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Factors Influencing the Adoption of M-Government: Perspectives from a Namibian Marginalised Community

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Abstract: Mobile-government (m-Government) services adoption is being advanced as an alternative solution for addressing challenges faced by electronic-government (e-Government) adoption in marginalised communities. However, factors of m-Government need to be understood if it is to be adopted by marginalised communities. There are suggestions that many contextual factors affect to the adoption of m-Government services. In this study, factors of m-Government in Oniipa, a marginalised rural community in Namibia are researched. Results show that security, technology trust, ICT supporting infrastructure, usage experience, costs, awareness, skills for accessing m-Government, language literacy, training, perceived ease of use, perceived usefulness, social influence, perceived empathy and compatibility are critical factors of m-Government services adoption. The study findings shall be used to propel m-Government adoption in a Fusion Grid project that aims to address infrastructural challenges faced by marginal communities when adopting e-Government. Similarly, policy makers can draw lessons on m-Government adoption from this study.

Keywords: m-Government, e-Government, rural areas, marginalised communities, information and communication technologies (ICT), government.

1. Introduction

As governments move towards improving service delivery through electronic government (e-Government), the adoption of e-Government services has gone well for others while progressing at a slow rate in some regions (Alotaibi, Houghton & Sandhu, 2016). The literature suggests that the rural dwellers who are more likely to be less educated are the least adopters of e-Government (Nam & Sayogo, 2011). From an economic point of view, study in (Liu, Li, Kostakos, Goncalves, Hosio & Hu, 2014) suggested that e-Government is more suited for urban settlements that are characterised by a dense population something that makes internet distribution cheaper when compared to “sparsely populated rural areas”. The rapid growth of mobile phone usage has seen mobile-government (m-Government) services being fronted as a suitable alternative for advancing government services in Africa, especially in marginalised areas (Ishengoma, Mselle & Mongi, 2018; Ochara & Mawela, 2015; Lui et al., 2014). Marginalised rural areas are often characterised by a poor Information and Communication Technology (ICT) supporting infrastructure, sparse population, less educated and old population that is usually less economically active (Ishengoma et al., 2018; Winschiers-Theophilus, Winschiers-Goagoses, Rodil, Blake, Zaman, Kapuire, & Kamukuenjandje, 2013; Lui et al., 2014). However, m-Government awareness and ownership of a mobile phone does not guarantee that the citizens will use m-Government (Rana, Janssen, Sahu, Baabdullah & Dwivedi, 2019). Hence, the willingness to adopt m-Government by citizens in marginalised areas need to be investigated if m-Government is to be successful. This is important given the fact that the adoption of m-Government is still in its infancy phase something that can be explained by the dominance of e-Government research when compared to m-Government research (Alotaibi et al., 2016; Lui et al., 2014; Ahmad & Khalid, 2017). In addition, research on m-Government has been focused on economically developed countries (Lui et al., 2014) that may present unique adoption characteristics when compared to economically less developed countries (Nam & Sayogo, 2011). This is critical given that culture does have an effect on factors of m-Government (Shareef, Kumar, Dwivedi & Kumar, 2016) something that limits the transferability of findings from one context to another without further confirmation. All these arguments motivate the need to investigate factors of m-Government within the context. This study focuses on factors of m-Government adoption in a marginalised rural community in Namibia. Findings from this study can be used as a point of reference when formulating policies for m-Government adoption in Namibia and other countries that may exhibit similar characteristics to the referenced case.

2.0 Literature review

2.1 Mobile phone adoption

The growth in use of mobile phones world over is said to be happening at a faster “rate than that of any other technology ever adopted” (Stork, Calandro & Gillwald, 2013 in Maoneke, Shava, Gamundani, Bere-Chitauro & Nhamu, 2018). The International Telecommunications Union (2019) states that the number of mobile phone subscriptions is bigger than the world population. For example, the mobile phone subscription is believed to be within the region of 170% to 190% in the Kingdom of Saudi Arabia (Alotaibi et al., 2016). Of late, the Asian-Pacific (57% of global subscribers) and Africa (10% of global subscribers) are among the leading continents that are experiencing a fast adoption rate of mobile phones. It should be noted that Africa has the least number

of mobile phone users when compared to all the other continents. Nevertheless, the adoption of mobile phones shows to be extending to rural areas world over. For example, 93.7% of the respondents from the rural Zhejiang province of China had mobile phones with 32.8% owning a 3rd generation phone (Lui et al., 2014). This trend might also be a reflective of developments in mobile phone adoption in rural Africa. Emerging results shows that Africa is experiencing a phenomenal growth rate in mobile phone subscription. For example, mobile phone adopters increased by 91% between 2010 and 2016 in Tanzania (Ishengoma et al. 2018). Similarly, the International Telecommunications Union (ITU) (2019) showed that mobile phone subscribers increased from 0,32 per 100 inhabitants in the year 2000 to 69,72 per 100 inhabitants at the end of 2017 in Tanzania. Within the Southern region of Africa, Namibia is among the leading countries that are experiencing a fast adoption rate of mobile phones. In the year 2000, Namibia had 4,32 per 100 inhabitants a figure that increasing to 105,79 per 100 inhabitants at the end of 2017 (ITU, 2019). This is in comparison to South Africa's 156, 03 per 100 inhabitants at the end of 2017, up from 18,24 in the year 2000. Similarly, Botswana had 12,85 per 100 inhabitants owning a mobile phone in 2000 that increased to 141,41 at the end of 2017. However, Namibia's other neighbouring countries such as Angola (44,73 per 100), Zambia (78,61 per 100) and Zimbabwe (85, 25 per 100) had less than 100 mobile phone subscribers per 100 inhabitants at the end of 2017 (ITU, 2019). The growth in mobile phone usage in Namibia is attributed to an improved telecommunication regulation that is paving way for private sector investment in ICTs, an area that was previously dominated by the public sector (Stork, Calandro & Gillwald, 2013).

Another interesting statistic is a finding that, at the end of March 2019, 56.8% of the world population had access to the Internet (Internet World Stats, 2019). Though showing a constant growth, Africa remains the least Internet adopter with a penetration rate of 37.3% (Internet World Stats, 2019). It has been suggested that Africa's growth in Internet access is largely attributed to a growth in mobile phone adoption (Stork et al., 2013). This has been found true with reference to Ethiopia, Kenya, Namibia, Nigeria, Rwanda, South Africa and Tanzania. Statistics released by ITU (2009) indicate that the dominant use of mobile phones to access the Internet is largely attributed to a constant drop in fixed Internet connection. Access to the Internet is critical as it facilitate the access to some of the m-Government applications (Ishengoma et al. 2018).

2.2 m-Government and e-Government challenges and opportunities

m-Government relates to the use of mobile phones such as tablets, notepads, feature phones to facilitate the deployment of government services and information to citizens (Alotaibi et al., 2016; Lui et al. 2014). There is a general consensus in the literature that m-Government is not a replacement of e-Government. Instead, m-Government aims to complement e-Government (Abu-Shanab & Haider 2015; Alotaibi et al., 2016). As such, m-Government is often seen as a component of e-Government. The literature goes on to suggest at least three different factors that are influential in motivating m-Government adoption. These factors vary according to the context and objectives of the m-Government adopter. For example, the adoption of m-Government can be motivated by a need to address challenges faced by e-Government in its attempt to extend services and information delivery to remote and underserved rural areas. Lui et al. (2014) reports of a pilot study that aimed to promote government services and information delivery using short message service (SMS) in the Madhya Pradesh government of India. This Madhya Pradesh government project was used in rural areas that had no Internet access. Lui et al. (2014) adds that rural China is characterised by a scattered population whose main economic activity is farming. Such a populace cannot afford a computer, Internet access and has low literacy rates to an extent that e-Government websites are considered less attractive (Lui et al., 2014). Similarly, Nam and Sayogo (2011) found that e-Government is less attractive to rural dwellers. Namibian rural areas share these characteristics where most of the rural communities "are scattered in low densities on farms" (Namibia Statistics Agency, 2013, p. 4). In addition, these rural areas have a poor ICT supporting infrastructure such as no access to the national electricity grid, no access to tap water, a poor road network and poor ICT skills (Gumbo, Jere & Terzoli, 2012; Pade, Plamer, Kavhai & Gumbo, 2009). As such, m-Government through simple technologies like SMSs is expected to play a critical role in service and information delivery in rural areas.

Secondly, the adoption of m-Government can be motivated by a need to take advantage of the wide use of mobile phones by the citizens (Alotaibi et al., 2016; Abu-Shanab & Haider, 2015; Ishengoma et al., 2018). In light of a high mobile phone adoption rate discussed in the previous section, it is imperative that governments implement m-Government solutions and benefit from a wide mobile phone usage. This is the most common reason for m-Government adoption in the literature. For example, study in (Vark, 2012) reports of how some African countries have taken advantage of a growing mobile phone adoption and used SMSs to enhance information delivery to rural farmers. This led to improved agricultural yields and profits. In addition, (Alotaibi et al., 2016) noted that the Saudi Arabian government took advantage of a growing mobile phone usage by its citizens and deployed m-Government through mobile applications. Examples of such applications include the "Health Mobile, tracking of Higher Education Information, Riyadh and Madinah Education, Appointments and

Document Tracking and Employee Inquiry” (Alotaibi et al., 2016). Similarly, the government of Jordan sought to take advantage of a high mobile phone adoption rate that exceeded the population size reaching 103% in 2010 (Abu-Shanab & Haider 2015). The government of Jordan developed a mobile portal with 27 electronic services for its m-Government. In addition, the government of Jordan made use of SMSs to address ICT infrastructural challenges that limited the accessibility of Internet driven mobile applications in some regions. The SMS function played two critical roles of pushing communication (e.g. sending awareness messages) and pulling SMS from the populace. The option of pulling SMSs allowed citizens to send messages to government departments at a fee (Abu-Shanab & Haider 2015). In addition, Ishengoma et al. (2018) suggested that the decision to adopt m-Government by the Tanzanian government was motivated by the wide use of mobile phones. The m-Government services offered by the Tanzanian government include the mobile government service payment platform, national examination results SMS facility, general SMS pushing platform and a USSD government menu that allow citizens to use a code (*152*00#) to access a menu with different government services. The Namibian government has also shown interest in taking advantage of a booming mobile phone usage by its citizen and adopted m-Government. This is reflected by the use of SMSs to push communication to citizens. For example, the Ministry of Finance send messages to Namibian citizens with the aims of communicating reminders or making awareness campaigns on tax. In addition, the Ministry of Home Affairs use the SMS service to inform the citizens of the outcome for any services that citizens would have applied for.

Lastly, m-Government can be adopted in order to enhance government service and information delivery to citizens (Ahmad & Khalid, 2017). Thus, even though e-Government is performing well, a government may also decide to implement m-Government in order to enhance service delivery. For instance, the Prime Minister of the UAE echoed that “the government of the future works 24/7 and 365 days a year. A successful government is one that goes to the people and does not wait for them to come to it” (Emirates 24/7, 2015a in Ahmad & Khalid, 2017). Hence, the government took advantage of a good ICT infrastructure to promote m-Government with the aims of improving service delivery.

2.3 Factors of m-Government adoption

The literature suggests different factors that influence m-Government adoption by citizens. A literature review by Ishengoma et al. (2018) found security and privacy/trust, infrastructure, usability, accessibility, personal initiatives and characteristics, and costs as critical factors influencing m-Government adoption. In addition, Alotaibi et al. (2016) adopted the Technology Adoption Model (TAM) and used a qualitative research methodology to investigate factors of m-Government. Their study found trustworthiness, usage experience, awareness and security as factors for m-Government adoption. Enjoyment was the only factors that was found not important to m-Government adoption (Alotaibi et al., 2016). Rana et al. (2019) conducted an exploratory survey in order to establish factors of m-Government adoption by citizens. Their study went on to identify the availability of mobile phones, awareness, the skills for accessing m-Government services, “the ability to read and write in a language used in the mobile phone”, costs, training, trust in m-Government and anxiety as important factors of m-Government. While their study confirmed some of the factors identified in the literature, Rana et al. (2019) also identified unique factors such as training, skills for accessing m-Government, anxiety and the availability of mobile phones. Another study by Liu et al. (2014) investigated factors of m-Government adoption by rural dwellers of the Zhejiang province in China. Liu et al., (2014) acknowledged that technological and environmental factors are important in influencing m-Government. As such, they proposed a model of m-Government that was based on the TAM and social environmental factors. Data collection and analysis found perceived ease of use (PEOU), perceived long-term usefulness and social influence having a significant direct influence on the Intent to use m-Government. In addition, a perceived near-term usefulness, image, integrity and benevolence were seen as having an indirect influence towards m-Government adoption. In addition, a study by Almarashdeh & Alsmadi (2017) found social influence, perceived trust, cost of services, perceived usefulness and ease of use important to m-Government adoption. Furthermore, a study by Shareef et al. (2014) on the impact of culture on m-Government made interesting findings. Thus, the PEOU, security and reliability were found critical to m-Government adoption in Bangladeshi and the USA. However, Shareef et al. (2014) noted that the perceived empathy in m-Government use was an important factor to participants from Bangladesh while those from the USA found empathy not critical. In addition, USA participants valued compatibility with perceived enjoyment seen as having an indirect effect on m-Government use. Interestingly, participants from Bangladesh did not find compatibility and enjoyment influential to their decision to use m-Government.

Table 1 summarise factors of m-Government that were found in the literature. Similar factors were consolidated under a given new name while other factors were splited where necessary. Focus was on factors that had a direct effect on factors of m-Government. In addition, preference was given to factors that had supporting empirical

evidence. Hence, factors of m-Government that were arrived at through literature review, for instance those in Ishengoma et al. (2018), were not considered in this study.

Table 1. Factors of m-Government adoption.

The identified factor	Description	Source
Security	Users perception that m-Government platforms provide the needed security to personal data influences adoption. Anxiety as a result of anticipated risks was considered an element of security.	Alotaibi et al. (2016); Ishengoma et al. (2018); Rana et al. (2019); Shareef et al. (2014)
Technology trust	Given that m-Government is still a new phenomenon, it is possible that citizens may have uncertainties regarding the capability of the technology to deliver the aspired services. In addition, trustworthiness goes hand in hand with citizen's perspective on m-Government reliability. As such, trust in technology will positively promote m-Government use.	Almarashdeh & Alsmadi (2017); Alotaibi et al. (2016); Ishengoma et al. (2018); Rana et al. (2019); Shareef et al. (2014)
ICT supporting infrastructure	The provision of ICT infrastructure such as the telecommunication network and access to electricity promotes the adoption of m-Government.	Ishengoma et al. (2018); Liu et al., (2014)
Usage experience	Experience in related technologies may promote m-Government adoption. For example, experience in using mobile phones to acquire a service promotes m-Government adoption.	Alotaibi et al. (2016);
Costs	The cost of accessing m-Government determines the willingness of citizens to adopt the technology. The lower the cost the better chances of m-Government adoption	Almarashdeh & Alsmadi (2017); Ishengoma et al. (2018); Rana et al. (2019)
Awareness	Awareness of m-Government initiatives may create a basis for adoption.	Alotaibi et al. (2016); Rana et al. (2019)
Availability of mobile phones	The availability or ownership of mobile phones enhances chances of m-Government adoption. However, it should be noted that ownership of a mobile phone does not guarantee m-Government.	Rana et al. (2019)
Skills for accessing m-Government	Within the context of developing countries, having the skills to operate mobile phones when accessing and using m-Government is important.	Rana et al. (2019)
Language literacy	This relates to the ability to read and write in a language used in the mobile phone	Rana et al. (2019)
Training	Training to use m-Government services has been found important in other developing countries.	Rana et al. (2019)
Perceived ease of use	The extent to which citizens can easily navigate around the system promotes m-Government adoption. Thus, this measures the extent to which m-Government is considered easy to use or is free from error. This is important for rural dwellers who are often less skilled.	Almarashdeh & Alsmadi (2017); Ishengoma et al. (2018); Liu et al., (2014); Shareef et al. (2014)
Perceived usefulness	This factor expresses the benefits that citizens expect to derive from using m-Government. Citizens are more likely to adopt m-	Almarashdeh & Alsmadi (2017); Liu et

	Government if they can foresee themselves yielding a lot of benefits.	al., (2014)
Social influence	Social influence involves peer pressure from those within the adopter's environment and the perception that, adopting m-Government would enhance one's social standing or image within their society.	Almarashdeh & Alsmadi (2017); Liu et al., (2014)
Perceived empathy	A feeling that someone cares about customers/citizens when accessing government services through m-Government can enhance adoption. Thus, the lack of physical interaction implies that the belief that someone will sincerely and promptly respond to services requested via m-Government enhances chances of adoption	Shareef et al. (2014)
Compatibility	Compatibility reflects the extent to which citizens find m-Government to be consistent with their beliefs or habits or customs or expectations or ways of doing things.	Shareef et al. (2014)

3. Methodology

This study is part of an ongoing community network project, the Fusion Grid, that aims to address infrastructural concerns in order to enhance e-Government use by citizens based in a selected marginalised rural community in Namibia. The e-Government challenges faced by citizens who are based in rural areas includes a lack of electricity, limited ICT skills, low incomes and poor connectivity as discussed in the literature review. It is in this regard that the Fusion Grid project aims to make an initial provision for ICT supporting infrastructure with solar powered technology (Nardelli et. al., 2019; Demidov et. al., 2019). These technologies aim at being less complex, simply plug and play that suits rural communities that are characterized by less skilled individuals. Fusion Grid provides a solar powered mobile network 4th generation long-term evolution (4G LTE) base station that delivers mobile network connectivity to the targeted rural community. Thus, the three main pillars of the research project are electricity provision (solar PV-based power system integrated with energy storage; Lithium-ion batteries, and power electronics), connectivity (4G LTE mobile network base station), and digital services (electronic learning (eLearning), mobile pay, and m-Government). Despite the highly technological characteristic of the initial Fusion Grid application, it needs to be considered as a prototype (Winschiers-Theophilus et al., 2013) for further elaboration with the end-users, the members of the community. Selected Namibian Offices/Ministries/Agencies (OMAs) were engaged in the experiment for delivering m-Government services. As part of the project initiation, it was important to understand factors that influence m-Government adoption. Data was gathered during a baseline survey. Quantitative and qualitative data was gathered by use of a questionnaire. Descriptive statistics and qualitative data analysis techniques were used to analyse data. It should be noted that qualitative data was only gathered to assess factors of m-Government adoption.

3.1 The Targeted Community: Oniipa Town Council (OTC)

Oniipa town council (OTC) is located in Oshikoto region (province), north of Namibia. OTC has a population of approximately 30 000, and attained a town council status on the 3rd of April 2015. According to the Namibian Local Authorities Act, a town council is an urban settlement that can rely on its own financial resources to pay for some of its operations. The donor agents and the central government are expected to contribute additional funding for the operation of a town council. It is important to realise that the growth of Namibian urban settlements were partly influenced by the developments in the colonial era. OTC is on the north of the Red Cordon Fence that was erected during the colonial era. During the apartheid rule by South Africa, the Red Cordon Fence divided Namibia into two, the north, dominated by villages (Bantustans) and the south dominated by urban settlements. This implied that the Bantustans, like OTC, were to be administered by Traditional Authorities with little or no government support while the southern part of Namibia was under the then homeland government. This partly explain why the Oshikoto region, home to OTC, is among the top three Namibian regions with a big proportion of rural areas that have the poorest people (Namibia Statistics Agency, 2012). The level of poverty and poor infrastructure in Namibian rural areas make these regions less attractive for business investment especially those in the ICT sector. Small-scale farming is the major economic activity in the Oshikoto region.

4 Results

A total of 150 hard copies of the questionnaire were distributed in OTC, and 105 completed ones were returned. The following sections present demographics results, and goes on to outlay findings on factors of m-Government adoption.

4.1 Gender and age distribution

Females by far contributed a significant proportion of the respondents. Of the 105 respondents that took part in the study, 67% were females while 33% were males. In terms of age distribution, the majority of respondents were more than 36 years old. In fact, those above 40 years old contributed 42% of the total respondents as shown in Figure 1. Rural areas are often characterised by an aged population (Winschiers-Theophilus et al., 2013).

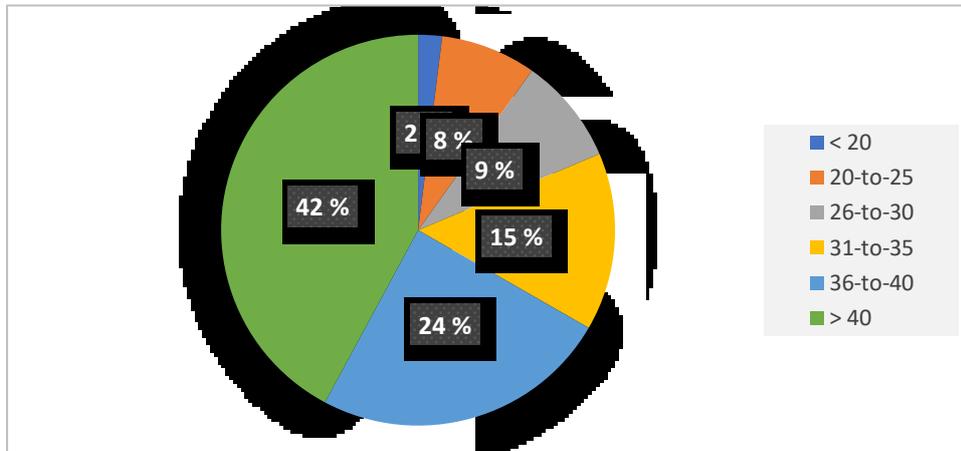


Figure 1. Age distribution of the respondents.

4.2 Level of education

Those with a certificate and metric (high school) as the highest qualification were represented by nearly 50% of the respondents. Exactly 14% had no educational qualifications. A fair share of the respondents had a diploma (22%) as the highest qualification followed by a small proportion of respondents with a degree and post graduate degree. This huge proportion of respondents with an educational qualification in a rural setting can be explained by the fact that the majority of the respondents came from Oniipa Town Council, with few of these coming from the adjacent rural areas.

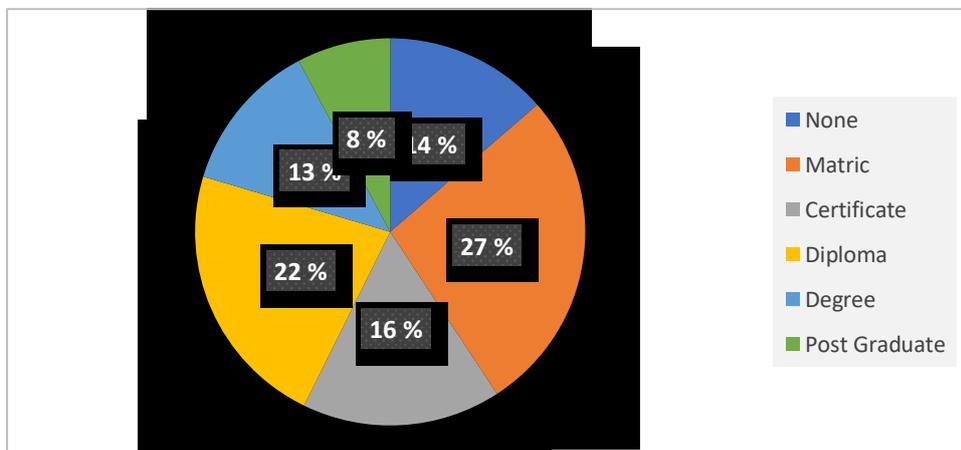


Figure 2. Level of education across the respondents.

4.3 Household electronic goods owned by respondents

Respondents were asked to indicate if they own or have access to selected house hold electronic goods. Only 38% indicated that they have access to lights. Interestingly, 31% of the respondents showed to have a television set at home, while 14% indicated that they have an electric cooker. In addition, only 25% indicated that they own an electric iron. Similar small proportions of the respondents indicated that they have an air conditioner at home (6%), a fan (13%) and a refrigerator (15%). It should be noted that temperature ranges vary between 3 and 31 °C in OTC. Nevertheless, these results could be explained by a lack of access to electricity as only 36% of the respondents indicated that they have access to the national electricity grid.

4.4 Ownership of ICTs

Respondents were asked to indicate if they own or have access to selected ICTs. The radio (90%) was found to be the most popular ICT gadget owned by respondents. This was followed by mobile phones that are owned by 77% of the respondents. However, only 59% indicated that they own a smart phone. Nevertheless, 31% of the respondents indicated that they own a television set as indicated in the previous section. Furthermore, 30% of the respondents indicated that they have access to the Internet. Another 30% indicated that they own a computer. It is interesting to note that the mobile phone penetration in OTC is comparable to that of rural Zhejiang province of China as reported in (Lui et al. 2014). However, results from this study confirms that Internet access remains low in the rural areas. This could be explained by a lack of lightweight Base Station solutions, and accordingly no business case for mobile network operators to extend the coverage to each corner and village of rural populated countries as is the case in Namibia.

4.5 Important ICTs and electronic household goods

Respondents were asked to rate the importance of nine selected ICTs and electronic household goods. These included mobile phone, lights television, air conditioner, refrigerator, computer, radio, tablet and a cooking stove. For every item, respondents were to indicate its importance in their livelihoods. Figure 3 shows the ICTs and electronic household goods that were considered important by respondents from OTC. Access or owning lights, mobile phones and a refrigerator are the most important ICTs and electronic household goods for respondents. It is interesting to note that ownership of a mobile phone is among the most important ICTs. In particular to ICTs, respondents showed less interest in tablets and computers. This finding can be explained by the fact that, being low income earners, members from the rural areas may not fancy ICTs they feel are luxurious. A basic mobile phone may be adequate for such a populace.

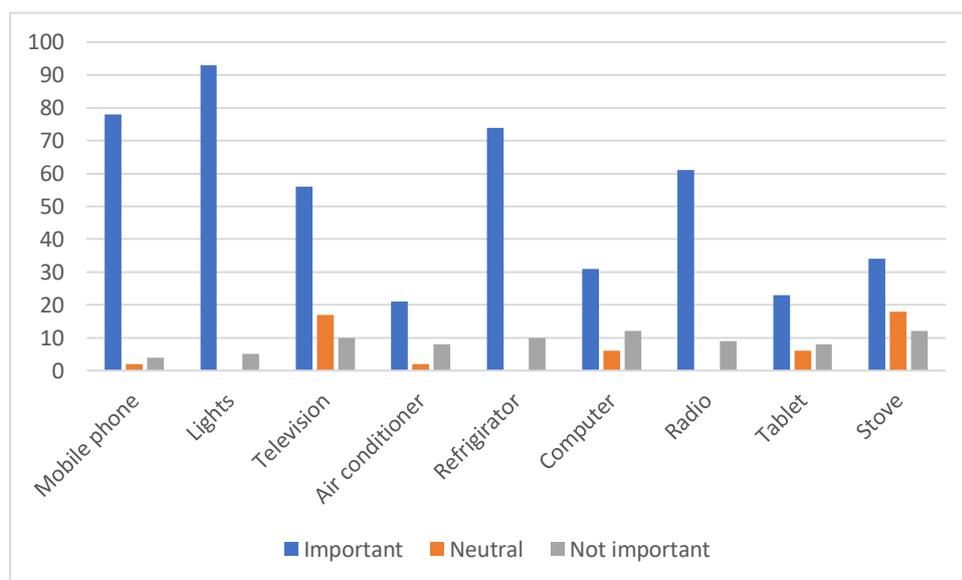


Figure 3. important ICTs and electronic household goods

4.6 Important services

Respondents were asked to rate the importance of selected services to their community. Nine services that were listed include: access to electricity, Internet access, health access, education, clean water supply, having sanitation, access to government services having a better job and security. Figure 4 summarise the study finding on important services. It is interesting to note that access to electricity; clean water and health are the most important services to respondents. Internet access is considered the least important service. Of the nine evaluated services, access to government services is rated the sixth most important service. Electricity and water access are the basic needs for any community. However, the low interest in Internet may be explained by the fact that, rural dwellers are not aware of the benefits associated with the Internet. Alomari (2011) in Alotaibi et al. (2016) suggested that it is important to promote awareness of technologies in use such that citizens would be interested in adopting them.

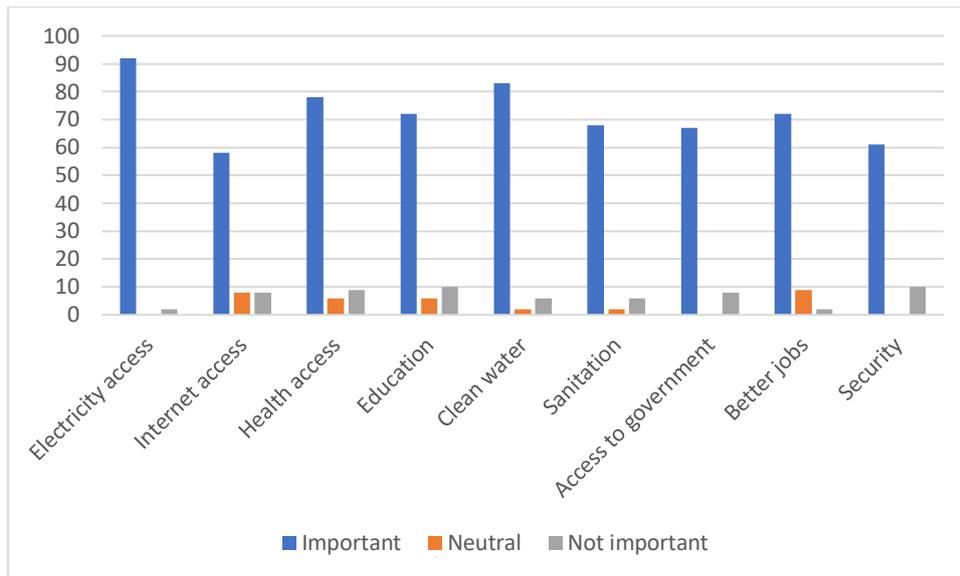


Figure 4. Important services.

4.6 Factors of m-Government adoption

Findings on factors of m-Government adoption are presented in this section. The findings are in particular to the identified factors of m-Government adoption presented in Table 1. Presentation of findings is based on quantitative data. However, relevant supporting qualitative data on each factor is also presented if available.

Security. Respondents were asked to indicate the importance of security and privacy in m-Government. The majority of respondents (56%) indicated that security is an important factor in their decision to adopt m-Government. Similarly, the literature shows that security is important for m-Government adoption (Alotaibi et al., 2016; Shareef et al., 2014). Security is important as it promote privacy, data integrity and availability.

Technology trust. To establish if trust was an important factor of m-Government adoption, respondents were asked to indicate if they would prefer to go to the governmental office, instead of using mobile phone to access governmental services. Approximately 46% of the respondents agreed that they rather walk into a government office instead of using m-Government. However, 50% of the respondents suggested that they would prefer to use m-Government. These findings suggest that technology trust is yet to reach inspiring levels to an extent of facilitating the access of government services using mobile phones. Hence, promoting trust among citizens can go a long way in enhancing m-Government adoption.

ICT supporting infrastructure. Respondents were asked to indicate if it was important to have access to mobile network for m-Government to be adopted. 76% of the respondents indicated that ICT supporting infrastructure is important for m-Government adoption. To some extent, this percentage is supported by the 77% who indicated that they own a mobile phone. However, 22% of the respondents indicated that they do not know while the remaining 2% did not consider mobile network access important. The importance of ICT supporting infrastructure was emphasised by comments made by some of the respondents. For instance, one of the respondents indicated that rural areas “*lack infrastructure*”. She went on to explain that rural areas “*don’t have the MTC [Namibia’s leading mobile network service provider] towers close. They don’t have access to Internet you understand.*” These findings are supported by the literature that shows that rural areas are characterised by a poor ICT infrastructure (Lui et al., 2014).

Usage experience. Data was gathered to establish if the experience gained in using the Internet or other mobile phone services could be considered as an important factor in influencing the decision to adopt m-Government. 63% of the respondents agreed that they could use their experience with other mobile phone services to know how to use m-Government services. The difference in m-Government adoption between economically advanced communities when compared to less economically advanced communities has always been down to differences in the level of adoption and use of other Internet and computing services (Alotaibi et al., 2016). Accordingly, the population’s experience with other mobile phone services may promote m-Government adoption.

Costs. The literature suggest that rural communities find accessing m-Government services expensive (Almarashdeh & Alsmadi, 2017; Ishengoma et al., 2018; Rana et al., 2019). A high cost of accessing m-Government services discourage adoption. When asked if buying mobile phone credit was expensive, 72% of the respondents indicated that mobile phone credit was expensive. A follow-up question was asked in order to find out if the respondents thought that using mobile phones to access government services would be too expensive for many people. 69% percent of the respondents agreed that accessing m-Government services would be expensive. Only 16% thought it would not be expensive. Rural dwellers have limited sources for generating an income. Hence, it is expected that they would find m-Government expensive. However, one would expect that using m-Government is less expensive when this factor is being considered in light of perceived benefits such as cutting travelling costs. In a way, this finding on costs suggest a lack of awareness of benefits associated with m-Government.

Awareness. Data was gathered to establish the impact of m-Government awareness on adoption. Respondents were asked if they could consider using m-Government services if they were familiar with a government department using such a facility. 63% of the respondents indicated that they would use m-Government. Only 24% indicated that they would not use m-Government even if they were familiar with a Ministry that uses the technology. These findings strongly suggest that the awareness of government departments that use m-Government could positively influence adoption. Alomari (2011) in (Alotaibi et al. 2016) stated that “a lack of awareness is one factor that prevented Jordanian citizens from adopting e-Government” (p. 59).

Skills for accessing m-Government. Respondents were asked to indicate if they would adopt m-Government if they have the necessary skills to access and use m-Government services. Rana et al. (2019) found that having skills to operate a mobile phone and accessing m-Government plays a critical role in influencing adoption. 54% of the respondents indicated that they had the skills to operate a mobile phone something they could use in m-Government adoption. However, 54% is just above half. Hence, policy implementers need to look into acquainting m-Government potential adopters with ICT skills if they are to adopt the technology. Ochara and Mawela (2015) noted that citizens’ ICT skills were critical to m-Government acceptance.

Language literacy. Namibia is a multilingual country with at least two dominant Indio-European languages namely English and Afrikaans that are widely used in urban areas. While English is the official language, it is common that the rural populace mainly use native languages when communicating. Hence, the ability to read and write in a language used in the mobile phone has the potential to enhance m-Government adoption (Rana et al., 2019). A strong interest (76%) in using local language when displaying content of m-Government suggest that respondents were particular about language literacy. This goes on to suggest that the Fusion Grid project may consider developing mobile applications that are oriented in local languages in order to maximise m-Government adoption.

Training. Data was gathered to establish the importance of m-Government services user training prior to adoption. For instance, respondents were asked if they would only consider accessing government services using mobile phones after getting explanations on how to use it from someone. 59% of the respondents indicated that they would need someone to explain to them how to use m-Government before using it. Only 23% indicated that they would not need any explaining from anyone prior to m-Government adoption and use. These findings were corroborated by a finding that 50% of the respondents indicated that they would need advice from someone prior to using their mobile phone to access government services. Only 27% of the respondents indicated that they would not need any advice from anyone for them to adopt m-Government. Hence, m-Government training is critical when targeting rural areas.

Perceived ease of use. The literature suggest that the usability of m-Government plays a pivotal role in its adoption (Almarashdeh & Alsmadi, 2017; Ishengoma et al., 2018; Liu et al., 2014; Shareef et al., 2014). To evaluate the perceived ease of use, respondents were asked if they felt that their mobile phones were user friendly. Fifty four percent of the respondents indicated that their mobile phones were user friendly. However, 30% of the respondents thought their phones were not user friendly. In addition, respondents were asked if they felt it would be complicated to use their mobile phones to access m-Government. Sixty three percent of the respondents indicated that using their mobile phone to access government services would be more complicated for them. Only 27% of the respondents indicated that using their mobile phones to access government services would not be complicated. Similarly, 55% of the respondents indicated that using mobile phone to access government service was not clear to them and sounded difficult. Only 31% of the respondents indicated that they understood how to use m-Government and it was not difficult. These findings can be explained by respondent’s keen interest to be afforded training prior to adopting m-Government. Accordingly, perceived ease of use is an important factor of m-Government adoption.

Perceived usefulness. The literature suggests that understanding perceived advantages associated with m-Government will likely promote adoption (Almarashdeh & Alsmadi, 2017; Liu et al., 2014). To some extent, it can be argued that respondents are aware of the potential benefits of using m-Government. For instance, 71% of the respondents indicated that using m-Government would make it easy for them. Only 13% thought using m-Government would not make life easy for them. Respondents weighed in with comments that suggest they were well informed with m-Government usefulness. One of the respondents indicated that using m-Government allows her to *“apply for services online than to going to the office and join the queues”*. Another respondent who seemed enthusiastic about m-Government also indicated that she would benefit from being able to *“pay for the municipality bills, apply for death, birth, ID card/certificate”*. In addition, another respondent weighed in by stating that *“it can[would] be nice to pay bills like electricity and water online”*. However, findings from a follow-up question appears to contradict the view that respondents are well informed of m-Government’s usefulness. When asked if the respondents were informed about why mobile phones should be used for accessing government services, only 34% of the respondents indicated that they consider themselves to be well informed. Surprisingly, the majority (43%) of the respondents suggested that they were not informed on why m-Government should be used. The remaining 23% were undecided. These findings support the perception that the targeted population require training on m-Government for them to understand its importance.

Social influence. The literature suggest that social influence is one of the most important factors promoting m-Government adoption (Almarashdeh & Alsmadi, 2017; Liu et al., 2014). As such, respondents were asked for questions with the aims of evaluating the potential effect of social influence on m-Government adoption. Firstly, respondents were asked if they would adopt m-Government because their friends are using it. Fifty five percent of the respondents indicated that they would adopt m-Government if their friends were using it. Only 38% of the respondents indicated that they would not adopt m-Government because of their friends, while 7% were undecided. These findings suggest that social influence does have an effect on m-Government adoption. In addition, respondents were asked if they would wait to see others use mobile phones to access government services before trying out the technology. Fifty four percent of the respondents agreed to waiting and see others use the technology first. Only 27% of the respondents indicated that they would not wait for others to adopt m-Government while 19% were undecided. Again, these findings emphasise the role of social influence though a close call given that close to 50% of the respondents suggest otherwise. Nevertheless, it can be argued that the respondents from rural OTC portray cultural characteristics of a collectivism where no one is keen on taking an independent initiative. Instead, they prefer to assume collectivism when solving problems as suggested by Hofstede (Shareef et al., 2014). However, when asked if the decision to adopt m-Government was entirely a respondent’s own decision without the influence of anyone else, 53% of the respondents agreed to this. Only 19% of the respondents indicated otherwise while 27% were undecided. These findings suggest that, while group opinion was important, respondents would still need to make their own final decision on m-Government. Factors such as anticipated costs and previous experience may influence the final decision. This reasoning is supported by the fact that, only 31% of the respondents went on to indicate that they would quit using m-Government services because a friend or family member has a negative opinion over it. Forty nine percent of the respondents indicated that they would not stop using m-Government services due to negative comments from friends and family. The remaining 20% was undecided.

Perceived empathy. Shareef et al. (2014) found that respondents from Bangladesh valued empathy in m-Government adoption. Similarly, respondents in this study appear to be motivated by perceived empathy when adopting m-Government. Eighty percent of the respondents indicated that they would be motivated by quick response in m-Government. In addition, 78% of the respondents also suggested that the ability to track the status of service application motivates them into adopting m-Government. One of the respondents stated that *“I’m a bit concerned about backlog, because umm sometimes you might fill it on the app, or online, and then you, they might never show up to, go to the verification process. Unless, maybe if that app or form has a time limit. That would be great”*. These findings suggest that the perceived empathy would positively motivate m-Government adoption.

Compatibility. There are suggestions that the extent to which m-Government is consistent with available technology, beliefs and practices positively influence adoption (Shareef et al., 2014). Data was gathered to establish the importance of compatibility in m-Government adoption. To evaluate the effect of technology compatibility, respondents were asked if they were of the opinion that their mobile phones were good enough for providing government services. Fifty percent of the respondents indicated that their mobile phones were compatible with m-Government. Approximately 37% indicated that their mobile phones were not compatible with m-Government while the remaining 13% was undecided. Even though 50% of the respondents indicated that their mobile phones are compatible with m-Government, the remaining 50% calls for a closer consideration

before implementing m-Government. In addition, respondents were asked if using mobile phones to access Internet services was consistent with their life style. Fifty percent of the respondents indicated that using mobile phones to access Internet services was compatible with their life style. Only 27% of the respondents thought this was not compatible with their lifestyle while 23% were undecided. Again, these findings suggest understanding the lifestyle of respondents may help enhance m-Government adoption.

5 Conclusion

m-Government is a recent phenomenon whose introduction was motivated by a need to enhance government services in rural areas or take advantage of the growing use of mobile phones. While governments are contemplating the adoption of m-Government, factors influencing m-Government remain debatable. Accordingly, this study investigated important factors that influence m-Government adoption by a rural populace based in OTC. Besides identifying factors of m-Government adoption, this study explored the dynamics within which these factors occur with reference to OTC. The factors that were found important include m-Government security, technology trust, ICT supporting infrastructure, usage experience, costs, awareness, skills for accessing m-Government, language literacy, training, perceived ease of use, perceived usefulness, social influence, perceived empathy and compatibility. These factors are critical for initiating a community network of this study project dubbed the Fusion Grid. In addition, it is also believed that policy implementers of e-Government can learn on important factors of adoption from this study.

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