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A Multi-Group Analysis of Salient Determinants of E-government Implementation Success in Developing Countries. A Study of Uganda and Tanzania

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Abstract

In-spite of the presence of all-encompassing synopsis of e-government implementation determinants in Most developed countries, a multi-group analysis of contextual salient determinants is missing in DCs. When it comes to implementation of e-government projects, most developing countries just copy already implemented projects from MDCs and paste without editing to suit their nations. This has resulted into massive failure of such e-projects partly due to failure to account the salient determinants of e-government implementation success which vary from one nation to another. This study bridges this knowledge gap by examining a multi-group analysis of contextual salient determinants of e-government implementation success in Uganda and Tanzania. Structured questionnaires were used to pucker quantitative data from the 72 employees and 64 employees from Ministries of finance and planning in Uganda and Tanzania respectively. PLS–SEM aided by SmartPLS 3 were used for analysis. Using UTAUT and empirical evidence, a model was proposed. Findings indicate insignificant results for information system attribute while all other constructs were significant. Findings for Tanzania indicated insignificant results for ICTI and ISA and positive significant results for TMS and UA. The Ugandan data set indicated insignificant results for ISA and TMS and positive significant results for ICTI and UA.

Keywords: Salient determinants, e-government implementation, developing cCountries, multi group analysis
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Introduction

Of recent, most nations have embarked on e-government implementation since it has become a global measure of economic growth and development (Salehi, Abdollahbeigi & Sajjady, 2021; Elbahnasawy, 2021; Malodia *et al.*, 2021). Numerous authors have done a prodigious job of

providing empirical foundations regarding e-government implementation success factors (Uyar *et al.*, 2021; Glyptis *et al.*, 2020). Globally, e-government implementation especially in most developed countries has brought supplementary benefits with success stories and these may entail; 24/7 e-service delivery, transparency and accountability, increased effectiveness and efficiency, cost reduction, increased e-participation, among others (Gong *et al.*, 2020; Kagoya & Mbamba, 2020). It should be recalled that e-government can be termed as the utilisation of ICTs by the government to deliver e-services to the end users who are the citizens, 24/7 without interruptions (Kagoya & Gilbert, 2020). It may also mean the state functions which are in digital format (Malodia *et al.*, 2021; Halsbenning *et al.*, 2021).

E-government implementation in Tanzania and Uganda has been studied by prior authors to ascertain the level of adoption (Kagoya & Mbamba, 2021, Khamis, 2020; Kagoya &). For instance, Sichone and Mbamba (2021) noted that there was need to identify the key factors impacting the satisfaction of users and e-service quality which necessitated the development of a framework for e-government implementation success. Similarly, Anwer *et al.* (2016) echoed that in Tanzania, the user satisfaction perception about e-government services is not definite because the varying observational views given by prior authors. Magayane *et al.* (2016) portrayed that Tanzania is at digital presence and interaction stage in terms of e-government implementation, but there is absence of e-readiness by majority citizens (Kagoya & Gilbert, 2020). On the other side, Uganda has websites for e-government service and information delivery to citizens. However, majority of the Ugandan citizens are not aware of such e-services, that are available due to failure of e-government developers to involve them in active participation of e-government implementation (Kagoya & Mbamba, 2021). These two developing nations were the appropriate choices for this the multigroup analysis due to the fact that, they face some similar ICT related hitches when it comes to e-government implementation aspects (Kagoya& Mbamba, 2021).

This study has acknowledged the incredible work done by previous scholars have continued to propose and develop e-government frameworks (Malodia *et al.*, 2021; Ahmad *et al.*, 2021; Singh *et al.*, 2020; Roblek *et al.*, 2020; Dias, 2020), e-government readiness assessment tools (Alghamdi, Goodwin & Rampersad, 2016; Assefa *et al.*, 2021; Kagoya & Gilbert, 2020; Haydari, 2020; Pal, Singh & Dhaliwal, 2020). And other studies have suggested models for e-government implementation (Elbahnasawy, 2021; Li & Xue, 2021; Sharma *et al.*, 2021; Li, 2021; Alkraiji, 2020). In spite of the great empirical literature provided by preceding authors in line with e-government, there is has not been a study addressing the a multigroup analysis of the key salient determinants for e-government implementation success in developing countries like Uganda and Tanzania.

Furthermore, the reviewed literature confirms that, majority of such studies were conducted mainly in most developed economies using qualitative research approach which makes their findings un generalizable to developing economies like Uganda and Tanzania (Kagoya & Gilbert, 2020). Worse still, those which were implemented in developing nations, 70% failed since they were just copied from those most developed countries with different technological, social, economic, ecological, political and geographical settings (Kagoya & Mbamba, 2021). Hinged on this background, the need to reduce this high failure rate e-government projects in developing countries under study, motivates this study. This study specifically grouped salient determinants into four (user attributes, information system attributes,

top management support and information and communication technology infrastructure attributes) to serve the contextual aspects of Uganda and Tanzania.

Literature review

Theoretical background

Prior studies emphasize the need for writing quantitative research supported by theoretical background to get rid of biasness, which may affect the actual field results (Kazdin, 2021; Schreurs & Vandenbosch, 2021;). It is also imperative to note that theoretical background tend to align the objectives, methods plus research findings which makes the study more clear, linked and understandable (Chu *et al.*, 2021; Zina, 2021).

Unified Theory of Acceptance and Use of Technology (UTAUT)

Preceding researchers about UTAUT theory as developed by Venkatesh *et al.* (2003) assert that it is regarded as a reflection on beliefs of an individual's internal schema (Venkatesh, Thong & Xu, 2016; Joa & Magsamen-Conrad, 2021; Eapen, 2021). UTAUT which modifies TAM model, comprises of eight competing technology acceptance models of Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), motivation model, innovation diffusion theory, TAM/TPB combined PC utilization model, and social cognitive theory.

UTAUT theorizes that an individual's behavioural intention to use technology, is influenced by performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh, 2021; Arfi, Nasr, Khvatova & Zaied, 2021). Given its importance in the field of e-government and information system research areas, voluminous researchers have utilized UTAUT in their studies (such as; Venkatesh, 2021; Qaid, Samikoni & Fahmi, 2021; Kagoya & Mbamba, 2021; Altalhi, 2021; Maznorbalia & Awalluddin, 2021; Kagoya & Mbamba, 2021; Raza *et al.*, 2021; Abbad, 2021; Kagoya & Mbamba, 2020; Almaiah & Nasereddin, 2020; Kagoya & Mkwizu, 2020). For instance, Almaiah and Nasereddin (2020) used UTAUT theory for examining factors affecting e-government services adoption among the citizens of Jordan, while Eapen (2021) used UTAUT theory of adoption for establishing the clinical support systems.

Additionally, UTAUT theory was applied by Venkatesh (2021) in the adoption and usage of Artificial tools, whereas Raza *et al.* (2021) applied UTAUT in Covid-19 pandemic for acceptance and social isolation via learning management system. Additionally, Kurfali *et al.* (2017) used UTAUT in the Turkish study on e-government adoption, while Kagoya and Mbamba (2021) used UTAUT to assess e-government implementation factors in Tanzania and their findings divulged that key attribute from individual users and support from key top managers, were paramount for successful implementation of e-government. Moreover, Maznorbalia and Awalluddin (2021) utilized UTAUT theory in analyzing the acceptance of e-government system by end-users in Sintok, Malaysia. On the contrary, this study intends to apply UTAUT theory to ascertain the salient determinants of e-government implementation success in Uganda and Tanzania as part of the developing nations on the African continent. The reason for

utilizing UTAUT in this study is to identify the contextual specific individual beliefs which influence the users' acceptance to use e-government systems in both Uganda and Tanzania. UTAUT is useful in this study as it lays a theoretical contribution by supporting the exogenous variables such as user attributes, where by individual end users are able to accept, adopt and use the technology with the support from top management. This support may be in terms of ICT infrastructure, information system support, ICT training, hardware and software; among others, in the context of Uganda and Tanzania.

This study differed from previous studies in that, it proposed an additional variable of user attributes to the UTAUT while others studies conceptualized it, as e-readiness, peer influence (AlAwadhi & Moris, 2008; Al-rawahna, Chen, Hung, 2018). More so, this study is of the view that, peer pressure (one of the user attributes) may influence e-government implementation success which is supported by UTAUT through its indicator of social influence. Furthermore, using UTAUT together with a support of empirical evidence, a model with four exogenous latent variables and one endogenous latent variable was proposed. The model proposed the salient determinants of e-government implementations success namely user attributes (UA), Information System Attributes (ISA), top management support (TMS) and Information and Communication Technology Infrastructure attributes (ICTI).

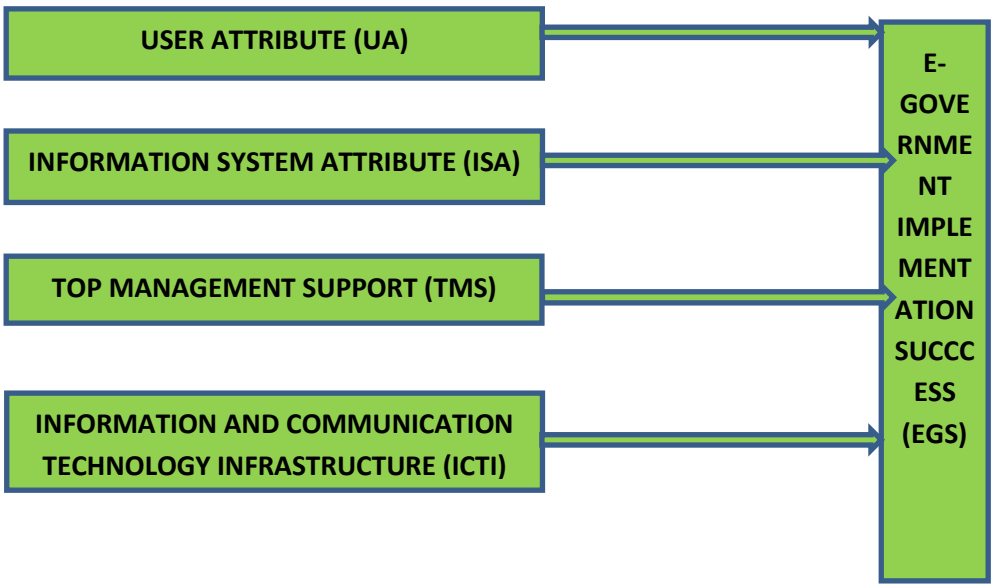

Figure 1: E-government implementation model for developing countries (Source: Literature review)

Empirical literature review

Gerger (2021) conducted a study to determine the critical factors to assess the usability of web 2.0 technologies for e-government transparency and effectiveness. Findings culminated into the formation of some critical success factors for e-government implementation and these were; transparent, human-cantered e-government applications, applicability, dynamic and social

aspects. Khan, Krishnan & Dhir (2021) studied e-government and corruption via a systematic literature review of 63 articles. The study developed an integrated framework to guide the e-government developers, government policy makers and future researchers on a clear understanding of e-government aspects.

Yera *et al.* (2015) conducted a study in Europe to examine the characterization of the adoption of e-government via ranking the measures of e-readiness. The findings of the ranking comparison revealed that E-government Use Index ($EGUI^{+}$) correlated at 5% level of significance with the four indexes, hence contributing to the clarity regarding the key factors affecting e-government usage in Europe plus its various stages of adoption. Manoharan *et al*. (2021) established five superlative groups for city e-governments which entailed: content, usability, services, security and privacy, social and citizen engagement.

Correspondingly, the author identified three groups of developers of e-governance and opined that, it was only in the development curve central point, that possess fastest growing cities thus depicting a climber marvel in the world dispersion drifts of e-governance. Contrarywise, this current study asserts that, there is need for developing countries (such as, Uganda and Tanzania) to conduct a multigroup analysis to ascertain the specific contextual salient determinants of e-government implementation success and avoid copy and paste mechanism of successful e-projects from MDCs. This will eventually aid in reducing the massive failure of such e-projects in developing countries as suggested by Kagoya and Mbamba (2021).

Additionally, Amogoh (2016) conducted a study in Nigeria to ascertain the e-government diffusion determinants using questionnaires, with queries regarding the three models (TAM, DOI and UTAUT). Findings opined that, the two prominent factors of reliability of electricity supply and trust in government were not within the theoretical dimensions, perhaps due to contextual differences. Kagoya and Gilbert (2020) evaluated e-government readiness in the Ugandan Ministries of ICT and national guidance, Finance, planning and economic development and Ministry of works and transport. Using descriptive statistical analysis on the gathered quantitative data, the results envisaged the development of EGRAF (E-government readiness assessment framework) for Uganda to enhance the citizen awareness about e-government for easy adoption and user participation purposes, hence increased e-government readiness.

Kagoya and Mbamba (2021) conducted a study about e-government implementation in Uganda, using positivism philosophical research orientations and deductive quantitative approach, results depicted that top management support, acts as moderating exogenous variable in the relationship between e-government implementation and user participation attributes in the Ugandan context. In this study, top management support is a predictor in both Uganda and Tanzania and not a moderator, and the difference perhaps is due to the differences in the time lag and the respondents' views by the time of the study. This also implies that top management support can be used as both a predictor and a moderator in the Ugandan context, when it comes to e-government implementation success.

Prior authors in Yemen institute of higher learning developed a conceptual e-government theoretical model based on UTAUT plus ICT innovations for lecturers' adoption that give a theoretical contribution and strategies for upcoming researchers in the developing world in line with e-government adoption and implementation (Qaid, Samikoni & Fahmi, 2021). Finally, Moon (2002) argue that, e-government implementation effectiveness and scope vary from nation to nation. The author asserted that some countries' e-government projects were developed based

on their websites and the Internet aid users during interactivity and usability purposes. Equally, some nations' e-government maturity stages differ from one another depending on the varying factors, such as economic status, political, social, cultural, technological and environmental factors (Shareef *et al.,* 2021; Kagoya & Mbamba, 2021; Ingrams *et al.,* 2020). Therefore, this research study suggests that, irrespective of the level of e-government development, a nation is at, e-government developers coupled with others key e-government stakeholders must consider the contextual salient determinants stipulated in the model, for successful e-government implementation. Some countries' e-government projects were developed based on their websites and the Internet that aid users during interactivity and usability purposes (Manoharan *et al*., 2021; Verkijika, & De Wet, 2018).

Methodology

This study was carried out in the contexts of Uganda and Tanzania to examine the silent determinants of e-government implementation success in less developed countries (LDCS). A cross sectional design and structured questionnaires were used to pucker quantitative data from the 72 employees and 64 employees from ministry of finance in Uganda and ministry of finance and planning in Tanzania respectively. The study population included all e-government users (employees) in ministries for both Uganda and Tanzania.

To avoid the situation of some respondents being reluctant in responding to the questions presented to them, the study opted for non-probabilistic sampling procedure and the respondents were conveniently and purposively selected. Uganda and Tanzania were chosen as countries of survey due to convenience of the researchers in terms of time and financial resources. The choice of the aforesaid Ministries was that, their respondents were exercising government electronic operations (MO ICT report, 2018; United Republic of Tanzania, 2014) and also the selected ministries were good representatives of the rest of the ministries in both countries since they are managing 90 %most of the ICT related national projects (Kagoya & Mbamba, 2020). Thus, Kampala and Dar es Salaam cities in were included and prior information to these cities were obtained, to know the respondents who were using the systems for their inclusion in the study.

The survey tool covered questions related to the user participation (including their attributes, IS attributes as well as ICT infrastructure that can affect usage); top management support; and e-government implementation success. Knowing the criticality of ethical consideration as advocated by previous researchers (Williamson *et al.,* 2021; Creswell *et al.*, 2021; Vol *et al.,* 2021), the study obtained consent from respondents and protected the interest of the respondent to safeguard the privacy and confidentiality issues which helped in reducing biasness hence acting as part of the common method bias (Kock, Berbekova & Assaf, 2021; Buijs & Jacobs, 2021) . Also the study at the introduction part of the questionnaire, the respondents were assured on their anonymity and confiidentialty. This effort enabled respondents to be open on reponding to the questions addresed to them (Poerwandari, 2021).

The study used a PLS-MGA (Partial Least Squared – Multi-group Analysis for data analysis which was suitable for comparative analysis between two countries results in the scope. It worth noting that, PLS-MGA assesses the measurement characteristics of the latent constructs comprising of the MICOM procedure hence supplementing on the accuracy level of the findings (Ritchie *et al.,* 2020; Dewi, Mohaidin & Murshid, 2019). Additionally, it aids researchers to

advance on the possibility of attaining vital and significant differences across group-specific results among numerous relationships that builds on PLS-SEM bootstrapping results (Hair *et al.*, 2018; Sarstedt *et al.*, 2018). More so, PLS MGA being an extension of the original Henseler's MGA non-parametric significant test (Olya *et al.*, 2021; Sarstedt *et al.*, 2011), enabled the researchers to unearth dissimilarities of sub elements/ subsamples from the total population.

The quantitative data obtained, was screened before performing the analysis and the screening involved checking for the accuracy of the data entered into a system, suspicious response patterns and missing data (Mücke *et al.*, 2021; Chung *et al.*, 2021). Data analysis involved descriptive, discriminant validity, convergent validity and composite reliability tests (Pontes *et al.*, 2021; Hair *et al.*, 2017). Variable items similar to the study problem were adapted from Fan and Yang (2015), which ensured more efficiency for validity and reliability (Rehman Khan &, 2021; Low *et al.*, 2021) and were able to answer research questions and meet the objectives (Saunders, 2021; Perucchetti *et al.*, 2021).

Results

Descriptive Statistics of the Sample

Table 1 revealed that of the 136 respondents 64 (47%) were from Tanzania and 72 (53%) were from Tanzania, this indicates nearer equal representation of the respondents from both countries. Furthermore, based on gender majority of the respondents in both countries were male 87 (64%) however, there was a significant number of female respondents 49 (36%), an indication that both male and female respondents were considered in a significant number under this study.

Table 1: Demographic Information

	Gender		
Country	Male	Female	Total
Tanzania	37	27	64
Uganda	50	22	72
Total	87	49	136

Assessment of Measurement Model

Initially the model was validated for the whole sample and then was grouped into two groups that are a sample contains responses from Tanzania and Uganda. After running the PLS algorithms the model result reveal that all measures meet the required criteria as describe in the Table 2 below.

Table 2: Country Specific Results

Latent Variables		**Tanzania**	**Uganda**	**All**
EGS	CR	0.959	0.910	0.934
	AVE	0.825	0.673	0.739
ICTI	CR	0.868	0.706	0.804
	AVE	0.623	0.385	0.507

ISA	CR	0.897	0.860	0.889
	AVE	0.556	0.475	0.535
TMS	CR	0.924	0.849	0.896
	AVE	0.671	0.487	0.590
UA	CR	0.937	0.828	0.889
	AVE	0.712	0.459	0.575
Path Relationships				
ICTI -> EGS		-0.118	0.298*	0.179***
ISA -> EGS		-0.097	-0.089	-0.111
TMS -> EGS		0.632*	0.194	0.329*
UA -> EGS		0.393**	0.224***	0.300*
R^2		0.535	0.277	0.377

Note: CR denotes composite reliability and AVE denotes average variance extracted
: *, **, *** Indicates significance at p<0.01, p<0.05, p<0.10 respectively

Internal consistency reliability was assessed using composite reliability (CR) and the findings as shown in Table 2 above indicated that all values for composite reliability for all constructs in each category of data were above 0.7 the minimum required threshold an indication that internal consistence were present in all underlying constructs. Moreover, convergent validity was assessed by examining the results of the average variance extracted (AVE) and the findings as shown in Table 2 above indicates that almost all values of average variance extracted were approximately equal to or higher than 0.5 an indication that convergent validity was achieved.

Table 3: Discriminant Validity by Fornell-Larcker Criterion

	EGS	**ICTI**	**ISA**	**TMS**	**UA**
EGS	**0.859**				
ICTI	0.494	**0.712**			
ISA	0.298	0.606	**0.732**		
TMS	0.525	0.699	0.571	**0.768**	
UA	0.497	0.509	0.376	0.447	**0.758**

Additionally, to assess the discriminant validity the study used the Fornell-Larcker criteria whereby the square roots of the average variance extracted were compared to the correlation of all other constructs. The findings as in Table 3 indicates that all the correlations were smaller relative to the square roots of the average variance extracted along the diagonal an indication that discriminant validity was satisfied.

Structural Model Results

As indicated in the Table 1 above, the findings for the complete data set indicates insignificance results for information system attribute while all other constructs were significant (ICTI: p<0.1, TMS: p<0.01, UA: p<0.01). Findings for Tanzania data indicated insignificant results for both ICTI and ISA and positive significant results for TMS and UA (TMS: p<0.01, UA: p<0.05). The

Ugandan data set indicated insignificant results for ISA and TMS and positive significant results for ICTI and UA (ICTI: $p<0.01$, UA: $p<0.1$).

Testing for Measurement Model Invariance

Before comparing group parameter estimates using multgroup analysis it is required first to check for measurement model invariance (Hair, Sarstedt, Ringle, & Gudergan, 2018). The establishment of measurement model invariance provides an assurance that in the model group differences exist not because of distinctive contents (Kuppelwieser, 2021; Goncalves, 2013). Therefore, to test for measurement model invariance, this study used the measurement invariance of composite models (MICOM) following the three steps as described in the following sections (Balzarotti, 2021). Basically, the three steps aimed at checking the existence of configural invariance, compositional invariance and equality of composite mean values and variances.

MICOM 1st Step involves checking for configural invariance. To ensure that the configural invariance for this study, first the study ensured the study measures what is supposed to measure by sharing the measurement items with practitioners and academicians who were experts in the concept and their feedback were incorporated before final data collection. Moreover, for both groups, treatment of missing values and outliers, coding was the same across the two groups. Furthermore, the algorithm settings in the software were the same for all two groups. Consequently, all these ensured the establishment of configural invariance as recommended by preceding authors (Ngah *et al.*, 2021; Ghazali, Mutum & Javadi, 2021; Keung *et al.*, 2021).

Table 4: MICOM 2nd Step Results

Composite	Correlation (c)	Correlation Permutation Mean	5% Quantile of the Empirical Distribution of cu	Permutation p-Values	Compositional Invariance Established
EGS	0.998	0.999	0.996	0.141	Yes
ICTI	0.955	0.969	0.919	0.222	Yes
ISA	0.962	0.952	0.847	0.330	Yes
TMS	0.991	0.989	0.965	0.425	Yes
UA	0.987	0.986	0.957	0.299	Yes

After being assured on the existence of configural invariance as explained in the MICOM first step, the next step was to assess the compositional invariance. This was done by running a permutation test with a minimum number of 1000 permutations. For compositional invariance assessment the aim was not to reject the null hypothesis at 5% level of significant, that the correlation between the composite scores of groups one and two (c) is equal to one. Findings as on Table 4 above through comparing the correlation (c) with the 5% Quantile indicated the Quantile to be smaller than the correlation in each composite thus signify the establishment of compositional invariance.

These results were also backed up by permutation p-values results whereby for all composite the values of p were greater than 0.5 indicating the failure to reject the null hypothesis at 5% level of significant. Therefore, the establishment of compositional invariance indicates the

existence of partial measurement invariance, this provides justification for our study to compare the path coefficients by means of multgroup analysis (MGA).

Table 5: MICOM 3rd Step (a) Results

Composite	Differences of the Composite Mean Value (=0) (Tanzania-Uganda)	95% confidence Interval	p-Values	Equal Mean Values?
EGS	0.067	[-0.320;0.346]	0.711	Yes
ICTI	-0.055	[-0.318;0.323]	0.772	Yes
ISA	-0.381	[-0.313;0.342]	0.025	No
TMS	0.148	[-0.333;0.348]	0.390	Yes
UA	0.094	[-0.350;0.335]	0.590	Yes

Table 6: MICOM 3rd Step (b) Results

Composite	Logarithms of the Composite's Variance Ratio (=0) (Tanzania - Uganda)	95% confidence Interval	p-Values	Equal Variance?
EGS	0.203	[-0.577;0.583]	0.529	Yes
ICTI	0.462	[-0.517;0.480]	0.069	Yes
ISA	-0.094	[-0.497;0.496]	0.758	Yes
TMS	0.684	[-0.633;0.570]	0.033	No
UA	0.664	[-1.084;1.082]	0.270	Yes

Given the fact that, the results as discussed above indicated the existence of compositional invariance, this study proceed with the final step for testing the equality of composite mean values and variances of the data from Tanzania and Uganda. Based on the findings in the Table 6, with the exception of information system attribute (ISA), all other confidence intervals included the original difference in mean value. This is an indication that there is no significance difference in the mean values of latent variables across the two groups.

These results are further supported by the results for p values. For composite variance, with the exception of top management support (TMS), all other confidence intervals include logarithm of the composite variance. Also, with the exception of top management support (TMS), all p values were greater than 0.05.

Multi-group Analysis (MGA)

As stated earlier, the existence of compositional invariance indicates the existence of partial measurement invariance, thus providing justification and motivation for this study, that is to compare the path coefficients by means of multigroup analysis (Assaker *et al.*, 2021; Jamal *et al.*, 2021). Furthermore, the multigroup analysis used in this study, aimed at testing the null hypothesis if the path coefficients between two groups (Tanzania and Uganda) are not significantly different, while the alternative hypothesis was to test whether the path coefficients were different (Ghazali, Mutum & Javadi, 2021; Toyoda *et al.*, 2021).

To explore this, the current researchers first focused on the results of permutation test and then analysed the group specific effects by running a multi-group analysis (MGA) approach on the quantitative data. The details are as described in the following results and discussions of the data obtained.

Table 7: Permutation Test Results

	Path Coefficients Original (Tanzania)	Path Coefficients Original (Uganda)	Path Coefficients Original Difference (Tanzania - Uganda)	Path Coefficients Permutation Mean Difference (Tanzania - Uganda)	95% confidence Interval	Permutation p-Values
ICTI -> EGS	-0.118	0.298	-0.416	0.007	[-0.374,0.378]	0.030
ISA -> EGS	-0.097	-0.089	-0.008	0.012	[-0.337,0.351]	0.967
TMS -> EGS	0.632	0.194	0.438	0.003	[-0.580,0.481]	0.089
UA -> EGS	0.393	0.224	0.169	-0.013	[-0.398,0.384]	0.429

Permutation test results portray that, two out of four structural model relationships do not differ between the respondents from Tanzania and Uganda. The findings designate the relationship between information and communication technology infrastructure (ICTI) attributes and e-government implementation success (EGS) differs significantly, that is the effect between ICTI and EGS is significant ($p<0.05$) different between the respondents from Tanzania ($\beta_{Tanzania} = -0.118$) compared to those from Uganda ($\beta_{Uganda} = 0.298$). Moreover, findings show that, the relationship between top management support (TMS) and e-government implementation success (EGS) differs significantly between the two groups. That is to say, the effect between TMS and EGS is significantly ($p<0.10$) different between the respondents from Tanzania ($\beta_{Tanzania} = 0.632$) compared to those from Uganda ($\beta_{Uganda} = 0.194$).

In order to obtain a clear difference between these two groups, this study further conducted a mult group analysis (MGA) in SmartPLS 3 and the results for PLS –MGA, Parametric Test and Welch-Satterthwaite t Test are as displayed in the Table 8 below and discussed thereafter.

Table 8: PLS –MGA, Parametric Test and Welch-Satterthwaite t Test Results

Path Coefficients	Path Coefficients-diff (Tanzania - Uganda|)	t-Value (Tanzania vs. Uganda)	p-Value (Tanzania vs Uganda)
PLS-MGA			
ICTI -> EGS	0.416		0.976
ISA -> EGS	0.008		0.530
TMS -> EGS	0.438		0.047
UA -> EGS	0.169		0.212
Parametric Test			
ICTI -> EGS	0.416	2.000	0.048
ISA -> EGS	0.008	0.033	0.974
TMS -> EGS	0.438	1.730	0.086
UA -> EGS	0.169	0.831	0.407
Welch-Satterthwaite t Test			
ICTI -> EGS	0.416	1.950	0.056
ISA -> EGS	0.008	0.032	0.974
TMS -> EGS	0.438	1.702	0.094
UA -> EGS	0.169	0.817	0.417

A PLS MGA results as it represents a one tailed test indicates the path coefficient based on respondent from Tanzania is significantly ($p<0.05$) larger than the path coefficient based in Uganda for top management support (TMS) and e-government implementation success (EGS) relationships. Through taking the 1-p value however the result indicates the path coefficient based on respondents from Uganda is significantly ($p<0.05$) larger than the path coefficient in in Tanzania for the information and communication technology infrastructure (ICTI) attributes and e-government implementation success (EGS) relationships. Furthermore, parametric test and Welch-Satterthwaite t test results were also checked and seem to provide similar conclusion as PLS-MGA results (Pontes *et al.*, 2021).

Table 9: Comparison of PLS Multi-group Results across Methods

Path Coefficient	Permutation Test	PLS –MGA	Parametric Test	Welch-Satterthwaite t Test
ICTI -> EGS	**	**	**	***
ISA -> EGS				
TMS -> EGS	***	**	***	***
UA -> EGS				

Notes: *, **, *** Indicates significance difference (p<0.01, p<0.05, p<0.10 respectively) of path coefficients across groups

By comparing on the results from different methods as indicated in Table 9, all the methods indicated path coefficients for ICTI to EGS and TMS to EGS were significantly different between the two data groups with the rest of path coefficient being similar across the groups. This multi-method comparison provides an additional confidence on the results obtained for this study (Walker *et al.*, 2021; Cuhadar *et al.*, 2021).

Discussion of the Results

This study examined a multi-group analysis to examine the silent determinants of e-government implementation success in developing countries with special reference to Uganda and Tanzania. The results for the combined data set showed that information system attribute was negatively and insignificantly related to e-government implementations success. Nevertheless, ICTI, TMS and UA were positively and significantly related to e-government implementations success. The findings are in support of UTAUT in a context of including the UA as a critical factor towards e-government implementations success. This study supports previous studies who also found ICTI, TMS or UA significantly positively related to e-government implementations success (Olugbara & Joseph, 2018; Kaaya, 2012;).

Furthermore, results for Tanzania data were insignificant results for both ICTI and ISA and positive significant results for TMS and UA. The significant results of TMS and UA in Tanzania data are in line with previous literature which supported the importance of top management support and user attributes towards successful information technology applications in organizations (Kagoya & Mbamba, 2021; Olugbara & Joseph, 2018; Kaaya, 2012; Dong *et al.*, 2009; Ragu-Nathan *et al.*, 2004). The Ugandan data set indicated insignificant results for ISA and TMS, and positive significant results for ICTI and UA. The significance results of ICTI and UA in Uganda data are in support of UTAUT together with other previous studies which used some of the proposed variables for e-government implementation success (Kagoya & Mbamba, 2021; Kaaya, 2012; Kagoya & Mbamba 2020; Olugbara & Joseph, 2018).

Nevertheless, further analysis using a multgroup analysis revealed that the path confidents for for ICTI to EGS and TMS to EGS were significantly different between the two data groups with the rest of path coefficient being similar across the groups. The difference in other key salient determinants may be due to the differences in the leadership style, social-cultural related issues, plus technological levels and different economic muscles.

Study Implications, Limitation and Future Research

Since the current study findings envisaged that the path coefficients for ICTI to EGS and TMS to EGS were significantly different between the two data groups, a lesson can be drawn especially to the e-government implementers and practitioners to consider the issue of

geographical differences rather than coping and pasting e-government projects and strategies from most developed countries. This study argues policy makers and all other relevant stakeholders in e-government implementation in Uganda to formulate policies that will support user participation attributes and ICT infrastructure attributes while those of Tanzania should embark on policies that involve users' participation attributes and top management support, as the key salient determinants for successful e-government implementation. Additionally, the study provides a significant methodological and empirical contribution to studies involving multigroup analysis using partial least square structural equation models, given the fact that it was the first of its kind in the developing countries specifically in Uganda and Tanzania.

Several limitations of this study need to be noted and taken into considerations in future studies. The study opted for cross-sectional design, but given the advantages the longitudinal studies possess over cross sectional studies further studies should concentrate on longitudinal research design. The study concentrated only on the direct relationships between the predictor variables (user attributes (UA), Information System Attributes (ISA), top management support (TMS) and Information and Communication Technology Infrastructure attributes (ICTI) and the predicted variable, we recommend future studies to concentrate on mediators and moderator variables hoping for more qualities compared to the study at hand.

Conclusion

This study used a multi-group analysis to determine the salient determinants of e-government implementation success in Uganda and Tanzania. Using cross sectional design, quantitative data was gathered from the two countries for comparative purposes. Findings revealed that, in Uganda, the salient determinants to be considered by policy makers for e-government implementation success are; User participation attributes (UA) and Information and Communication Technology attributes (ICTI). On the contrary, those of Tanzania should that were statistically and positively significant at the time of this study are; top management support (TMS) and user participation attributes (UA). Overall results for combined data from Uganda and that of Tanzania reveal that, user participation attributes (determinants) are paramount and similar in e-government implementation success in both developing countries. Therefore, the governments from both neighbouring East African countries should give relevant support to the e-government users and encourage e-government developers to actively involve end-users in all the phases of e-government development for implementation success.

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