There is also evidence to suggest that low income developing countries have tended to invest more in core government administration systems, such as customs, tax and finance and less in transactional government to citizen/business services, for instance online filing of taxes and e-services portals (World Bank, 2016).

Furthermore, much of the research on ICT4D has tended to be interpretive (Walsham et al. 2007; Lin et al. 2015) and largely case based, and there is a call by scholars to engage with wider definitions of development and different levels of analysis. Realising the benefits attributed to implementing e-Government, in whichever socio-economic context, has an underpinning expectation that the public services being implemented in reality do address the needs and requirements of the citizens. Governments need to know what citizens want from

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<sup>1</sup> “Information and Communication Technologies for Development”

e-Government in order to develop citizen-centred e-Government services, (Bertot & Jaeger, 2008). Ultimately, with citizens being the primary and most important stakeholder of e-Government, their satisfaction plays a central role in the potential ‘success’ of the frequent and recurrent use of public e-services by citizens (Osman et al., 2014). Indeed, one of the major factors leading to the unsuccessful e-government adoption is lack of user support and involvement in the project implementation as key stakeholders (Imamoglu and Sitki, 2008; Luk, 2009; Tan et al., 2007). Lack of stakeholder involvement could lead to resentment among them, turning them into resistance force, resulting in the failure of e-government projects (Luk, 2009). Despite the significant role of stakeholders in the project, little is known about the potential relationship between the e-government adoption as the outcome and stakeholder involvement in the project as the influencing factor (Janssen, et al. 2013; Luk, 2009). Researchers must first concentrate on identifying needs of citizens and prioritising them according to the magnitude of benefits with service requirements matching the characteristics of the technological alternatives (Chaudhuri, 2012). By adopting a citizen-centric approach for our empirical study of e-Government, we propose the following essential research question: ‘What online public services need to be developed to benefit citizens, one of the key stakeholders, in each of the different African contexts?’ This is an important issue we intend to address in our research.

Admittedly, a citizen–centric approach to e-Government is resource intensive, expensive and a complex process (Ojha et al. 2012; van Velsen et al. 2009). ‘The elicitation of user requirements takes time’ as these need to be identified, analysed, documented, specified and validated and then integrated in the whole design, engineering and development process (van Velsen et al. 2009). However, if e-Government services are not used by citizens, it will not only be costly, but any attempts to subsequently correct or alter the implemented system will require even greater investment, providing less functionalities (Bertot & Jaeger, 2008; Janssen, 2013). An under-utilised e-Government service results in a low return on investment of public funds (which incorporates citizen use) and will become more difficult to sustain in the future (Ojha et al. 2012). Consequently, in the long term, the benefits to citizens and civic society will ultimately outweigh the costs.

### **E-government: contingency value for citizens**

We adopt a contingency value approach to estimate the value a citizen may place on a service. The contingent valuation method, which was first coined by Ciriacy-Wantrup (1947) and developed by Davis in 1963, is an evaluation technique to obtain how much value customers (citizens) would place on public goods and/or services based on economic theory and survey research methods (Mitchell & Carson, 1989). This is typically used in cost-benefit analysis studies to measure the value of non-market goods mostly in environmental, healthcare and traffic safety studies (Venkatachalam, 2004; Poel et al. 2016). More recently, it has been used in studies related to assessing the value of cultural experiences, such as concert halls and museums (Armbrecht, 2014) and also digital technologies, for instance to determine users’ tolerance of spam e-mail (Yoo et al. 2006), e-Government services demand (Chen and Thurmaier, 2008) and electronic invoicing (Poel et al. 2016). Essentially, ‘value’ is a trade-off between a user’s time and effort costs and the benefits perceived by them (Ojha et al. 2012; Gagliardi et al, 2017). Chen and Thurmaier (2008) found that citizen-businesses are likely to pay for online e-government if the relative costs of time and resources required to complete the transaction are less online than through the traditional channel. They reported that the demand for a specific online service is measured both by the desire for a service and by a willingness to pay for that service. They concluded that firms are willing to pay a charge for an e-service if it is of benefit to them. For those firms where online services are of no benefit, no matter if they are more convenient and lower cost, the firms are most unlikely to

use them (Chen and Thurmaier, 2008). Few studies have examined user charges for adoption of a digital service and even fewer in the context of e-Government (Shariful Islam et al., 2012). Research has shown that value for money is linked to an individual's behavioural intention to use an online service, even in the context of a developing country, i.e., Indian public railway e-ticketing system (Ojha et al., 2012). Here we use a citizen's willingness-to-pay for a service as a means of gauging the degree for its demand.

Furthermore, the problem of financing digital services is one of the most significant barriers to the development and advancement of e-Government (Johnson, 2007). Charging users for public services is not new, for instance renewal fees for identification documents and licenses. However, charging a 'convenience fee' with the implication that there is an extra charge for online transactions is new, and government officials are hesitant in imposing additional charges for online services (Johnson, 2007). The implications of such charges for losing the digital divide, especially in developing countries where socio-economic inequalities are magnified, are significant. Johnson (2007) argues that such convenience charges actually improve equity so long as the online service is not mandated and that there is an alternative channel for accessing that service which does not impose a convenience fee. He reasons that while non-users are not forced to fully subsidise users, they also help officials gauge citizen preferences and estimate demand for online services. Such user charges can also have an overall trickle down social benefit that can reduce congestion, which improves the "traditional" cost free channel, reduces overcrowding, increases satisfaction and overall usage. "[A]s more people become comfortable with using web portals, and more services are put online, the benefits from individual online usage will spill over to all of society; for example by reducing the digital divide and/or making government more constituent-centric" (Johnson, 2007, p488). Chen and Thurmaier (2008) discuss spill-over effects in terms of social externalities. Based on data collected from firms, they argue that the greater benefits a specific firm enjoy from e-government services, the higher charges the firm should be prepared to pay for such services. On the other hand, e-government services that generate higher social externalities thereby benefiting a wider community (e.g. reducing congestion cost; reducing waiting time) should be subsidised accordingly by governments. Applying this theory, our research investigates how much convenience fees citizens would be willing to pay for e-government services of high or low social externalities.

Our focus is therefore on citizens who might be willing to pay convenience fees for accessing online public services. If they demonstrate a willingness to pay for e-services of higher/lower social externalities, the implications for development of public services for the benefit of citizens are clear. Thus the aim of this research is to (i) understand what online public services need to be prioritised for economically active citizens; (ii) potentially explore citizen subsidy of these specific public services, and (iii) investigate where resources should be invested in terms of media/devices (PCs and mobile phones) to access online services. It is not the intention of this paper to advocate an enterprise approach to e-government policy, but rather to try and consolidate our understanding of citizen demand of public e-services and the potential value of these services to respective citizens. To our knowledge there is very limited empirical research which adopts a contingent valuation method to investigate these three research questions within the context of e-government in developing countries.

## **Research Context and Methodology**

### *Data Collection Strategy*

The research focused on three exemplar sub-Saharan African countries based on population size and geographic distribution: Nigeria, in West Africa is the most populous country with over 185 million people; Ethiopia in East Africa is another populous country with over 102

million people; and South Africa in the South with a population over 56 million and the largest economy in Africa (2016 estimates; The World Bank, 2018b). In addition to their high population share, the first two countries are chosen on the assumption that they represent low and middle-income countries while South Africa is assumed to represent high income countries. Despite poverty, Ethiopia, along with South Africa, is categorised as 'high' in the United Nation's Online Service Index (OSI), and Nigeria as 'middle' while no African countries are not listed as 'very high' in the OSI (UN, 2016). This juxtaposition of poverty and fair performance in the OSI of the two countries provide interesting research opportunity as successful penetration of e-government could bring out further economic development for the countries. Further, comparing citizens' attitudes toward e-government in these countries with that of South Africa, the largest economy in the continent with a 'high' OSI performance, will enable our research to make a unique contribution within e-government.

Since public sectors in African countries are generally large and manage a substantial share of development resources, the allocation and use of these resources can significantly influence the pace and pattern of growth where the widespread introduction of public e-services could potentially have an extensive impact. However, one of the major problems is ensuring that the online public services being developed and deployed are relevant, appropriate and realise the expected benefits. In developing countries where resources are scarce, the investment in and use of public e-services is vitally important. Africa, as an example, is the world's second largest and second most populous continent with over 1 billion inhabitants accounting for nearly 15% of the world's population.

In 2016, all 193 member states of the United Nations reported a national website (or basic e-government presence), with 90 of these nations (including over 50 developing countries) providing a 'one-stop' public service platform for citizens to access an array of online public services; 148 countries providing at least one form of online transactional service; 100 countries providing search features, 98 requiring digital ID and 71 countries providing online tracking systems, and 141 providing security features (such as https or digital certificates) (UN, 2016). So, while some countries, both developed and developing, are capitalising on the benefits that digital technologies can provide, there remains a huge gap in the UN e-government development index and most African countries and the rest of the world (UN, 2016) including developing countries in Asia. Although sub regions within Africa vary in terms of e-government exploitation, with the most developed (according to the UN E-Government Readiness Index, (UN, 2010)) being Northern Africa (0.3692) followed by Southern Africa (0.3505), East Africa (0.2782), Middle Africa (0.2603) and Western Africa (0.2156) lagging behind the world average of over 0.5, these regional trends remain largely unchanged in 2016 (UN, 2016) which is ostensibly problematic for the future development of e-government in these nations.

Pick & Nishida (2015) examined technology utilisation at the country level to understand the impact of socio-economic determinants and geographical agglomerations or clustering. Levels of technology utilisation were found to be impacted by social, economic, government and societal openness factors. The study also found spatial autocorrelation within regions, where socio-economic determinants explained national geographic agglomerations of similar technology levels in major world regions. For Africa the most significant determinants of technology utilisation were found to be higher/tertiary education, press freedom (government control of communication and knowledge) and FDI (foreign direct investment). For Asia, tertiary education followed by FDI and innovation most significantly impacted technology utilisation compared to Europe where judicial independence and governance quality including control of corruption, regulation and free flow of information and capacity for innovation were more important for increased utilisation of technology. The implications of

this study are consistent with that of others, that advocate there is no one size fits all, but rather that a nation's government policies need to be tailored to the distinctive factors that apply for that nation's region and area. Thus, for developing nations, and Africa in particular, government policies should focus on higher education quality and enrolments, support for greater societal openness and FDI friendly policies (Pick & Nashida, 2015) to increase utilisation of technology. The major issue therefore, is to ensure that the right technology and public e-services being provided are compatible with the requirements of the individual nation states and their citizens to ensure a return on investment in e-Government for national development and social engagement.

A survey was conducted in the respective cities of Addis Ababa (Ethiopia), Lagos (Nigeria) and Johannesburg (South Africa) over a 3-month period (June to August). The sample of citizens was drawn from each respective city's Chamber of Commerce database for Ethiopia and South Africa, and for Nigeria a purchased database of businesses, based on stratified random sampling. Samples were randomly identified from both sectors ensuring all locations within the city were covered. The sampling frame concentrated on economically active citizens that had Internet or computer skills, as our aim was to garner the views of those that have some experience of and use the Internet and/or e-services. The total sample size from all the three countries was 1,297, with 482 responses from Addis Ababa, 411 from Lagos and 404 from the city of Johannesburg. The survey instrument took around 20 to 30 minutes to complete and was collected in person by local enumerators to ensure completion of the whole questionnaire. All respondents were guaranteed confidentiality and anonymity. Respondent demographic profiles are summarised in Table 1 and the profile of their internet use is summarised in Table 2.

<b>Demographic Profile of Respondents</b>	<b>Ethiopia N= 482</b>	<b>Nigeria N=411</b>	<b>South Africa N=404</b>
Average Age (years)	38	35	32
Standard Deviation	10	7	9
Level of Educational Attainment (Graduates)	79%	70%	43%
Gender (male)	68%	74%	63%
Average family income (£)	298	726	1700
Per capita Income (2010) (£)	237	737	3812
Private sector employees	55%	75%	67%
Managerial roles (incl. business owners)	50%	76%	42%

**Table 1:** Demographic Profile of Respondents

<b>Internet Use Profile of Respondents</b>	<b>Ethiopia</b>	<b>Nigeria</b>	<b>South Africa</b>
Computer ownership	69%	79%	74%
Mobile phone ownership	100%	100%	99%
Internet Use	95%	100%	93%
Use of Mobile to access the Internet	42%	82%	74%
Home Internet access	36%	75%	67%
Access to the Internet via Internet café	18%	18%	6.5%
Access to the Internet at work	50%	3%	11%
<i>Frequency of Internet use:</i>			
Daily	71%	87%	84%
Once or more a week	16%	11%	7%
Once or more a month	4%	2%	1%

Never	5%	0.2%	7%
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**Table 2.** Internet Use Profile of Respondents

In addition to demographic information, respondents were also asked about their use of digital services including mobile devices and the Internet, and their experiences of ‘traditional’ public services.

A series of bi-variate tests were conducted in order to identify statistically significant differences in respondents’ online usage and their current experience with off-line public services. Statistically significant differences in respondents’ willingness to pay in terms of average convenience fees were also conducted to evaluate the differences in responses between access of e-services via PCs and mobile phones. Because the data of fees and salaries were not normally distributed, non-parametric tests were also used in the analysis.

*Contingent Valuation Approach*

For the second part of the survey, a contingent valuation approach was adopted. Here, we evaluate the ‘value’ of e-Government services to our citizens in each of the respective countries following Chen and Thurmaier (2008) citing Portney 1994 (Chen and Thurmaier 2008, p544). The contingent valuation approach enables respondents to have a choice between two different quantities of public goods; one with the existing level of the good against the alternative that entails a higher cost (Carson, 2000). Respondents were given a ‘specific and realistic’ scenario or description to ensure reliability of results (Hanemann, 1994 cited in Chen and Thurmaier, 2008; Venkatachalam, 2004). In this instance, the benefits related to e-government were collated from the literature with additional information captured from local citizens after piloting the survey, such as experiencing long queues, travelling to multi-locations and making unofficial payments for accessing public services to include contextual specifics. The benefits identified were saving time, convenience (related to reducing travel to various offices and being able to access digital services anywhere and anytime), avoiding queues, monitoring application progress, reducing loss of documents and mistakes and avoiding unofficial payments to get a quicker service.

The scenario of e-Government presented to respondents were based on a description of these benefits, and respondents were asked to identify the public services they would most like to have delivered online. To obtain a preliminary guess about the WTP (willingness to pay) distribution, a pilot survey with open-ended questions was conducted which directly asked individuals the maximum amount of money they are willing to pay for the improved e-services. Bearing this in mind, each respondent was then asked to report the maximum amount of convenience fee they would pay for the potential online service using PCs and mobile phones. The elicitation mechanism in this instance was open-ended questions (e.g. what is the maximum amount of convenience fee you are willing to pay for access to public services online?). The amount they were willing to pay were converted into British Pounds from each respective currency for ease of comparison.

In order to help policy makers decide on appropriate amounts of convenience fees, social externalities along with the contingent valuation approach should be utilised (Ojha et al., 2012). Following this proposal, the level of social externalities of these e-services was then assessed. Most critically, within our research, degrees of externalities were determined by how popular online services were – the higher demand citizens exhibited for e-services, the higher externalities those e-services entail. Conversely, if the demand is low, the potential spill-over effects are also considered to be small and localised, leading to low social externalities. The binary levels of social externalities (high/low) are indicated in Table 4A



and 4B. We chose those e-services which at least rounded 10% of respondents opted for are seen as e-services of 'high' social externalities whilst e-services below the threshold are categorised as services of 'low' social externalities.

## Outline Findings

### *Demographics*

There is no official demographic data available for employees in terms of sector based on position (managerial/non-managerial) and access to computer and the Internet for each city. However, as our respondents all have some degree of ICT skills/knowledge they are assumed to be far above the national average. For example, in our sample, computer ownership is 68% in Ethiopia, 72% in South Africa and 79% in Nigeria. However, the national average for these countries is 0.2% for Ethiopia, 5% for Nigeria and 14.8% for South Africa. In terms of gender, in the first instance, it appears that female citizens are under-represented in our sample as the gender proportion for the City of Addis Ababa is 48% male and 52% female, the proportion of females in the sample is 32%, which is similar in the case of Nigeria (26%) and South Africa (37%). However, since our sample includes only economically active citizens, the proportion of economically active females that participate in the labour market is comparatively low in all countries, and the gender profile of our sample is consistent with the economically active population. In respect of respondents' annual earnings and household incomes, South African respondents marked the highest averages (£12,545 for earning, and £15,273 for household income in terms of the median) followed by Nigeria (£4,560 and £6,000) and Ethiopia (£1,843 and £2,786). These figures are significantly higher than the national average earnings of: £4,272 for South Africa, £1,066 for Nigeria, and £243 for Ethiopia.

### *Digital Device Usage*

The majority (70-80%) of respondents in our study owned personal computers. More than nine out of ten respondents had used the Internet across the three countries, with a large majority (70-87%) accessing the Internet daily. Turning to mobile phones, nearly all our respondents owned mobile phones across all countries. This is against the national average where only 22.3% and 66.8% respectively had mobile phone subscriptions in Ethiopia and Nigeria (The World Bank, 2018a). On the other hand, in South Africa, on average, people had more than one mobile phone subscription (The World Bank, 2018a)<sup>2</sup>. This suggests that our Ethiopian and Nigerian respondents were from cohorts with high mobile phone ownership, whereas our South African respondents were not as equipped with mobile phones as its own population. We see some large variation by country in terms of accessing the Internet through mobile phones; where 70-80% of respondents had accessed the Internet through mobile phones in South Africa and Nigeria, less than half of Ethiopian respondents had done so.

The major reason for not being able to own a computer was mainly due to the high cost; in particular, for more than 80% of respondents from Ethiopia, followed by 64% of Nigerian and 40% of South African respondents ( $\chi^2(2) = 51.155, p < .001, V = .39$ ). Maintaining computers including consumables is also seen as a barrier among some respondents (32%) in Nigeria, but this appears not to affect respondents from the remaining two countries (0.7% from Ethiopia and 6.7% from South Africa) ( $\chi^2(2) = 60.471, p < .001, V = .42$ ). Access to computers is also problematic for one in two (51%) Nigerian respondents; however, this

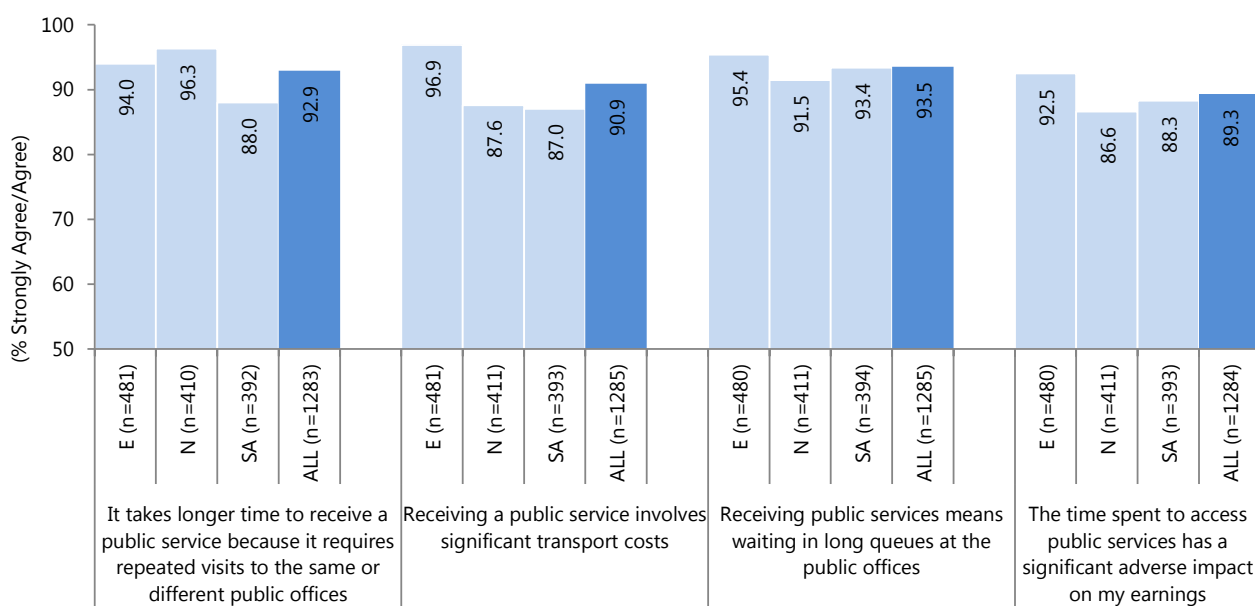
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<sup>2</sup>130.6 mobile phone subscriptions against 100 people – 2012 estimate.

seems to be less of a restriction for respondents in Ethiopia (6%) and South Africa (4.8%) ( $\chi^2(2) = 93.693, p < .001, V = .52$ ). In terms of demographics and digital service usage, the sample is consistent with our intended target population – which is economically active and ICT conversant.

### Experience of Public Services

Overall, when asked about their experiences of using public services, the majority of all respondents ‘strongly agree’ or ‘agree’ that they experienced a loss of time and money when accessing public services in the traditional way (see Figure 1). A relatively higher proportion of respondents in Ethiopia and Nigeria (94% and 96%, respectively) than South African respondents (88%) experienced more problems, in terms of having to spend more time to receive a public service because of repeated visits to the same or different public offices ( $\chi^2(2) = 22.429, p < .001, V = .13$ ). The costs included significant transport costs, more so in Ethiopia (97%) than in Nigeria (88%) or South Africa (87%) ( $\chi^2(2) = 33.369, p < .001, V = .16$ ) but these are significant costs for all respondents. A large majority of all respondents across all countries (over 90%) experienced waiting in long queues in order to receive public services in the traditional way. For most respondents (93% of Ethiopian respondents, 87% of Nigerian and 88% of South African respondents), they felt that the time they were spending to access public services traditionally had a significant adverse impact on their earnings - an overview is presented in Figure 1.



**Figure 1:** Reported Experience of Public Services

### Demand for Public Services

Respondents were asked to prioritise the types of public services that they would consider to be very useful if delivered on-line. Respondents were able to select more than one service but were not provided with a pre-selected list of services. All of the Nigerian respondents (100%), 95% of Ethiopian respondents, 88% of South African respondents selected one or more public e-services that they would find useful and these are summarised in Table 3.

		Ethiopia	Nigeria	South Africa
<b>Respondents selecting one or more public e-services</b>		<b>95%</b>	<b>100%</b>	<b>88%</b>
Public E-service	Description			
Utilities	(payment)	75%	69%	2%
Personal Life-Event Licenses	Application & renewal	52%	16%	53%
	Drivers Licenses	18%	10%	18%
	Passports	12%	6%	4%
	ID	11%		30%
	Birth/Marriage/Death	5%		1%
	Document Authentication	4%		
Inland Revenue Services	(paying taxes)	25%	5%	13%
Business Services		32%	2.5%	7%
	Customs and Excise	19%	2 %	5%
	Business Licence	13%	0.5%	2%
Health Services		11%	2%	8%
Land & Housing	Application for housing/land and payment of rents & taxes	14%	2%	
Traffic department	Payment of fines/vehicle registration	10%	1%	5%
Education & Youth Services	Registration at schools and universities, payment of fees, youth services	4.5%	0.5%	2.5%
Dept of Justice	Court/police/prison services	4%	0.2%	7%
Social Services	Pensions/benefits	1%		2%
Postal Services		1%	2%	
Local Municipal Services	Sub-city services	5%		2%
	Kebele Services*	9%	n/a	n/a
Public Transport		13%		2%
Public Information		1%		
Leisure Services	Booking tickets to sports and leisure events	6%		
Labour Department		1%		3%
Online markets	Shopping/commodity exchanges	3%		
Airlines	Ticketing and reservations	4%		
Library Services	On-line libraries	4%		
Public Services	Other public services	8%		

\* Popular term used to describe a cooperative urban neighbourhood association. *Kebeles* were formed after the nationalization of all urban land and rentable dwellings in July 1975. These cooperatives became the counterpart of the peasant associations developed under the military government's Land Reform Proclamation of March 1975. After their introduction, *kebeles* became the basic unit of urban government and served as instruments of socio-political control in urban areas. Services rendered at Kebele Level include issuance of ID (new, renewal, replacement), housing (Registration, distribution, maintenance), evidences (health, employment, economic status, residence, marriage, decides, family, departed, new arrivals, etc.), Communication (other offices, sub-city, City, etc.), Social organizations

(license, support, etc.), Developmental activities (schools, sanitation, health, village roads, house construction, etc.) (source: [http://lcweb2.loc.gov/frd/cs/ethiopia/et\\_glos.html](http://lcweb2.loc.gov/frd/cs/ethiopia/et_glos.html))

**Table 3.** Summary of Demand for Types of Public E-services

The types of services identified on the whole were centred around payment of utilities – particularly for Ethiopia and Nigeria but to a much lesser extent in South Africa which mirrors the institutional infrastructure and requirements of each of the respective countries (e.g. privatisation of utilities). Personal life-event licenses, for instance, driving licenses, passports, ID's birth/marriage/death certificates especially for Ethiopia and to a much lesser extent South Africa and Nigeria and inland revenue services were also public services which citizens would find to be particularly useful. The Ethiopian respondents revealed a demand for a broader spectrum of online public services, ranging from on-line library services, to ticketing and booking cinema, sports and other leisure events, public transport and the more innovative public commodity exchanges. This emphasises the lack of supply of public e-services currently offered and confirms the existence of citizens' demand for a whole range of services it also suggests that government services play a large part in the lives of Ethiopian citizens. The South African citizen demand for services was concentrated largely on application and renewal of personal life-event licenses specifically IDs and drivers' licenses, and to a much lesser extent revenue services, health, justice and business services. Nigerian respondents' demand for online public services was the least in terms of numbers of public services identified and tended to concentrate around utility payments and to a much lesser extent drivers' licensing and inland revenue services.

#### *Willingness to pay for Digital Public Services*

##### Contingency valuation and social externality analysis

Each respondent was asked to quote one governmental service she/he would consider to be most useful if it was delivered online (i.e. their 'wish list'). Using the contingency valuation methods, they were also asked to report the maximum convenience fee in their local currencies which they would be willing to pay for a single online public service accessed via PCs and mobile phones. These convenience fees were converted into British Pounds for ease of comparison. Table 4A and 4B presents average fees which respondents were willing to pay for accessing the specific online public services via PCs and mobile phones, respectively. Those online services were grouped into high and low social externality categories, depending on the number of times they were quoted as the most preferred online services. The 'Externalities' columns in Table 4A and 4B indicate the level of social externalities ('High'/'Low'). Statistically significant differences in convenience fees were sought between two groups of high and low social externality e-services within each country. Because the distribution of fees is not normal, the median is reported in the following sections as a more robust measure.

In Ethiopia, respondents were willing to pay on average £1.79 per service, using PCs (Table 4A). Among e-services of high social externalities, respondents were willing to pay on average £1.79 for utilities, personal life-event licenses, and general local services and £2.50 for banking. Ethiopian respondents appeared to pay higher amounts of convenience fees for services considered to have lower social externalities; for example, they were ready to pay £2.77 for business services. A further analysis showed that, overall, using PCs, Ethiopian respondents were willing to pay lower convenience fees ( $\tilde{x}$  = £1.79) for high-externality e-services and higher convenience fees ( $\tilde{x}$  = £2.14) for low-externality services. The difference

was found to be statistically significant ( $U = 10,281.00, z = -2.844, p < .01, r = -.137$ ). Among Nigerian respondents, the opposite picture appeared using PCs; they were willing to pay higher convenience fees for high-externality services (£4.80 and £4.00 for utilities and personal life-event licenses, respectively) whilst lower fees for low-externality services (e.g. £2.00 for general local services and £2.80 for inland revenue service; Table 4A). The median convenience fee for high-externality e-services was £4.80 whilst that of low-externality e-services was £2.60 among Nigerian respondents, and the difference was found to be statistically significant ( $U = 12,748.00, z = 3.276, p = .001, r = .165$ ). No statistically significant differences in convenience fees were found among South African respondents using PCs (£13.63 for both high-/low-social externality groups). In relation to the equivalent statistics using mobile phones, no equivalent differences in convenience fees between high and low-externality e-services were found to be statistically significant in any of the three countries (Table 4B). These findings suggest that citizens did anticipate varying levels of greater benefits than costs (Chen and Thurmaier, 2008) by utilising e-government services instead of accessing offline services.

#### Access mode analysis

Next, differences in amounts of convenience fees respondents were willing to pay between PCs and mobile phones were considered. In general, respondents were willing to pay higher fees using PCs than mobile phones ( $z = -13.54, p < .001, r = -.38$ ). Overall, the average fees respondents were willing to pay using PCs was £3.57 compared with £0.18 using mobile phones (Table 5). In particular, South African respondents preferred accessing online public services using PCs rather than mobile phones ( $z = -13.76, p < .001, r = -.71$ ); median convenience fees using mobile phones for all online services were zero in South Africa while the equivalent median fee through PCs was £13.64 (Table 5). Likewise, among Nigerian respondents, the overall median convenience fee they were willing to pay through mobile phones was zero with the equivalent figure based on PCs was £4.00 ( $z = -7.21, p < .001, r = -.36$ ). Only Ethiopian respondents were willing to pay equally by using PCs and mobile phones (£1.79 for both modes).

A set of equivalent analyses were conducted for all online services within each country. Though the difference in the overall median convenience fees between PCs and mobile phones was not statistically significant among Ethiopian respondents, respondents were willing to pay more using PCs than mobile phones for certain online services including utilities ( $z = 2.92, p < .01, r = 0.21$ ), personal life-event licenses ( $z = -2.75, p < .01, r = -0.42$ ), general services ( $z = -2.73, p < .01, r = -0.40$ ), and banking ( $z = 2.58, p < .05, r = 0.30$ ), (Table 5). Likewise, Nigerian respondents were also willing to pay higher fees for utilities ( $z = -5.07, p < .001, r = -0.31$ ), personal life-event licenses ( $z = -4.02, p < .001, r = -0.51$ ), and health services ( $z = 2.02, p < .05, r = 0.83$ ), using PCs than mobile phones. Personal life-event licenses ( $z = -6.50, p < .001, r = -0.68$ ), general local services ( $z = -4.29, p < .001, r = -0.81$ ) inland revenue ( $z = -4.12, p < .001, r = -0.82$ ), business services ( $z = -3.44, p < .01, r = -0.73$ ) and department of justice ( $z = -3.24, p < .01, r = -0.81$ ) were such services for which South African respondents were willing to pay more using PCs. There was no single e-services for which respondents were willing to pay higher convenience fees using mobile phones than PCs across the three countries.

Therefore, an interesting interim finding suggests that by understanding citizen needs, demands and how they can benefit from online public services, this could drive decisions related to (i) what public services need to be prioritised for economically active citizens (ii) potentially explore citizen subsidy of these specific public services which will have a trickle down benefit to poorer citizens by reducing the pressures on traditional channels of public

service delivery (iii) investigate where resources should be invested in terms of media to access online services (PC-based, mobile-based or both).

### **Implications for Policy**

The large majority of respondents from the three African countries reported to have had negative experiences of costing them significant amounts of time and money as they received governmental services. Given current negative experiences in receiving governmental services, online public services could provide them with attractive solutions to the significant cost they have to bear. These findings are in line with past studies that identified actual benefits among users such as saved time and money through not visiting government offices (Kumar and Best, 2006), convenience of accessing services anytime of the day (Dwivedi et al, 2006), and enhancing accuracy of information provided/transaction (Alomari et al., 2014).

The results further suggested that using PCs, Ethiopian respondents opted for paying lower fees for services that were of higher social externalities. The finding is compatible with the model proposed by Chen and Thurmaier (2008) where high-externality online services should be subsidised by governments so those services were diffused and utilised by greater numbers of people. On the contrary, Nigerian respondents were willing to pay higher fees for high-externality services. This illustrates high demand for those services (utilities and personal life-event licenses) among Nigerian respondents and, in turn, suggests that providing such high-externality online services at lower prices than they were willing to pay might possibly facilitate a wide and smooth diffusion of such services. On the other hand, their willingness to pay less for lower-externality services might render the introduction of higher convenience fees for such services challenging. In order to facilitate the effective introduction of e-government services, it is important to set (lower) fees that encourage citizens' use of e-government and simultaneously lessen funding problems of e-government (Ojha et al., 2012). The majority of contingent valuation studies focus on one type of public good such as environmental assets such as increasing air and water quality (Carson, 2000), prevention of environmental disasters (Carson et al., 1992), renewable energy (Longo, et al., 2008), cultural experience (Armbrecht, 2014), digital invoicing (Poel et al. 2016), users' tolerance of spam e-mail (Yoo et al. 2006). In contrast, our study captures citizens' willingness to pay for a wide range of online services proposed by our sample that are grouped under the name of "e-government" based on a rich dataset, which is one of the key contributions of our study. The amount of convenience fees also differed by the type of devices they would use to access online public services; generally, respondents were willing to pay higher fees using PCs rather than mobile phones. To the knowledge of the authors, little attention has been paid to comparing citizens' varying willingness to pay through different devices. Shariful Islam et al. (2012) measured diabetes patients' willingness to pay for short message service (SMS) using mobile phones, but their findings were confined within one type of devices, mobile phones, without comparing it in (an)other devices/modes of payment. Thus, our research is considered to be one of the first few studies that provides some insight into citizens' attitude by mode of payment. Within each country, for certain types of services, respondents reported differing amounts of fees they would be willing to pay. Such information is vital for project organisers to be aware of so appropriate fees can be introduced for differing services via PCs or mobile devices.

It is important to recognise the implications for respective government policy as a consequence of our outline findings. While some countries, both industrialised and developing, are capitalising on the benefits that digital technologies can provide, continuing challenges faced in developing countries mean that low-income countries, such as those located in Africa, are less able to achieve and realise those benefits. The economic

performance of African countries has been viewed with pessimism, consistently considered to be the poorest continent (Harrison et al. 2014). Clearly, the availability of new information technologies (internet and mobile) provided to citizens is critically important through free public access. Recent empirical studies have shown that these technologies have contributed to longer term economic growth in African countries and stress the need for government to further invest in developing robust telecommunications infrastructures (Donou-Adonsou et al. 2016). There are also implications in this respect relative to the time citizens were prepared to allocate in accessing information technology facilities (travel, expense, etc). More attention is therefore required to ensure mobile services are accessible through subsidised ‘smart-phones’ distribution. Our results demonstrate the significant demand for eServices and a lack of supply, in all the countries considered, of publically sponsored access. The sophistication of the technology infrastructure is also a function of the respective government prosperity where priority should be given to systems implementation.

However, one of the major constraints and challenges for developing countries is the limited fiscal capacity and ability to mobilise fiscal resources to finance the provision of public services, which is essential for economic development (Ali et al. 2015). Consequently, this poor fiscal capacity, namely the amount and type of resources a state has at its disposal, not only has an impact on economic wellbeing but also on the quality of government, which is particularly relevant in this case (Baskaran & Bigsten, 2013).

*“an increased fiscal capacity enhances the quality of government because citizens demand more accountable administration when they have to bear a larger fiscal burden ... as citizens begin to voice demands for more accountability”* (Baskaran & Bigsten, 2013, p105).

Thus, e-Government is one way in which developing countries can focus on developing good governance and strengthening civil society to improve the quality of government and motivate citizens to participate in the political process.

### **Theoretical Implications**

The adoption of a contingency value approach supported the field work data collection through attention to collecting and processing the narratives (Pentland, 1999) involved from citizens in relation to their views on ‘willingness to pay’ initiatives. It enabled significant insights into our findings and also showed that respondents wished differing governmental services to become available online and were willing to pay varying amounts of convenience fees for such services, suggesting that citizens anticipated varying degrees of trade-offs (Ojha et al. 2012; Gagliardi et al, 2017) between costs and benefits according to what e-government services they would utilise. It is also important to note that research from the contingent valuation approach in the context of e-government is still in its infancy stage, and there are very few previous studies found in the literature. Our research is thus relatively new which clearly demonstrates the need for further theoretical development in relation to identifying and reporting ‘stories’ within empirical e-government data sets. However, this ‘lack’ of theories actually enabled us to extensively explore the empirical data, making interesting findings in quest of such 'stories', whilst avoiding the pitfall where "Advances in knowledge that are too strongly rooted in what we already know delimit what we can know" (Gioia et al., 2012, p16). Our study in context was primarily a quantifiable effort to the research problem, and it is useful to acknowledge recent calls for more ‘qualitative’ research designs (Sarker, et al, 2018) in terms of its theoretical implications. However, the adoption of a contingency value approach enabled ‘sense-making’ of our substantial empirical observations and is also argued to be the most appropriate theoretical and methodological contribution for our study.

## Research Limitations and Directions

Our research focused on economically active digitally ‘savvy’ citizens in the major capital cities in each of our selected countries. While these are not representative of the population at large, our intention was to understand what citizen-led government services would look like from the perspective of this group, with an insight into the value they place on these online services and their ability to access them. Technology diffusion starts with the early adopters (Rogers, 2010), and here we have focused on those that are likely to be early adopters. It is evident that this resulted in limited variance within a more holistic sample frame, and it is noted that an attempt to capture all sections of society is beyond the scope of our research. Secondly, there might potentially be gaps between hypothetical values of willing to pay (WTP) than actual values of payment (Venkatachalam et al., 2004). Following suggestions made by Venkatachalam et al. (2004), every care was taken to gather as much information as possible from respondents through pilot surveys and the literature to fully explain potential benefits of using e-government to respondents in the main survey. Further, a preliminary guess about the WTP range was obtained through pilot surveys.

While countries around the world reap the benefits of an expanding digital environment, development challenges persist, adversely impacting low-income countries from achieving that same rate of growth. The World Development Report (2016) recently highlighted these findings in addition to three factors that contribute to a government’s responsiveness towards these digital changes. According to the report, public services tend to be more amenable to improvements through digital technologies, if the proposed system allows for fluid feedback, a replicable development process, and an outcome that can be easily measured and reported. Our research goes some way in identifying this prospect with insightful findings based on quantifiable empirical data.

In this respect our research has shown that in three exemplar countries in Africa, there is a demand for digital public services. Interestingly, our findings suggested that citizens in both Nigeria and South Africa, were prepared to pay more, to access services online via PCs rather than via mobile phones, despite the fact that almost all our respondents were mobile phone owners. This suggests there is an element of mistrust linked to the (mis)use of mobile phones for online activity. The situation was different in the case in Ethiopia, where PCs and mobile phones were seen to be equally important. Future studies could investigate why this was the case. There is a clear distinction in the types of online public services citizens required in different contexts. For instance, for Ethiopia and Nigeria payment of utilities was in high demand, but much less so in South Africa where there was more of a demand for personal life-event licenses such as IDs than the other countries. Demand for types of public services therefore are highly dependent on socio-economic and political contexts and as such need to be accounted for in the design and implementation of online public services. One model of e-government services does not fit all.

As well as clearly identifying a monetary value for accessing public services online, our study found that the majority of our citizens felt that the costs of accessing public services traditionally, had a significant and adverse impact on their earnings through loss of time (having to wait in queues and having to go to multiple locations or the same location multiple times), but also additional costs of transport and informal/unofficial “convenience” fees to get the quality of public service they wanted. The implication here is that enabling citizen access to public services online (e-government) has an indirect impact on poverty reduction by improving productivity and efficiency of citizen’s working lives by directly reducing the time and cost it takes to access public services the “traditional” way. Future research could look at



quantifying these benefits and the different financing options relevant to each context. Future studies could also usefully extend and build on our work further and examine the value of e-government for different groups of citizens, including poorer citizens and those in different regions. Another area is to explore in more depth whether and how citizen willingness-to-pay translates into an actual revenue stream for public service provision and whether this contributes to improved quality of, and trust in government, from the perspective of government and citizen stakeholders.

## **Conclusion**

We initially identified directly from citizens the type of e-Government services they need in each of the respective African countries and established any similarities or differences between citizens from divergent African socio-political contexts. We further presented insights on how citizens might 'value' e-Government services and how we can evaluate this approach. If online services are of no benefit, no matter how convenient and lower cost online services are, they are unlikely to be used. Thus, in the context of resource constrained countries, it is even more important to effectively target development needs that have a socio-economic impact. Accessing digital public services directly addresses the needs of economically active citizens and can also facilitate the steps toward an improved quality of government and interaction with civil society. Our study has contributed to an initial understanding of the value, cost and benefits of citizen-led e-Government in the context of exemplar developing countries in this respect.

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Table 4A:  
Willingness to pay for Online Public Service via computer (average fee GBP)

	Ethiopia					Nigeria					South Africa					Total				
	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%
Utilities	High	2.11	1.79	198	45.6	High	7.79	4.80	272	68.7	Low	15.00	15.91	4	1.9	High	5.48	2.50	474	45.5
Personal Life-Event Licenses	High	2.01	1.79	42	9.7	High	6.46	4.00	64	16.2	High	13.36	13.64	92	43.4	High	8.72	8.00	198	19.0
General Local Services	High	2.86	1.79	47	10.8	Low	4.07	2.00	11	2.8	High	14.85	13.64	28	13.2	Low	6.92	2.32	86	8.3
Banking	High	3.21	2.50	75	17.3	-	-	-	0	0.0	-	-	-	0	0.0	Low	3.21	2.50	75	7.2
Inland Revenue Services	Low	3.03	2.14	22	5.1	Low	3.44	2.80	21	5.3	High	15.27	13.64	25	11.8	Low	7.66	4.00	68	6.5
Business Services	Low	3.37	2.77	28	6.5	Low	7.90	6.00	12	3.0	High	21.88	21.82	22	10.4	Low	10.81	5.36	62	6.0
Health Services	Low	1.68	1.25	5	1.2	Low	2.27	1.90	6	1.5	High	7.89	6.59	20	9.4	Low	5.80	4.55	31	3.0
Dept of Justice	Low	1.88	1.88	2	0.5	Low	1.60	1.60	1	0.3	Low	14.63	13.64	16	7.5	Low	12.60	13.18	19	1.8
Land & Housing	Low	2.36	1.96	10	2.3	Low	5.18	2.60	8	2.0	-	-	-	0	0.0	Low	3.61	2.27	18	1.7
Education & Youth Services	Low	1.88	1.88	2	0.5	Low	1.40	1.40	1	0.3	Low	18.91	18.18	5	2.4	Low	12.46	13.18	8	0.8
Airlines	Low	2.74	2.86	3	0.7	-	-	-	0	0.0	-	-	-	0	0.0	Low	2.74	2.86	3	0.3
Total		2.50	1.79	434	100.0		7.08	4.00	396	100.0		14.41	13.64	212	100.0		6.66	3.57	1042	100.0

Those respondents who did not report their convenience fee and/or preferred online services are excluded from the analysis.

Table 4B:  
Willingness to pay for Online Public Service via Mobile Phone (average fee GBP)

	Ethiopia					Nigeria					South Africa					Total				
	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%	Externality	$\bar{x}$	Median	<i>n</i>	%
Utilities	High	3.08	1.79	207	45.9	High	4.88	0.00	276	68.8	Low	2.27	0.00	4	1.9	High	4.09	1.07	487	45.7
Personal Life-Event Licenses	High	1.24	0.00	43	9.5	High	2.60	0.00	65	16.2	High	4.73	0.00	92	43.2	High	3.29	0.00	200	18.8
General Local Services	High	1.35	0.00	48	10.6	Low	0.93	0.00	11	2.7	High	1.61	0.00	28	13.1	Low	1.38	0.00	87	8.2
Banking	High	3.76	2.68	80	17.7	-	-	-	0	0.0	-	-	-	0	0.0	Low	3.76	2.68	80	7.5
Inland Revenue Services	Low	3.18	2.05	22	4.9	Low	1.83	2.00	21	5.2	High	2.80	0.00	26	12.2	Low	2.63	0.00	69	6.5
Business Services	Low	2.94	1.79	29	6.4	Low	4.55	2.70	12	3.0	High	7.75	0.00	22	10.3	Low	4.93	0.00	63	5.9
Health Services	Low	0.57	0.00	5	1.1	Low	2.80	2.60	6	1.5	High	5.00	0.00	20	9.4	Low	3.86	1.07	31	2.9
Dept of Justice	Low	2.68	2.68	2	0.4	Low	2.40	2.40	1	0.2	Low	2.59	0.00	16	7.5	Low	2.59	0.00	19	1.8
Land & Housing	Low	1.70	1.70	10	2.2	Low	5.15	0.60	8	2.0	-	-	-	0	0.0	Low	3.23	1.05	18	1.7
Education & Youth Services	Low	1.16	1.16	2	0.4	Low	1.60	1.60	1	0.2	Low	9.09	0.00	5	2.3	Low	6.17	0.80	8	0.8
Airlines	Low	2.98	3.57	3	0.7	-	-	-	0	0.0	-	-	-	0	0.0	Low	2.98	3.57	3	0.3
Total		2.77	1.79	451	100.0		4.19	0.00	401	100.0		4.31	0.00	213	100.0		3.61	0.18	1065	100.0

Those respondents who did not report their convenience fee and/or preferred online services are excluded from the analysis.

Table 5:  
Willingness to pay for Online Public Service (average fee GBP) by device (PCs and mobile phones)

	Ethiopia				Nigeria				South Africa				Total			
	Externality	PC	Mobile	sig.	Externality	PC	Mobile	sig.	Externality	PC	Mobile	sig.	Externality	PC	Mobile	sig.
Utilities	High	1.79	1.79	<.01	High	4.80	0.00	<.001	Low	15.91	0.00	ns*	High	2.50	1.07	<.001
Personal Life-Event Licenses	High	1.79	0.00	<.01	High	4.00	0.00	<.001	High	13.64	0.00	<.001	High	8.00	0.00	<.001
General Local Services	High	1.79	0.00	<.01	Low	2.00	0.00	ns	High	13.64	0.00	<.001	Low	2.32	0.00	<.001
Banking	High	2.50	2.68	<.05	-	-	-	-	-	-	-	-	Low	2.50	2.68	<.05
Inland Revenue Services	Low	2.14	2.05	ns	Low	2.80	2.00	ns	High	13.64	0.00	<.001	Low	4.00	0.00	<.001
Business Services	Low	2.77	1.79	ns	Low	6.00	2.70	ns	High	21.82	0.00	<.01	Low	5.36	0.00	<.01
Health Services	Low	1.25	0.00	ns*	Low	1.90	2.60	<.05*	High	6.59	0.00	ns	Low	4.55	1.07	ns
Dept of Justice	Low	1.88	2.68	ns*	Low	1.60	2.40	ns*	Low	13.64	0.00	<.01	Low	13.18	0.00	<.01
Land & Housing	Low	1.96	1.70	ns	Low	2.60	0.60	ns*	-	-	-	-	Low	2.27	1.05	ns
Education & Youth Services	Low	1.88	1.16	ns*	Low	1.40	1.60	ns*	Low	18.18	0.00	ns*	Low	13.18	0.80	ns*
Airlines	Low	2.86	3.57	ns*	-	-	-	-	-	-	-	-	Low	2.86	3.57	ns*
Total		1.79	1.79	ns		4.00	0.00	<.001		13.64	0.00	<.001		3.57	0.18	<.001

Those respondents who did not report their convenience fee and/or preferred online services are excluded from the analysis.

\* Numbers of respondents were lower than 10 - significance test results need treating with caution.

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