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SOCIOECONOMIC DETERMINANTS OF E-GOVERNMENT ADOPTION IN SELECTED DISTRICTS OF TANZANIA

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Abstract

E-government is changing the way governments deliver its information and services to citizens. E-government offers a number of benefits if it is properly managed. Unfortunately, in many countries all the citizens do not experience government benefits. This study explored the impact of socioeconomic factors on e-government adoption, specifically addressing the digital divide in Tanzania. A survey was administered on 450 citizens, in order to examine the effect of demographic characteristics on e-government usage. The findings of this study revealed that income, age, occupation and education significantly helped to explain differences between the adopters and non-adopters of e-government. There was no significant gender difference between the adopters and non-adopters of e-government. It was concluded that it is important for governments to identify the demographic groups that are being excluded from e-government and then implement policies to facilitate their inclusion.

Keywords

E - government adoption, demographic characteristics, digital divide, socioeconomic determinants

Introduction

A lack of access to e-government information and services is due to a number of reasons. Literature consistently identifies occupation, income, age and education as significant predictors of access to technology, which is one of the major elements of e-government (Mossenburg, Tolbert and Stansbury 2003; Choudrie and Lee 2004; Venkatesh et al 2003). According to Laudon and Laudon (2005) there is a segment of society that lags behind this socio-technical revolution. Certain demographic groups are less likely to have computers and internet access than others resulting in inhibiting access to e-government. Information accessibility to all citizens is a challenge that hinders e-government adoption (Chircu and Lee, 2005; Carter and Belanger, 2005; Carter and Weerakkody 2008; Dimitrova and Chen 2006).

Citizens require accurate, reliable and timely information in order to carry out their various activities successfully. While some information can be obtained easily, some other information may require extensive searching and consultation of multiple sources to be accessed (Sife, Dulle

and Msoffe 2010). Citizens require access to information about their government in order to be able to make informed decisions for the good of the country (Quinn 2003). Access to government information is essential in a democratic society for fostering citizen trust, fighting corruption, and providing basic information to the public, companies and journalists (Florini 2007). Citizens have a variety of avenues for accessing government information, for example, press releases, requester releases, leaks from whistle-blowers, and open public meetings (Cuillier and Piotrowski 2009:443).

The adoption of information and communication technologies (ICTs) and diffusion of the internet have increased the expectations of citizens that governments can provide information and services in the same way as in the commercial sector (Al-Shafi and Weerakkody 2007:1-2). The internet-driven activity that improves citizens' access to government information and services is known as electronic government (e-government) (Yang and Rho 2007: 1199; Kalu 2007: 359).

Tanzania implemented different citizen-focused e-government plans to make the government more reachable, transparent, efficient, and effective in delivering public services (Yonazi 2010). Tanzania started implementing broad-based and cross-cutting public service reforms in the mid-1990's and these laid the foundations for the establishment of e-government in the country (Davison, Wagner and Ma 2005:295; Mutahagahywa, Kinyeki and Ulanga 2006:1). E-government was one of the ten priority areas of the National Information and Communication Technology Policy of 2003 (United Republic of Tanzania 2003). Despite the Tanzanian government's efforts to embark on the ICT usage, e-government adoption has been quite slow. The slow e-government adoption is as a result of people not being able to access e-government information due to factors such as the absence of electric power, low literacy level among potential users, limited technical expertise to support and maintain information and communication technology (ICT) infrastructure, poor telecommunication, and a lack of computers (United Nations 2008).

Various studies from the developing world assessed factors that may influence e-government adoption. For instance, Bwalya (2011) examined e-government adoption and synthesis in Zambia; Heeks (2003) examined causes of failure for e-government initiatives in developing countries; Kaaya (2004) determined the status of government websites in East African countries. Others include Ndou (2004) who examined e-government opportunities and challenges in the developing countries, and Mofleh, Wanous and Strachan (2008) who reviewed ICT transformation in Jordan, identifying critical factors for slow adoption of e-government. Mutagahywa, Kinyeki and Ulanga (2006) assessed the efforts of the government of Tanzania in the e-government area; Yonazi (2010) studied the initiatives enhancing the adoption of e-government in Tanzania.

Looking at the studies above, one notices that scholars have examined the e-government-related interventions in developing countries and in Tanzania but have not looked in detail at the effect of socioeconomic factors on e-government adoption. This research assessed the role of socioeconomic characteristics of citizens as a way of examining e-government adoption in Tanzania. The article is organised as follows: first, theoretical background which explains the effect of demographic characteristics on e-government adoption; then, hypotheses are presented that predict which demographic factors hinder or facilitate e-government usage; the remainder of the article discusses the methodology, data analysis, findings, discussion and conclusion.

Literature review

A number of studies suggest that demographic characteristics of citizens such as the age, gender, education, occupation and income have an imperative role in explaining adoption of e-government services. The following section explains the effects of demographic characteristics on e-government adoption.

Gender

Gender can be employed as a descriptive variable as well as an explanatory variable (Morgan 1986). Various literature have discussed the role of gender in the adoption and usage of ICTs (Choudrie and Lee 2004; Haines and Leonard 2007; Leonard and Cronan 2005; Venkatesh et al 2003). These studies have shown different results, for example, other previous studies revealed that gender played an important role in technology adoption and usage in both the organisational and household contexts. For instance, Venkatesh, Chuan-Fong and Stolzoff (2000) showed that male users used a computer more than females, and suggested the male gender to be one of the most important variables when examining adoption of PCs (personal computers) in the household. However, the Pew Internet Project Report (2000) suggested that although men and women have different attitudes toward technology, the surge in the number of women online has eliminated some of the disparity in access between genders. In more recent research, this argument was supported by Mossenburg, Tolbert and Stansbury (2003).

Age

According to Burgess 1986, age can be employed as a factor or independent variable to explain a particular social grouping, social process or individual or collective behaviour. A number of studies have confirmed the significant, direct and moderating effect of age on the behavioural intention, adoption and usage behaviours (Harris, Medlin and Dave 1996; Venkatesh et al 2003). Venkatesh, Chuan-Fong and Stolzoff (2000) suggested that the age group in the United States of America (USA) which mostly adopts computers, is 15–17 years, which is then followed by the age group of 26–35 years. Similarly, Choudrie and Lee (2004) found in South Korea that the group that increased the adoption of broadband by using personal computer bangs was the younger age group. As a result, the younger generation's usage of broadband in South Korea exerted a substantial influence on parents' decisions for subscribing to broadband, since parents considered broadband as imperative for educational and entertainment purposes. Carveth and Kretchmer (2002) found that in many West European countries, the older demographic groups are less likely to use the internet compared to the younger groups. According to their findings, in the United Kingdom (UK), 85 per cent of those aged 16–24 had internet access compared to just 15 per cent in the 65-74 age range, and 6 per cent over the age of 75 years (Carveth and Kretchmer 2002). In addition, Anderson, Gale and Jones (2002) also suggested that the demography of dial-up users is different to that of broadband users.

Education level

Burgess (1986) argued that individuals and citizens that have educational qualifications are more likely to attain better occupations and are more likely to adopt innovations. Venkatesh, Chuan-Fong and Stolzoff (2000) suggested that there is a positive correlation between the level of education, technology ownership and usage. Similarly, Choudrie and Papazafeiropoulou (2006) mentioned that education is one of the most important drivers in technology usage. Moreover, Dwivedi and Lal (2008) argued that education can be considered as an independent variable to

explain the differences between adopters and non-adopters of technology, in this case e-government.

Income

Rogers (1995) described income as a correlate or antecedent of innovativeness. The diffusion of innovation theory suggests that new technologies are initially adopted by those with more resources (Rogers 1995). The findings of a longitudinal study using USA census data found that income enhanced computer ownership (Venkatesh, Chuan-Fong and Stolzoff 2000). Furthermore, this study suggested that a considerable gap persisted between the lower and higher-income groups (Venkatesh, Chuan-Fong and Stolzoff 2000). A study by Choudrie and Dwivedi (2005) also confirmed that income and occupation drive the general pattern of ICT ownership and usage. Similarly, Carveth and Kretchmer (2002) suggested that in USA the higher the household income, the more likely the members of the household will be to own a computer and use the internet. This suggestion was in line with Carveth and Kretchmer's (2002) suggestion that only 23 per cent of a lower income group in comparison with 68 per cent of the higher income group used the internet in Western European countries and UK. Carveth and Kretchmer (2002) confirmed the importance of per capita income in explaining the gap in computer and internet use. Previously-mentioned theoretical arguments and empirical evidence supported the inclusion of both income and occupation as independent variables that explain the difference between broadband adopters and non-adopters.

Occupation

Gilligan and Wilson (2003) argued that occupation can be used to differentiate the adopters and non-adopters of broadband. This is because broadband is useful in performing job-related tasks; therefore, respondents with higher and skilled occupation categories are more likely to adopt broadband, which is not expected for the lower occupation categories.

Hypotheses

Based on the literature presented above, the following hypotheses were proposed:

H1: There will be a difference in terms of household income level between the adopters and non-adopters of e-government.
H2: There will be a difference between the adopters and non-adopters of e-government in relation to education.
H3: There will be a difference between the adopter and non-adopters of the various age groups.
H4: There will be no significant gender differences between the adopters and non-adopters of e-government.
H5: There will be a difference between the users and non-users of e-government of different types of occupation.

Research methodology

To test the proposed hypothesis for this study, a questionnaire was designed to gather the necessary information. The questionnaire was composed of unambiguous and easy questions for respondents to complete. This questionnaire draft was pre-tested using convenience sampling in order to increase the reliability and validity of the findings.

Sample size and questionnaire administration

Purposive sampling was used to select regions, districts, wards and participants involved in the study. This study used the non-probability method, which is also referred to as quota sampling (Picard 2007: 63). Quota sampling is based on the researcher's ease of access to the sample. With this method, a required percentage of the total research population (the quota) is identified with some visible characteristics that are used to guide the sample.

The quota sampling method was used in this study for the following reasons: it was not possible to get a list of households and participants in advance, the budget was limited and there were financial constraints. Additionally, it was difficult to use probability sampling methods because Tanzania did not have a systematic arrangement of habitation (Nchimbi 2002). Therefore, it was not possible to sample households and participants using the simple random approach.

Regions, districts and wards were selected purposively based on accessibility by roads; presence of public access ICTs such as telecentres and internet cafes; a diverse combination of urban area, peri-urban area and rural areas, geographical location and economic activities taking place in these regions. Onwuegbuzie and Leech (2005: 280-281) view purposive sampling as belonging to the quantitative approach due to the fact that it can be used to generalise the findings. The selection of urban, peri-urban and remote regions means that a representation of the whole country was assured.

Participants were drawn from each of the three wards in each region (see the sample size in table 1). Based on the criteria of high, medium and low concentration of households the selection of households was done as follows. In Kinondoni district, participants were obtained at a sampling interval of one in every ten households. In Morogoro town district, participants were obtained at a sampling interval of one in every five households and in Njombe district participants were obtained at a sampling frame of one in every three households (the density of the households determined the decision on intervals). In the households participants were purposively selected based on their position in the house, age and gender. The study attempted to have an equal representation of men, women, young and the elderly.

Table 1: Sample size

Region	Sample	%
Dar es Salaam	150	33.55
Morogoro	150	33.55
Njombe	150	33.55
Total	450	100.0

Response rate

A self administered technique was employed to administer the questionnaires to the respondents. A total of 450 questionnaires were collected from the three districts in Tanzania. After eliminating incomplete responses, 448 (99.6%) usable responses were retained.

Data analysis and findings

A cross-tabulation was done in order to identify the number of respondents having specific characteristics as described in tables 2, 3, 4, 5, and 6. The Chi-square statistics were used to test the statistical significance of the cross-tabulation tables. Chi-square tests whether or not the two variables are independent. If the variables are independent (have no relationship), then the results of the statistical test will be non-significant. If the variables are related, then the results of the statistical test will be statistically significant.

Gender

In terms of gender differences, table 2 shows that amongst the e-government information users, there were more males (40 per cent) compared to females (37 per cent). Contrastingly, regarding the non-users, the females (64 per cent) exceeded the males (60 per cent). Although these figures suggest gender differences between the users and non-users, these differences are not large enough to suggest the occurrence of any significance. Pearson's chi-square test (x^2 test) in table 7 illustrates that there were no significant differences between the gender of those who used the internet or websites to access government information and services and those who did not use the internet or websites to access government information and services. A Spearman correlation test was also conducted to examine if there was any association between the gender of respondents and e-government adoption. The findings suggest the absence of a significant correlation between the gender of respondents and e-government adoption (table 8).

Table 2: Gender

Gender	Non-users	Users	Total
Male	60.2%	39.8%	100.0%
Female	64.4%	35.6%	100.0%

Age

Table 3 shows that access to e-government information amongst Tanzanians decreases with age. The majority of e-government information users were between the categories of 20–40 and 31–40 years.

Table 3: Age of the respondents

Age	Non-users	Users	Total
20–30	58.6%	41.4%	100.0%
31–40	59.0%	41.0%	100.0%
41–50	67.1%	32.9%	100.0%
51–60	75.0%	25.0%	100.0%
Over 60	71.4%	28.6%	100.0%

The findings in table 3 show that e-government information users belong to the youthful and middle-aged age groups; however, the older age groups consisted of a majority of non-e-government information users. Pearson's x^2 test (table 7) confirmed that there was a difference between the ages of the users of e-government information and services and non-users of e-government information and services. A Spearman correlation test was also conducted to examine if there was any association between the age of respondents and access to e-government

information and services. The findings suggest that there was a significant negative correlation between the age of respondents and the use of e-government information and services (table 8).

Education

Table 4 shows the educational attainment of the users of e-government information and services and non-users of e-government information and services. The findings suggest that the majority of users of e-government information and services were educated to post-graduate or master's degree level (60.6 per cent) followed by respondents who had advanced diploma or university degree level (49.6 per cent) education. About 46.2 per cent users of e-government information and services had A-level qualifications. A reasonable number (44.2 per cent) of e-government information and services users had O-level secondary school education. A small number of the adopters (16 per cent) had primary school education. None of those who never attended school access e-government information and services. In comparison to the users of e-government information and services, the majority of non-users were reported to have lower levels of education. Pearson's x^2 test validated that there was a significant difference between the education levels of the users of e-government information and services and non-users of e-government information and services (table 7). Furthermore, a correlation test was conducted to examine if there was any association between the education level of respondents and access to e-government information and services. Table 8 presents the results obtained from this test. The findings suggest that there was a significantly positive correlation between the education level of respondents and access to e-government information and services (table 8).

Table 4: Education

Level of education	Non-users	Users	Total
Never attended school	100.0%	-	100.0%
Primary school	84.0%	16.0%	100.0%
O-level secondary school	55.8%	44.2%	100.0%
A-level secondary school	53.8%	46.2%	100.0%
Advanced diploma or university degree	50.4%	49.6%	100.0%
Post-graduate or master's degree	39.4%	60.6%	100.0%

Occupation

Table 5 shows the occupational categories for both the users and non-users of e-government information and services. This suggests that a total of 58.3% per cent respondents who are government employees were users of e-government information and services, and 41.7% were non-users of e-government information and services. Similar trends were observed for respondents who are working in the business sector which consisted of 48.4 per cent users compared to 51.6 per cent non-users. Respondents who were self-employed consisted of more non-users (59.6 per cent) than users (40.4 per cent). Likewise, farmers had more non-users (92.5 per cent) than users (7.5%). Academicians had less non-users (33.3 per cent) than users (66.7 per cent).

Contrastingly, the student category had more users (52.1 per cent) than non-users (47.9 per cent) (table 5). The results also revealed that the retired or unemployed were not accessing (100 per cent) e-government information and services. The findings from Pearson's x^2 test also validated that there was a significant difference between the occupational categories of users and non-

users of access to e-government information and services (table 7). A correlation test was also conducted to examine if there was an association between occupation and access to e-government information and services. The results obtained from this test suggest that there was a significant negative correlation between the occupation of respondents and access to e-government information and services (table 8).

Table 5: Occupation of the respondents

Occupation	Non-users	Users	Total
Government employee	41.7%	58.3%	100.0%
Business sector employee	51.6%	48.4%	100.0%
Self-employment	59.6%	40.4%	100.0%
Student	47.9%	52.1%	100.0%
Farmer	92.5%	7.5%	100.0%
Academician	66.7%	33.3%	100.0%
Retired/unemployed	100.0%	-	100.0%
Other	25.0%	75.0%	100.0%

Income

The findings shown in table 6 suggest that the smallest number (9.7 per cent) of users belonged to the category with less than 30,000 Tanzanian Shillings (TZS) monthly household income. The second lowest income group, that is 30,000-100,000, had more non-users (72.3 per cent) than users (27.7 per cent). Moreover, other income groups which are 101,000-400,000 and 401,000-600,000 had more users than non-users, which are 56.5% and 57.1 respectively. It was interesting to note that the income group belonging to the category of TZS 601,000-1,000,000 with higher income had more non-users (53.6 per cent) than users (46.4 per cent).

Table 6: Monthly incomes and website access

Monthly income	Non-users	Users	Total
Less than 30,000	90.3%	9.7%	100.0%
30,000–100,000	72.3%	27.7%	100.0%
101,000–400,000	43.5%	56.5%	100.0%
401,000–600,000	42.9%	57.1%	100.0%
601,000–1000,000	53.6%	46.4%	100.0%
Above 1000,000	48.4%	51.6%	100.0%
Not applicable	58.1%	41.9%	100.0%
I do not want to answer	50.0%	50.0%	100.0%

However, all the income categories above TZS 1,000,000 had more users (51.6 per cent) than non-users (48.4 per cent). Generally, the users exceeded the non-users in all the higher income level categories except for the income group belonging to the category of TZS 601,000-1,000,000. The respondents who belonged to the group of those who did not want to answer had an equal number of users (50.0 percent) and non-users (50.0 per cent). Pearson's x^2 test confirmed that there was a significant difference between the income category of users and non-users of internet or website government information and services (table 7).

Table 7: Pearson's chi-square test

Variable	Number of variable (NVC)	Degree of freedom (DF)	Significance
Gender	448	1	0.608
Age	448	5	0.024
Education	448	6	0.000
Occupation	447	7	0.000
Income	448	7	0.000

A correlation test was also conducted to examine if there was an association between income and access to e-government information and services. The results obtained from this test suggest that there was a significant positive correlation between income of respondents and access to e-government information and services (table 8).

Table 8: Spearman correlation

Variable	NVC	Correlation coefficient	Significance
Gender	448	-0.024	0.304
Age	448	-0.130	0.003
Education	448	0.355	0.000
Occupation	447	-0.323	0.000
Income	448	-0.323	0.000

Discussion

The results of this study showed that H1, H2, H3 and H5 were significant at 5% (see table 8). H4 was not significant. The findings from the chi-square test supported all the hypotheses. These hypotheses and expected results were discussed in the theoretical background section. The Spearman correlation test showed a significant relationship between income, education, age and occupation. However, as predicted earlier, this study has shown that gender cannot be used to explain e-government adoption as there was no difference in gender in e-government usage.

Education was identified as a factor which enhanced access to e-government information. Only those people with education were categorised as users of e-government information, but those with the least education and those who had never gone to school were categorised as non-users. In general, these findings are consistent with the findings from previous studies (Choudrie and Lee 2004; Choudrie and Papazafeiropoulou 2006; Dwivedi and Lal 2007; Venkatesh et al 2000). Moreover, income was an enhancing factor for those people with higher income. The number of e-government users increases as the income level rises. This finding justifies the diffusion of innovation theory, which suggests that new technologies are initially adopted by those with more resources (Choudrie and Dwivedi 2005; Carveth and Kretchmer 2002; Rogers 1995).

The results also indicated that age was an inhibiting factor to e-government adoption since e-government information users belonged to the youthful and middle-aged age groups. This result supports earlier findings that point out that there is a significant age difference in terms of the e-government users and non-users (Anderson *et al* 2002; Carveth and Kretchmer 2002; Choudrie and Lee 2004; Morgan 1986; Venkatesh, Chuan-Fong and Stolzoff 2000).

Generally, these findings showed that there was a difference between the e-government users and non-users of different types of occupation (table 5). These findings correspond to Freeman's (1995) finding that there was a significant difference between the occupational categories of adopters and non-adopters of broadband.

It was found in this study that there were no significant differences between the gender of those who use the internet or websites to access government information and services and those who do not use the internet or websites to access government information and services. These findings may also be viewed in the light of previous research, for example, Choudrie and Lee (2004) who highlighted the role of housewives in the purchasing decisions of broadband technology, and did not suggest differences in gender when considering adoption.

Conclusion

This research examined the critical factors which affect e-government adoption, and focused specifically on the socioeconomic factors. This research combined both theoretical and empirical literature on demographic variables and their effects on the adoption of a number of technologies and e-government. The purpose was to investigate the impact of various socioeconomic attributes upon citizens' adoption of e-government in Tanzania. Ignoring the e-government barriers caused by the digital divide will hinder the growth and lessen the benefits of e-government. It is important for government agencies to identify which demographic groups are being excluded from e-government and then implement policies to encourage inclusion.

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