

Adoption of E-Government Services Among Citizens in the Selected Districts of Tanzania

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Abstract

The government of Tanzania has been making efforts to provide its information and services through the use of information and communication technology. However, e-government adoption has been quite slow. Few studies explore e-government adoption in Tanzanian context; therefore, the purpose of this paper is to assess factors that influence citizen adoption of e-government in Tanzania. A multiple linear regression analysis was performed to assess the relationship between the independent variables (trust, intention to use, relative advantage, image, compatibility, perceived ease of use, perceived usefulness and social influence) with the dependent variable e-government adoption (net benefit).

The results indicate that social influence determines adoption of e-government in Tanzania. In light of these findings, researchers should conduct a similar study using other different models of e-government adoption, in order to identify more factors that influence e-government adoption in Tanzania.

Keywords

E-Government Adoption, E-Government in Tanzania, Citizen Adoption

1. Introduction

The emergence of e-government concept has made governments to discover the importance of making their services more efficient and available. The government of Tanzania recognises the imperativeness of information and communication technology in the public sector. Various technologies exist to facilitate e-government in Tanzania, such as computers, mobile devices, the internet, television, radio and many others [7]. Moreover, various e-government related initiatives have been implemented [1]. Despite the attempts to enhance provision of services using various technologies, e-government deployment is still poor. The purpose of this paper therefore, is to assess factors that influence citizen adoption of e-government in Tanzania. To pursue this line of inquiry, this research uses Davis [2] model, Rogers [3] model, Trustworthiness [4] and the UTAUT model [5]. The integration of models has not been done in the existing literature of e-government adoption in Tanzania. The study is original in that it involved Tanzanian citizens from Dar es Salaam, Morogoro and Iringa, thus representing urban, peri-urban and rural Tanzania regions, while most of e-government studies in Tanzania have concentrated on the public sector organisations (G2G) alone. The paper is divided into four parts: the first part presents the theoretical framework of the study and reviews the accumulated knowledge and available literature that is relevant to the topic. Several hypothesised relationships are formulated between e-government adoption and major independent variables. The second part presents the research methodology used in this work. The third part comprises of the research hypotheses testing and result. In this part, the data is analysed using factor analyses, linear regression and correlation analyses. The fourth part comprises of discussion of the findings. The final part consists of conclusions and recommendations.

2. Theoretical Framework

The conceptual framework of this study addresses the key factors related to e-government adoption. The proposed model and theories follows the TAM and explains the intention towards the actual use of e-government website with perceived usefulness and perceived ease of use as e-government adoption determinants [2]. Rogers [3] model was used to measure relative advantage, compatibility, social influence and image.

A. Social Influence

Social influence is defined as the degree to which peers influence use of a system. Whether this is positive or negative; it is a very important factor in many aspects of the lives of citizens and is likely to be influential [5]. Relevant references, such as citizen's family, colleagues and friends may have an influence on citizens' decisions [6]. The findings of many scholars like Rogers [3], Taylor and Todd [8], and Pavlou and Fygenson [9] suggest that social influences are an important determinant of behaviour. Thus, the following hypothesis is proposed:

- H1a: There is a significant relationship between social influence and e-government adoption in Tanzania
- H1b: Social influence is positively related to e-government adoption

B. Compatibility

Compatibility can take on a very broad meaning. Moore and Benbasat [10] introduced the concept of work practice compatibility. Work practice compatibility can be further refined into task compatibility, workflow compatibility and professional compatibility [11]. Karahanna, Agarwal and Angst [12] also defined various forms of compatibility such as compatibility with values, past experience, current practices and preferred practices. In the context of this research, compatibility is defined as a citizen's belief that e-government fits the way one works and lives [3]. If citizens find e-government services compatible, then it is likely that they will want to use it. This led to the following hypotheses:

- H2a: There is a significant relationship between perceived compatibility and e-government adoption in Tanzania
- H2b: Higher levels of perceived compatibility is positively related to higher levels of intention to use a state e-government service.

C. Perceived ease of use (PEOU) and Perceived Usefulness (PU)

Perceived usefulness was originally defined by Davis as the belief that using a particular system would enhance one's job performance [2]. Perceived ease of use refers to one's perceptions of the amount of effort required to use the system. The model predicts that higher perceptions of usefulness and ease of use will increase intention to use a system [2]. This led to the following hypotheses:

- H3a: There is a significant relationship between perceived usefulness and e-government adoption
- H3b: Higher levels of perceived usefulness is positively related to higher levels e-government adoption

- H3c: There is a significant relationship between perceived ease of use and e-government adoption
- H3d: Higher levels of perceived ease of use is positively related to higher levels of e-government adoption.

D. Trust

Trust is the belief that the other party will behave as expected in a socially responsible manner, and in doing so, it will fulfil the trusting party's expectations [13]. Trust is crucial in economic transactions because it reduces the risk of falling victim to opportunistic behaviour [14]. Perceptions of trustworthiness could also influence citizens' intention to use state e-government services [4]. Thus, it should be imperative to establish citizen trust in e-government if it is to succeed [14]. From these discussions, the following hypotheses were formulated:

- H4a: There is a significant relationship between perceived trust and e-government adoption in Tanzania.
- H4b: Higher level of trust in the government is positively related to e-government adoption.

E. Relative Advantage

According to Rogers [3], relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. When e-government is used it contributes to valuable promotions of the company; enhance the quality and speed of customer services; create competitive advantages; entice shoppers and encourage customer interaction; support core business functions that are integral to business strategy; and provide new business opportunities by increasing market presence and facilitating online purchasing [15]. According to Polatoglu and Ekin [16] these advantages may have an effect on individuals' adoption decisions. Agarwal and Prasad [17] found that there is no significant relationship between adoption of online services and its relative advantages. From the above debate, it is apparent that an individual, who perceives online services as a useful innovation, would be likely to adopt the online service. This led to the following hypothesis:

- H5a: There is a significant relationship between e-government adoption and its relative advantage
- H5b: Higher levels of perceived relative advantage is positively related to e-government adoption

F. Image

Image construct is defined as the degree to which an individual believes that the adoption of an innovation will bestow him with added prestige in his relevant (Plouffe, Hulland & Vanderbosch [18]). Moore and Benbasat [10] present image, as a factor that influences the acceptance and use of an innovation. In contrast to this observation, Carter and Belanger [4] suggested that higher levels of perceived image do not directly affect citizen's intentions to use e-government services. This is also consistent with previous work where image was not a good predictor of e-commerce use intention when compared to the other diffusion of innovation constructs (Van Slyke, Belanger & Comunale [19]). From the above debate, it is apparent that perceived image does not affect e-government adoption. Thus, the following hypothesis was formulated:

- H6a: There is a significant relationship between perceived image and e-government adoption
- H6b: Higher levels of perceived image will be positively related to higher levels of e-government adoption

III. Methodology

To test the proposed model for this study, a questionnaire was designed to gather the necessary information. The questionnaire was pre-tested using convenience sampling in order to increase the reliability and validity of the findings.

A. Sample Size and Questionnaire Administration

This study used the non-probability method, which is also referred as quota sampling [20]. Quota sampling method was used in this study due to the following reasons; it was not possible to get a list of households and participants in advance, limited budget, and financial constraints. Additionally, it was difficult to use probability sampling methods due to the fact that Tanzania does not have a systematic arrangement of habitation [21]. Therefore, it was not possible to sample households and participants using simple random approach.

Participants were drawn in each of the three wards in each district. 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. In the households, participants were purposively selected based on their position in the house, age and gender. The study strived to have an equal representation of men, women, young and the elderly.

Regions, districts and wards were selected purposively based on accessibility by roads; presence of public access ICTs such as telecentres, internet cafes; a diverse combination of urban area, peri-urban area and rural areas, geographical location and economic activities taking place in these regions. The selection of urban, peri-urban and remote regions means that a representation of the whole country was assured. The questionnaire was administered to 450 citizens in the three Tanzanian districts. After eliminating incomplete responses, 448 usable responses were retained.

IV. Research Hypotheses Testing and Findings

This section demonstrates the results of factor analysis of intention to use, relative advantage, image, compatibility, perceived ease of use, perceived usefulness and social influence. These factors were used as independent variables in the subsequent analysis. This study assessed the internal consistency of the entire scale with the use of Cronbach's Alpha [22]. Furthermore, Factor Analysis was employed for the validation of the model. A multiple linear regression analysis was performed to assess the relationship between the independent variables (trust, intention to use, relative advantage, image, compatibility, perceived ease of use, perceived usefulness and social influence) with the dependent variable e-government adoption (net benefit).

A. Factor Analysis

1. Trust

Seven items were used to measure trust. All the items strongly correlated and were significant at the 0.01 level. Factor analysis can be done on the items since the items are correlated. The factor analysis results indicate that the items are valid, as the KMO measure is 0.852 and Bartlett's Test of Sphericity was significant (0.000). Factor analysis led to two factors, and all the items had a significant loading (Table 1). The first factor was labelled *trus_1* and the second factor was labelled *trus_2*. The Cronbach alpha

for the entire scale was found to be 0.876, which shows that the internal consistency was high.

Table 1: Factor Analysis of Trust

Item	Component	
	1	2
504c	.920	.253
504b	.908	.267
504a	.879	.258
504d	.877	.317
505b	.266	.923
505c	.232	.915
505a	.327	.841

2. Intention to Use

Four items were used to measure intention to use. All the items are strongly correlated and significant at the 0.01 level. The result of KMO measure of sampling adequacy was 0.737, which is good for factor analysis. The Bartlett’s Test of Sphericity was found to be significant at 0.000. As displayed in Table 2, the entire load is on one factor, which is labelled int_us1. The internal consistency of scores on the four items is good, with Crobach alpha at 0.860. This suggest that these items can be used together to create a composite variable for the intention to use factor.

Table 2: Factor Analysis of Intention to Use

Item	Component
	1
I intend to increase my use of an internet to access government information in the future	.930
I intend to continue using internet to access government information in the future	.900
I will continue using internet to access government information in the future	.834
I will regularly use internet to access government information in the future	.766

3. Relative Advantage

Four items were used to measure relative advantage. All the items are strongly correlated and significant at 0.01 level. The results of KMO measure of sampling adequacy was 0.803, which can be used for factor analysis. The Bartlett’s Test of Sphericity was found to be significant at 0.000. As displayed in Table 3, the entire load is on one factor. The internal consistency of scores on the four items is good, with Crobach alpha at 0.847. This suggests that the items can be used together to create a composite variable for the relative advantage factor and is labelled rel_ad1.

Table 3: Factor Analysis of Relative Advantage

Item	Component
Internet enables me to meet my government information needs	.883
Internet offers me personalized government services	.856
Using internet to access government information enabled me to better manage my daily activities	.842
Using internet enables me to have access to timely government information and services	.729

4. Image

Five items were used to measure the image factor. The KMO measure of sampling adequacy was 0.698, which is sufficient for factor analysis. The Bartlett’s Test of Sphericity is significant at 0.000. The correlations are significant at 0.01 level. The factor analysis led to two factors, and all items had a significant loading as indicted in Table 4. The first factor is labelled imag_1 and the second is labelled as imag_2. The items had internal consistency with Crobach alpha at 0.717, which indicates inter-relatedness between the items. After factor analysis, the value of alpha dropped to 0.257. This could be due to low number of questions. The items would be discarded if a low Crobach alpha is due to poor correlation between items.

Table 4: Factor Analysis of Image

	Component	
	1	2
People who use internet to obtain government information are trendy	.899	.018
Using internet to obtain government information improves my image	.885	.090
People who use the internet to obtain government information are IT savvy	.884	.145
Only young people use internet to obtain government information	-.001	.864
People who use internet to obtain government information have more prestige	.166	.832

5. Compatibility

Four items were used to measure compatibility. All the items are strongly correlated and significant at the 0.01 level. The result of KMO measure of sampling adequacy was 0.835 which is good for factor analysis and the Bartlett’s Test of Sphericity was found to be significant at 0.000. As displayed in Table 5 the factor analysis results led to one factor. The Crobach’s alpha for the entire scale was found to be very high (0.941). These results suggest that these items can be used together to create a composite variable for compatibility factor. The items in this factor are labelled as Comp_ty.

Table 5: Factor Analysis of Compatibility

Item	Component
	1
I think that using internet to obtain government information fits well with the way I live my life	.951
Using internet fits well with my lifestyle	.923
Using internet is compatible with all aspect of my life	.915
Using internet to access government information is completely compatible with my current situation	.898

6. Perceived Ease of Use

Three items were used to measure perceived ease of use. All the items are strongly correlated and are significant at 0.01 level. KMO measure of sampling adequacy was 0.631 and the Bartlett’s Test

of Sphericity was significant at 0.000. These values allow factor analysis. As displayed in Table 6 the entire load is on one factor and is labelled peaou. The Crobranch's alpha for the entire scale was found to be 0.788, which means that the internal consistency of the items is good.

Table 6: Factor Analysis of Perceived Ease of Use

Item	Component
Navigation: it is easy to navigate around the government website	.911
Usability: it is easy to use internet to obtain government information and service	.876
Accessibility: the government websites provides access for persons with disabilities	.732

7. Perceived Usefulness

Five items were used to measure perceived usefulness. All the items are strongly correlated and significant at 0.01 level. The result of KMO sampling adequacy was 0.792 which is good for factor analysis and the Bartlett's Test of Sphericity was found to be significant at 0.000. The results of factor analysis reveal that all the items loaded in one factor, which was labelled as PU (Table 7). The Crobranch's alpha for the entire scale was found to be 0.869, which indicates high internal consistency of the items.

Table 7: Factor Analysis of Perceived Usefulness

Item	Component
Timeliness: usually the government information from the government website is up-to-date	.866
Accountability: I am able to communicate with government officials though the government website/email/internet	.838
Content: the website provide the precise government information I need	.824
Transparency: the government website enable me to actively give my opinion to the government	.821
Pricing: I save money and time when using information from the government website	.699

8. Social Influence

Six items were used to measure social influence. The correlation table shows that all the correlations are significant at 0.01 level. Factor analysis can be carried out as the items are correlated. The factor analysis results indicate that the items are valid, as the KMO measure is 0.914 and the Bartlett's Test of Sphericity is significant at 0.000. All the factors loaded together to produce one factor, which was labelled as soc_inf (Table 8). The internal consistency of scores on the six items is very high, with Crobranch alpha at 0.957. This suggests that these items can be used together to create a composite variable for the social influence factor.

Table 8: Factor Analysis of Social Influence

Item	Component
If your family would look favourably on you for accessing information on the internet	.943
If your friends would look favourably on you for accessing government information on the internet	.938
If your leader from local government access government information on the internet	.912
If your close friend access government information on the internet	.905
If it is a culture in my community to access government information on the internet	.884
My decision to access, (or not to access) government information on the internet is influenced by my family/friends	.866

9. Net Benefit

Net benefit was measured by twelve (12) items. All items are strongly correlated at 0.01 level of significance, which gives a strong base to continue with factor analysis. Before proceeding with factor analysis the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test were conducted to determine whether or not it was appropriate to conduct factor analysis. The determined KMO measure of sampling adequacy was 0.872. The Bartlett's test of Sphericity was found to be significant (0.000). The results suggested that the data could support factor analysis. Crobranch's alpha was calculated among the twelve set of variables used in the factor analysis to determine the reliability of those questions for measuring a single construct. The value of Crobranch alpha was 0.898 hence good internal consistency of the scores for the twelve items. This is due to the fact that the level of alpha that indicates an acceptable level of reliability is 0.70 or higher. The factor analysis results are presented in Table 9.

Table 9: Factor Analysis of Net Benefit

Item	Component	
	1	2
Increased income	.850	.003
Accessed new and better markets	.796	.245
Job opportunities	.703	.219
Access to medical services	.701	-.172
Improved living standards	.701	.359
New and better opportunities	.692	.450
Business improved or expanded	.613	.444
Access to educational opportunities	.504	.453
Make rational decision and take appropriate actions	.103	.876
Improvement in skills	.168	.867
Improved in awareness of government services	.043	.864
Easy coordination of activities	.309	.835

As noted from Table 9, the exploratory factor analysis yielded two constructs from the twelve items. The factor loadings of the items ranged from 0.5 to 0.9. The weight of all the factor items is not less than 0.5. These factors are listed as ne_1 and ne_2.

B. Regression Results

Multiple linear regression analysis was then performed on the factors which were validated using factor analysis in order to test the hypotheses. The results are presented in Table 10 below.

Table 10: Regression Results for Factors Influencing E-Government Adoption

	Coefficients	Std. Error	T	Sig.
(Constant)	1.831	.370		
trus_1	.116	.076	1.532	.127
trus_2	.128	.088	1.450	.148
int_us1	-.206	.075	-2.748	.006
rel_ad1	.004	.069	.054	.957
imag_1	.098	.063	1.561	.120
imag_2	.083	.055	1.493	.137
comp_ty	.040	.054	.750	.454
Peaou	-.002	.073	-.023	.982
Pu	.051	.075	.674	.501
soc_inf	.123	.046	2.694	.008

V. Discussion

This section discusses the results of a survey targeted towards e-government adoption in Tanzania. The significant and non-significant factors found in the study and their influences on practice are outlined below.

A. Significant Results

Of the adoption factors (Table 10), only social influence had a significant impact on e-government adoption in Tanzania as discussed below:

1. Social Influence

H1a and H1b are supported. This means that social influence had a significant positive relationship with e-government adoption. This implies that e-government adopters were influenced by positive messages from their social networks, hence a strong behavioural intention to adopt the e-government systems. Other scholars concur with this finding as noted in their postulations that social influences are an important determinant of behaviour [3]. These findings may also be viewed in the light of previous research. For example, Gupta, Dasgupta and Gupta [22] and Al-Shafi and Weerakkody [23] explored the adoption of e-government in Qatar and found that social influence determine citizens' use of e-government.

B. Non-significant Factors

It is often interesting to evaluate not only significant results, but also unexpected results, especially in a relatively new field, such as e-government [4]. Compatibility, trust, relative advantage, perceived ease of use, perceived usefulness, and image were found to be insignificant in terms of explaining factors that influence access to e-government information and e-government adoption in Tanzania. An interpretation of these results is presented below.

1. Compatibility

H2a was rejected, and H2b was supported. This means that citizens may have higher intentions to use e-government services than those who view these services as incompatible with their lifestyles. Surprisingly, the strength of this relationship is not statistically

significant, which means that compatibility does not matter in explaining e-government adoption in Tanzania. On the contrary, Karahanna, Agarwal & Angst [12] are of the opinion that higher levels of perceived compatibility are associated with increased intentions to adopt e-government.

2. Trust

H4a was rejected. This means that, trust was positively related to e-government use, but the association with e-government adoption was not significant. These findings contradict the findings of previous studies, which argue that trust should be imperative to establish citizen trust in e-government if it is to succeed [14]. In the Tanzanian context, the trust factor cannot be used to explain e-government adoption. However, these findings are consistent with the research findings by Carter and Belanger [4] who reported that trust in e-government does not have a direct effect on the use of e-government. Trust in the government does not have a direct effect on intention to use state e-government services. Citizens frequently interact with the government agencies to seek government information and services, such as the processing of admission for universities, to seek information about national examination results, etc. These activities must be completed regardless of the level of trust an individual has in the government.

3. Relative Advantage

H5a was rejected and H5b was supported. This means that relative advantage is not significantly related to e-government adoption, although their relationship was positive. According to Rogers [3], relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The use of e-government contributes to valuable promotions of the company; enhances the quality and speed of customer services; creates competitive advantages; entices shoppers and encourages customer interaction; supports core business functions that are integral to business strategy; and provides new business opportunities by increasing market presence and facilitating online purchasing (Drinjak, Altmann & Phil [15]; Polatoglu & Ekin [16]). According to Polatoglu & Ekin [16], these advantages may have an effect on individuals' adoption decisions. However, it was surprising to find in this study that relative advantage is a non-significant predictor of e-government adoption. This study is in line with Agarwal and Prasad [17] who found that there is no significant relationship between adoptions of online services and its relative advantages. This is probably because of a desire to adopt new technologies born out of curiosity about innovation rather than benefits innovation might offer.

4. Perceived ease of use (PEOU) and Perceived Usefulness (PU)

H3c, H3d, H3a were rejected while H3b was supported. This means that PEOU and PU are not significantly related to e-government adoption. PEOU had a negative relationship with e-government adoption while PU had a positive relationship with e-government adoption. Perceived usefulness was originally defined as the belief that using a particular system would enhance one's job performance [2]. Perceived ease of use refers to one's perceptions of the amount of effort required to use the system. In contrast to the finding of this study, Davis [2] model predicts that higher perceptions of usefulness and ease of use will increase intention to use a system [2].

In addition, Lin, Fofana & Liang [24] assessed citizen adoption in Gambia and their findings indicated that perceived ease of use significantly affect citizen's attitude to use the e-government systems. However, Gambias perceived usefulness was found to have a weak link intention to use e-government systems. In this study, it was found that perceived usefulness had a positive relationship with e-government adoption. This means that perceived usefulness enhances e-government adoption. In contrast, perceived ease of use, as appears in Table 1-23, had a negative relationship with e-government adoption. However, these factors are not significant meaning that they cannot be used to explain e-government adoption in Tanzania.

5. Image

H6a was rejected and H6b was supported. This means that image is not significant in determining e-government adoption in Tanzania. Although the analysis carried out in Table 1-23 showed that image is positively related to e-government; it did not play a role in influencing the dependent variable in this study. This result is in line with Carter and Belanger [4], who suggested that higher levels of perceived image do not directly affect citizens' intentions to use e-government services. Image is insignificant probably because of the collectivistic culture of the country where this study is conducted [25]. In a collectivistic society, people might consider too much differentiation and rewards for any reason as inimical to the fundamental goal of maintaining harmony in groups [26]. There may be little incentive in trying to gain high prestige, which would make one distinctive from the rest. Thus regardless of whether the use of the service can bestow higher image, the senior citizens' perception of the service will not be significantly affected.

VI. Conclusion and Recommendations

Social influence is the only factor that explains e-government adoption Tanzania. However, compatibility, perceived usefulness, trust, relative advantage, and image were found to be insignificant in terms of explaining e-government adoption in Tanzania. Furthermore, it can be concluded that this study extends the theoretical knowledge in the area of citizens' adoption of technology (in this case, e-government applications and services) by testing a combination of models in the Tanzania context.

It is therefore recommended that a similar study (e-government adoption G2C) be conducted using different models of e-government adoption; in order identify factors, which influence the adoption of e-government in Tanzania.

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