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Factors of Implementing Citizen Centric e-Government in Developing Countries: Namibia

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Abstract. The low adoption and use of e-Government has motivated interest in researching citizen centric e-Government. This is important to developing countries where e-Government is seen as promoting social exclusion due to differences in income, access to ICTs and literacy rates across the populace. This study used a prototype m-Government application to investigate factors of citizen centric e-Government. The study targeted one of the Ministries in Namibia and investigated challenges faced by citizens when accessing government service. While m-Government and e-Government could play a key role in addressing some of the challenges faced, it was noted that the government need to strategically implement e-Government given a number of contextual factors. For instance, while an urban-based citizen could afford a smart phone and operate one, the case is different with a citizen living in rural communities; rural populace, characterised by the aged cannot afford smart phones nor operate ones without assistance. This is mainly down to the fact that part of the rural populace cannot read and write in English or their native language. Hence, this study suggests understanding ICTs accessible to the populace, ICT skills, attitude towards technology, ICT infrastructure, costs, security and using a community-based partnership approach as key factors of e-Government in Namibia.

Keywords: m-Government, e-Government, rural electrification, ICTs, citizen centric, Namibia.

1 Introduction

The debate on factors of citizen-centric electronic government (e-Government) has become a topic of interest [1, 2]. A low electronic participation (e-participation) and the adoption of less interactive e-Government [3] platforms are some of the reasons why understanding citizen centric e-Government in Africa has become important. Often, African governments struggle to align their e-Government implementations to existing technologies and governmental structures [4, 5]. This study uses a prototype mobile government (m-Government) application to establish factors of e-Government implementation. Namibia is experiencing a fast-mobile phone adoption rate as reflected by an increase in mobile phone users from 4,32 per 100 inhabitants in the year 2000 to 105,79 per 100 inhabitants at the end of 2017 [6]. However, m-Government provision and ownership of a mobile phone does not guarantee e-participation [7]. In addition, research on citizen centric e-Government has been focused on economically developed

countries or developing countries outside Africa that may present unique adoption characteristics that are not comparable to those in Africa [8]. This is critical given that a number of factors play a key role in e-Government adoption including culture [9] something that limits the transferability of findings from one context to another without further confirmation. All these arguments motivated the need to investigate factors of e-Government in Namibia. This study focuses on factors of e-Government design and implementation in a selected government Ministry in Namibia. Findings from this study can be used as a point of reference when formulating policies for e-Government and m-Government adoption in Namibia and other countries that may exhibit similar characteristics to the referenced case.

2 Literature Review

2.1 Factors Influencing e-Government Design and Implementation

There is a growing interest in citizen-centric e-Government [11-13]. It is believed that citizen-centric e-Government has the potential to create public value as expected by the citizens [10, 12]. This study is guided by factors of e-Government design and implementation in Ochara and Mawela [5] and Jaeger and Bertot [14]. Accordingly, citizens' means of access to ICTs, ICT skills, community-based partnerships, information needs, ICT infrastructure and attitude towards ICTs are the key factors that were considered for citizen-centric e-Government in this study [5, 14].

Access. Ochara and Mawela [5] proposed that better access to ICTs could reduce the digital divide. In support of this proposition, Jaeger and Bertot [14] commented that, "a system that resides on technologies to which the citizen does not have access will also guaranty failure." As such, e-Government platforms should correspond with the technologies used by citizens [14]. This may involve making sure that Namibia's e-Government platforms are compatible with mobile phones that are widely used by the populace [15, 16, 17]. Approximately 80% of the Namibians use mobile phones to access the Internet [18]. In addition, language is one of the issues that may influence the access of e-Government services [4]. Namibia has at least eleven ethnic groups with at least eleven different officially recognised languages even though English is Namibia's official language [19].

ICT Skills. Computer illiteracy can promote digital divide across the population [5]. Jaeger and Bertot [14] noted that "developing a Web-based e-Government service that requires a broadband connection, high-end computer, and advanced technology competencies will immediately exclude a segment, or multiple segments, of the intended service population." As such, ICT skills are important to Namibia who is gearing towards a "knowledge-based economy by 2030". Accordingly, the Namibian government is working on equipping its employees with ICT skills that could enable the use of e-Government services" [16].

Community-based partnership. Jaeger and Bertot [14] suggested that integrating e-Government with the immediate community's public resources such as libraries and schools has the potential to increase e-Government acceptance. [4] echoed a similar view by suggesting that e-Government must be implemented in such a way that it adapts to the context not the other way around. As such, Namibia may implement its e-Government through schools and public libraries. Such an initiative is key as it avoids the idea of "off-loading" e-Government services to a community without overseeing other critical activities of training and user support [14].

Citizen information needs. Jaeger and Bertot [14] suggested that understanding how citizens search, acquire and use information could provide basis for developing citizen-centric e-Government. This is important given that a significant number of users in the United States appear to trust information sourced through social media instead of government websites [21].

ICT infrastructure. The provision of ICT infrastructure in economically developing countries has been a concern for some time. The majority of developing countries, Namibia included, are dominated by rural areas where there is still sparse connectivity and have no electricity [22, 23]. Indications are that, rural areas are often excluded from e-Government access due to their geographical location and economic standing [6, 24, 25, 26]. This is so despite the growing use of mobile phones in the rural areas [6, 24, 25, 26].

Attitude. Attitude towards ICTs use is one of the factors considered important in determining the likelihood of e-Government use [5]. Thus, the willingness to use ICTs by the citizens can work in favour of e-Government use [16]. Attitude, arguably, reflects the extent of shift in the traditional cultural belief that ICTs can be used to facilitate the provision and access to e-Services without the need for human physical contact. Therefore, understanding the attitude towards ICTs can help ascertain the amount of effort the government should put in promoting e-Government and the likelihood of success.

3 Methodology

This study uses a qualitative case study strategy. The authors had no control over the subject study something that makes it suitable to conduct a case study as purported in Maoneke and Isabrye [27]. A selected Namibian government Ministry was considered as the case study for this research. The selected Ministry offer a wide range of government services that are critical to all Namibian citizens. The study makes use of a prototype m-Government application to gather data for evaluating factors of e-Government design and implementation. The prototype assumed one of the services (application for an identification -ID- document) offered by the selected Namibian government Ministry. The aim was to establish the perception of participants if a mobile

application was used to apply for an ID instead of the current manual system. Below is an overview of the prototype, design factors, data collection and analysis methods.

The figure displays a six-step mobile application prototype for ID registration:

- 1. Basic Details:** Includes fields for Surname, First names, Maiden Name (if applicable), and Date of Birth. Navigation: Continue, Cancel Application.
- 2. Gender and Marital Status:** Includes radio buttons for Gender (Male, Female) and Marital Status (Never Married, Married, Widow/Widower, Separated, Divorced). Navigation: Go Back, Continue, Cancel Application.
- 3. Contact Details:** Includes fields for Street Address, City, Phone Number, and Email Address. Navigation: Go Back, Continue, Cancel Application.
- 4. Birth Certificate:** Includes a file upload section with 'Choose file' and 'No file chosen' options. Navigation: Go Back, Continue, Cancel Application.
- 5. Confirm:** Includes instructions on what to do after submission (fingerprints, signature, ID photo) and a declaration statement. Navigation: Go Back, Submit, Cancel Application.
- 6. Thank you:** A confirmation screen with a checkmark icon and instructions to contact an official. Navigation: Cancel Application.

Fig. 1. Activities of the m-Government Prototype.

3.1 ID Application Prototype Design

This study made reference to the Finnish and Estonian electronic identity services in order to come up with a prototype of e-Government that is compatible with Namibia. Estonia is widely regarded as one of the leading countries in terms of e-Government development with close to 100% digital ID adoption [28]. The process of applying for an ID in Namibia is comparable to that of the Finland. The steps involved include completing and signing an application form that is followed by capturing the applicant's biometrics (fingerprints and photo). In addition, ID application in Namibia requires that applicants submit a copy of their birth certificate. This functionality was included in the prototype even though the Finish ID application process does not require a copy of the birth certificate. The wide adoption and use of mobile phones to access the Internet motivated the thought of basing the prototype on a mobile application. A mobile authentication option based on SIM cards were adopted for the prototype such that participants could be differentiated according to their mobile number. This was done

for the sake of the experiment in the study and a more appropriate form of authentication need to be researched. Some screenshots of the prototype that was used in this study are presented in Figure 1.

3.2 Data Collection and Analysis

In addition to participating in a fictitious ID application using a mobile prototype, participants were interviewed. Face-to-face interviews were done prior to exposure to the mobile application in order to gather data on background information about the participant and their perception on government service. Participants were then exposed to the prototype and asked further questions on their perception about using m-Government. All interviews were tape recorded. Additional data was gathered through observations during face-to-face interviews and participation in the prototype experiment. All participants were randomly selected. Data analysis started with the transcription of tape-recorded interviews. This was followed by an analysis of response from each participant that saw findings on factors of m-Government implementation being coded according to those found in the literature. In addition, emerging themes were coded on their own. Lastly, themes on factors of m-Government implementation were put together, combining themes from all the participants and making comparisons taking note of similarities and differences.

4 Data and Sample Profile

Fifteen participants took part in the prototype experiment and face-to-face interviews. Participants were given labels (e.g. participant 1: P1) to avoid the use of their actual names for privacy reasons. Only Namibians were engaged.

4.1 Factors of e-Government Design and Implementation

This section present study findings. Focus was on evaluating the importance of factors that influence the design and implementation of e-Government discussed in Section 2.

Access. It was observed that the majority of the participants owned a smart phone. Participant P4 lost her phone so she relied on her young son's (P5) phone. In addition, participant P6 indicated that he owns a feature phone. Mobile phone adoption is also extending to marginalised rural areas though at a slower pace compared to urban settings. Participant P15 from Omatako, a marginalised rural area, gave a brief overview of ICTs owned by people from his village *"let me say 60% of people have have cell phones that they use. But not all can afford it, so only a few. Yeah, especially the young—the young people they do have smartphones but the elder people they just use their normal phones to communicate..."* Furthermore, there are suggestions that there is poor access to other ICTs. Participant P15 states that *"for computers I cannot say much, computer it's, it's really rare with our communities, I think not even... Not even more than ten people have computers, unless it's just teachers. Mostly, yeah. So,*

teachers I think depend on how many teachers we have at our school, I think most of them they have. But I think the community maybe just few, not more than ten people, maybe highest it's not more than 15. But the teachers I think it's even more than 15 now, so, that has...

ICT Skills. The majority of participants except, P4, demonstrated basic ICT skills of at least completing an online form, uploading a file and submitting a form. Participant P4 asked her son to participate in the prototype experiment on her behalf. This suggests older people may not be confident about their ICT skills hence, they may need to engage their children or next of kin. In addition, participant P3 appeared shaky when completing the forms and skipped choosing a file (see step number 4 in Figure 1) something that could be due to lack of knowledge about the feature. Nevertheless, the general feeling was that the prototype application was easy to use as participant P4 summarised his perception by saying that the process was *“very easy, [if the government introduce the app] they will bring that thing it will be very easy to apply for ID”*. Participants indicated that they have different skills that include using the social media, email, electronic banking, browsing the Internet and text messages. However, the same cannot be said about rural dwellers, especially the elders, due to low literacy rates. Participant P15 indicated that *“most of the people [at my village] stay at the farms and they cannot even speak English. They just speak their home language or they use Afrikaans but that is difficult for them.....even for the written language, we the San people, we don't know how to read our own language.”*

Community-based Partnerships. Community-based partnerships are important for they could provide the necessary technical skills to support m-Government use at local level and provide access to others. Participant P2 indicated that, such an initiative *“it's gonna [going to] take a lot of convincing people”* for them to adopt e-Government. Furthermore, P4, a 47-year-old lady was not comfortable trying out the system. This demonstrated a need for technical support if e-Government is to be used by the elderly. When P4 was asked to complete forms on a prototype, she stated that *“oh no I don't know what exactly [is] about a form”*. She continued to state that *“can I use my baby, my son? [Son's name]. My son he will come and help you....He knows about mobiles.”* Furthermore, participant P3 skipped a step to upload a fictitious birth certificate something that could be due to a lack of knowledge of the feature. On the other hand, participant P15 from a rural village appeared to recommend the need of community-based partnerships that could help locals to adopt m-Government. P15 suggested a *“hub”* or *“campsite”* where the community centre could go and gain access to ICTs for m-Government. Due to the language problem, P15 went on to recommend the use of translators as he stated that *“I think there should be even more than three people [at the hub], one should be of San speaking language and the other two they can speak English, then this one can translate for the people.”* These findings suggest that community-based partnerships that could help citizens through these processes and steps involved are a critical requirement for e-Government in Namibia.

Attitude Towards Technology. Participants expressed mixed reaction on using IT in improving government service. There was a group of participants who showed a positive attitude towards using e-Government and or m-Government in light of the hardships faced with travelling to the government offices and waiting in long queues. Participant P4 states that *"maybe people will uh will take, go for that [using Internet to access government services], because now is the time for you know this— how do you call that? The Internet and that?"* Participant P8 stressed that the IT *"application would definitely work."* Similarly, P9 thought it was a good idea *"as long as there could be an option to verify the information submitted by the user. The people the ministry should be able to know the information is true without trusting the user to apply correct information"*. Participant P15 weighed in as he suggested that such an idea would reduce transport costs. He explained that *"it's less costly because people don't need to, to just to go move from one place to another just to fill in the details, I think it's something very good for the community as well. Cause they will just be at home and them everything will be completed without moving up and down."* In addition, P15 indicated that such a system could *"it saves time, and I think maybe for one-one-one house or maybe for people come together in a place where you can do this, it's faster than [travelling] to towns"* to apply for an ID.

However, a thought of people in the rural areas made participants to have some degree of reservation over the feasibility of using IT-driven system. Participant P15 explains *"it will need somebody trained that can help them, cause my community members, especially the elders and even the younger ones, they do not go to school, it's a problem. Cause our community members, most of them they, they have a communication problem when it comes to communicating in this official language-English."* Similarly, P10 raised concern over how such systems would be used by those based in rural areas. It was stated that, *"always coming up with these fancy ideas is always an issue [given] that the majority of the people, unfortunately, are staying in rural areas. So, it's always an issue as to how you would get this out and make it easy for them to use"*. These views were shared by P8.

ICT Infrastructure. Interviews with participants revealed a number of ICT infrastructural concerns. Participant P2 indicated that *"they have a lack of infrastructure"* in rural areas. She went on to explain that rural areas *"don't have the MTC [Namibia's leading mobile phone service provider] towers close. They don't have access to Internet you understand."* In addition, P10 suggest there is poor network access in rural areas as she stated that *"the closer the people are to the rural areas they wouldn't have, you know, access to for example this e-services that government uh actually advocating for. So, I think that's a big issue currently."* Participant P15 went on to suggest that, while there are sections with base stations in the rural areas, signal reception remains poor. Participant P15 stated that *"at least, at our village we have Internet tower. But it's not that high, but it can cater for the surrounding. The other village we were yesterday, it's a problem, there's no Internet connection"*. Similarly, one would need to position themselves strategically to get mobile phone reception in the villages as P15 went on to state that *"Only maybe when you try to call you can at least access but you have to stand in a way that the phone can be.....stable in order for*

you to communicate....network is very weak". The same applies to supporting infrastructure for other ICTs. For instance, there are indications that there is poor radio signal reception rural areas. P15 states that "we don't have radio connection. So we need an aerial in order for us to connect to radio". Similarly, electricity access is poor in the village. Most households are not connected to the national electricity grid. "We don't have electricity at all, and it's only the school and the clinic that has. Even with the phones, its very difficult cause we have to go to the school and ask if they can help to charge our phones" says P15.

Costs. ICTs access costs are an important factor that imaged from the data. This appeared common to all participants. For instance, there was an impression that data may be expensive as most of the participants indicated that they did not have data in their mobile phones. Even though participants were not required to use their phones in testing the prototype, every time the interviewer asked her co-researcher about data availability, participants would jump in to indicate they do not have data. For example, during conversations with participant P1, the interviewer asked: *"Ana, do you have uh data, could you share it?"* and participant P1 quickly responded *"no I don't have"*. *"No, I'm asking her"*, the interviewer had to clarify. Similarly, participant P2 stated that *"but I don't have data at the moment"*. In addition, there are suggestions that ICT access costs might be higher in the rural areas. For instance, P15 indicated that *"the base that can help with printing or making copies is the school, and since it's only the school that can help, they tend not to"* out of fear that they may run of the stationery or experience breakdown in a location where there is limited sources of ICT support. In addition, printing and photocopying is *"very expensive even if the communities want to use it they won't be able cause it's expensive. They have to pay more than fifteen [Namibian] dollars just for one copy"*. That is approximately US\$1 per page or copy. These findings suggest data remain expensive for the majority of citizens and ICT infrastructure remains a critical requirement for a successful citizen-centric e-Government.

Security. Another theme that emerged from data analysis is the subject of security. It should be noted that the prototype recommended two authentication measures to participants. The first one was the authentication used at the bank or a mobile phone number. Nearly all participants were not comfortable to use the authentication they use at the bank. In particular, participants were not comfortable integrating bank authentication with that of a government applications system. Participant P7 states that *"when it comes to bank, they're like okay what if tomorrow I wake up and my account is empty."* Similarly, P8 explains that *"You know when it comes to bank, money, you know, you're just like ahhh, let me take mobile, it's a bit safer. I felt more comfortable with the mobile, yes"*. P11 weighed in by stating that *"Mm, yeah, I'm not very comfortable with my bank details being shared at the ministry"*.

5 Discussion, Recommendation and Conclusion

Government service delivery remains poor in developing countries. Information technology is expected to play a key role in enhancing service delivery. As such, citizen-centric e-Government is seen as one of the solutions that could improve government service delivery [1, 2]. This study investigated factors that should be looked at when implementing citizen-centric e-Government. Focus was on a selected government Ministry in order to establish how such an initiative could improve service delivery. The study found access to ICTs, ICT skills, community-based partnerships, attitude towards technology, citizen information needs, ICT infrastructure, costs and security as important factors for citizen-centric e-Government.

In particular to access to ICTs, the study found that the majority of participants own a mobile phone. However, this statistic may change in rural settings where few people own a phone and the most commonly owned phones in rural areas are the feature phones. This could be explained by the fact that rural areas are twice as much likely to be poor compared to their urban counterparts [25]. As indicated by P15, only a few are able to own and use a smart phone. So, it is mostly *“teachers and the other elder people that have been working”* who can own and use a smart phone. When asked if people own computers in rural communities, participant P15 responded that *“for computers I cannot say much, computer, it’s really rare with our communities, I think not even... not even more than ten people have computers”*. As such, a citizen-centric e-Government suitable for Namibia would be one that is compatible with technologies owned by citizens. In this case, m-Government that is accessible on both smart phones and feature phones would be ideal. In addition, ICT skills were found popular among the youth and the working class. Elders based in rural areas are likely to struggle when it comes to operating a mobile phone. This is down to the fact that some of the rural dwellers cannot read. Hence, they mainly use phones for making calls and playing music. Besides, some of the elders need assistance to make a call. As such, the government needs to look at how e-Government and m-Government can be delivered to such a population. The use of community-based partnerships can be one of the options given the low literacy rates and limited access to ICTs. Clinics and schools in rural areas that have access to electricity can be instrumental in providing centres for community-based partnerships in e-Government and m-Government. This study findings have already shown that rural populace makes use of local schools to charge their phones. Hence, providing e-Government and m-Government access through schools could be an ideal alternative. Again, such schools can also provide the necessary support where citizens find it difficult to operate e-Government systems. Furthermore, the attitude towards technology appears positive in light of challenges faced. However, more needs to be done in promoting awareness, imparting the necessary skills and supporting ICT infrastructure. The study noted that mobile phone reception remains a challenge in rural areas. So does access to electricity. Namibia Statistics Agency [25] shows that the majority of rural households (85%) have limited or no access to the main electricity grid as they use firewood for cooking. Another key factor is costs. e-Government and m-Government should be accessible at relatively low costs. This study findings suggest that even the urban populace find the cost for data high. In

the case of the rural population, the majority (31.1%) of the population's source of livelihood is farming a seasonal activity that may not be adequate to finance high costs of Internet access [25]. Lastly, the Namibian government should look into e-Government security design and mechanisms that is acceptable to the populace. While countries like Estonia have succeeded in its e-Government partly due to its digital IDs with digital signatures that interlink the private and public sector [28], there appears to be a lack of trust when it comes to interlinking information between government platforms and banks. As such, security and user authentication is one of the key issues especially for the investigated Ministry considering the fact that, the Ministry offer services to a populace that does not have any form of formal identification document.

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