

Determinants of ICT usage at Unesco World Heritage Sites in Tanzania

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ABSTRACT

This study aimed to assess the determinants of ICT usage at UNESCO World Heritage Sites in Tanzania. Data for this study were collected from August 2017 to February 2018 from 238 World Heritage Site decision-makers. The study stratified these respondents into three strata based on UNESCO's categorization of WHSs type (nature, mixed, and culture). Systematic random sampling was then used to select respondents from each stratum according to their ratio in the population. Descriptive statistics examined the kurtosis and skewness indices of the output. Testing of the hypotheses involved structural equation modeling (SEM) analysis techniques. The results indicated that WHSs decision-makers would increasingly use ICT when they perceive a relative advantage (PR) and a higher level of perceived less complexity (PCL). Moreover, a higher level of ICT support infrastructures (INF) and support skills (SS) would result in a greater level of ICT usage. Lastly, a higher level of perceived competitive pressure (PCP) and perceived pressure from customers (PPC) would result in a greater level of ICT usage.

Only one variable, perceived compatibility, did not have a statistical significant relationship on ICT usage and determine to be an insignificant factor that can influence ICT usage at WHSs. A significant contribution is that the study contributes to expanding the knowledge base of the use of ICT technologies in the tourism industry. The study could be used to develop more robust models concerning ICT determinant factors, not only to WHSs but to other tourism sectors such as training institutions, hotels, ICT vendors, consultants, and the government in Tanzania.

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1. INTRODUCTION

This paper focuses on the determinants of Information and Communication Technologies (ICT) usage at UNESCO World Heritage sites (WHSs) in Tanzania. It was inspired by the fact that the evolution of ICT has allowed WHSs to promote and distribute information about their attractions. In doing so, the technology has enlarged a possibility for interested people to acquire rich and up to date information about the sites. Thus, the use of ICT has proved

to be a key factor for the sustainability of the sites (Ramos-Soler et al. 2019). Nonetheless, “small-medium Enterprises (SME) particularly those in the least developed countries south of the Sahara Desert have not been responding quickly enough to changes in ICT” (Msuya, et al. 2017, p. 27). Matambalya and Wolf (2001.p19) confirm that the “diffusion of ICT in East Africa is low by international standard”.

Tanzania’s tourism industry, particularly WHSs, is a proof of the slowness in adopting and using ICT, which would have helped the sector to transform their service delivery system by militating against challenges such as inadequate institutional arrangements, inadequate communications, poor infrastructure, as well as limited data management capacity (Monko et al. 2017). Monko et al. (2017, p. 53) observe that “the sector is characterized by poor consumption and artworks, neglect, low publicity, weak branding, to mention a few”, all which ICT could have helped.

The available literature does not, however, preciously enlighten about the sluggishness of the adoption of ICT in this area where ICT is plausible to make a significant impact (Awa et al., 2016; Fuchs et al., 2010; Mndzebele, 2018; Mupfiga, 2015; Mwai, 2016; Osorio et al., 2016). This is because most of these studies focused on determinants of ICT usage in Western and Asian destinations whose level of ICT usage is not the same as the sites located in remote areas, which are the interest of the present study. Close research to the present research in Africa and Tanzania (Kilangi, 2012; Isote, 2013; Otieno, 2015; Obonyo and Okeyo, 2016 and Kamuzora, 2016) also have their focus on sectors other than tourism. As a result, a gap existed on the hurdles facing the adoption of ICT at UNESCO WHSs. The finding of the study is quite resourceful to stakeholders of tourism and scholars in the field of ICT for development.

2. EMPIRICAL LITERATURE REVIEW

Factors determining the usage of ICT have been identified in several previous studies with an exception that such studies were conducted many years ago or where conducted in contexts that do not resemble the context of cultural sites in Tanzania. The factors identified by the previous studies fall into the categories of technological, organizational, and environmental factors. Subsequent subsections present empirical studies along with these categories in considerable detail.

2.1. Technological Factors (TF)

Osorio-Gallego et al. (2016) investigated factors influencing ICT adoption and usage among Small and Medium Enterprises (SMEs) in Colombia. The study administered questionnaires to 474 SMEs and used multiple regression models to analyze data. The study established that Perceived Relative Advantage among SMEs that ICT offers opportunities was the main determining factor for ICT usage. In the study, perceived compatibility had a negative impact on ICT usage. Similarly, Mupfiga (2015) employed both qualitative and quantitative methods to examine factors influencing ICT usage in the tourism and hospitality sector at the Meikles Hotel in Zimbabwe. The quantitative findings indicated a significant positive relationship between stakeholders’ readiness and ICT usage. In the same vein, Awa et al.

(2016) surveyed factors determining ICT adoption in line with TOE theory in Nigerian SMEs. Quantitative designs were applied, and data were collected and analyzed through the logistic regression. The findings indicated that technological factors are the main factors influencing ICT usage.

In contrast, Ismail and Mokhtar (2016) applied TOE theory to investigate the determinants of ICT usage among SMEs in Malaysia during pre-and-post adoption. The methodology of the study was a quantitative design. The study reported that all variables under TF (i.e. perceived relative advantage, perceived compatibility, and perceived less complexity) had a significant effect on SMEs' adoption of ICT in Malaysia. Thus based on the above discussion and review of various literature, the following hypotheses were proposed under TF:

H1a: There is a positive relationship between perceived relative advantage (PR) and ICT usage in WHSS

H1b: There is a positive relationship between perceived compatibility (PCT) and ICT usage in WHSS

H1c: There is a positive relationship between perceived less complexity (PCL) and ICT usage in WHSS

2.2. Organizational Factors (OF)

According to Shiue (2007), teachers will perceive greater control to employ technology into instructional use when they have the necessary hardware and software resources. Cowie and Jones (2009) support that ICT support infrastructure can be one of the factors that influence ICT usage among school teachers. Similarly, Petti and Passiante (2009) reported that ICT support infrastructure is one of the conditions for effective implementation of ICT usage for the management of a tourism destination. Kessi (2016) founds in his study that improved ICT support infrastructure ensures effective use of ICT and an increase in the percentage of staff who have access to broadband and the internet in the workplace. On the other variable under OF, Ilkan *et al.* (2017) found that ICT support skills learned by future support managers determine the level of ICT usage. That is, more training of people working in the tourism industry foster the level of ICT adoption and usage and enhances local engagement with e-Tourism related projects. Ilkan *et al.* (2014) further said that adequate ICT skills by employees facilitate effective use of ICT and provide higher quality customer service. In a similar study, Morais *et al.* (2013), confirm that ICT skills are one of the necessities of tourism professionals worldwide to act and position themselves in front of any situation. Thus, based on the above discussion and review of various literature, the following hypotheses were proposed:

H2a: There is a positive relationship between ICT support infrastructure (INF) and ICT usage in WHSS

H2b: There is a positive relationship between ICT support skills (SS) and ICT usage in WHSS

2.3. Environmental Factors (EF)

Fuchs *et al.* (2010) used data gathered from 212 DMOs in Austria to investigate factors influencing ICT usage and performance in Austrian Destination by using a linear structural equation modeling approach. Results from the study suggested a positive relationship between environmental factors, including perceived competitive pressure and perceived pressure from customers. Further, Mndzebele (2018) explored factors influencing ICT adoption and usage among SMEs in Swaziland. The research employed a quantitative survey to 100 SMEs owner. The findings indicated eight determinants of ICT adoption and usage among Swaziland SMEs. The most important were environmental factors such as the pressure from customer variables and the need to meet the demands of their suppliers. Mwai (2016, p. 17) examined factors determining the usage of ICT by SMEs in the hospitality industry in Kenya. The findings indicate that EFs, such as pressure/demand from customers, who always are in search of flexible, specialized, accessible, and interactive products and communication) determine ICT adoption and usage by SMEs. Thus, based on the above discussion and review of various literature, the following hypotheses were proposed under EF:

H3a: There is a positive relationship between perceived competitive pressure (PCP) and ICT usage in WHSs

H3b: There is a positive relationship between perceived pressure from customers (PPC) and ICT usage in WHSs

3. THEORETICAL BACKGROUND

A theoretical framework underpinning our study is Technology, Organization, and Environment (TOE) theory for its strength in explaining factors for ICT usage. TOE theory provides a useful analytical framework in determining factors influencing ICT usage (Oliveira and Martin, 2011). The main assumptions of the theory is that decision to use new ICT system within the organization is determined by three (TOE) factors namely; technological, environmental and organizational factors (Adeola and Evans, 2019; Bahrini and Qaffas, 2018; Kante et al. 2017; Kilangi, 2012; Kim and Kim 2018; Lama et al. 2018; Wagaw and Mulugeta, 2018). Technological Factors (TF) refers to means of accessing, processing, and distributing volumes of data in the organization, and hence it aids thought process during decision-making (Gastelú et al. 2015). How TF determines ICT usage will be studied in line with Ismail and Mokhtar (2016); Tornatzky and Fleischer's (1990), and Szymczak (2016). The focus will mainly be on: (1) perceived relative advantage referred to as the degree to which using modern ICT system is better than the old system and promise to bring benefits to the organization (2) perceived compatibility, which is an assertion that an organization will accept a modern ICT system if it is compatible with its existing infrastructure. (3) perceived less complexity, which is a degree at which a modern ICT system must be easy to use and manageable in order to be adopted at a high rate. The theory also identifies Organizational Factors (OF) is defined as a framework containing organizational based equipment, including ICT support infrastructure (INF) and ICT support skills (SS) that are deliberately designed to be the determinants of ICT usage within the organization. INF includes both tangible and intangible hardware and software which

enhance creation, acquisition, storage, dissemination, retrieval, manipulation, and transmission of information. SS is a degree to which individual perceptions and beliefs about ICT usage are improved through the ability to tackle the learning curve and to minimize the fear that ICT systems may bring to an organization. Environmental Factor (EF), in theory, is a degree to which a firm conducts its business. The main variables under EF are perceived competition pressure (PCP) and perceived pressure from customers (PPC). PCP is a degree to which pressure from competitors and suppliers becomes a driving force for an organization to use ICT for them to be able to compete at the same level. On the other hand, PPC refers to the pressure by customers to an organization. Taking into account that ICT adoption and usage are motivated by technological, organizational and environmental factors (according to TOE theory), the main objective of the study was to assess determinants of ICT usage at UNESCO World Heritage sites (WHSs) in Tanzania. Most of the previous studies which applied TOE theory to determine ICT usage were in a different context to the context of the present study. For example, Saunders *et al.* (2017) applied TOE theory to investigate ICT adoption and usage to Saudi retailers. In the study, technological factors that influenced ICT usage to Saudi retailers included compatibility. Similarly, Saunders *et al.* (2017) applied the theory to determine factors influencing ICT usage at the firm level in Philadelphia. This study borrowed variables and methodologies and findings of the previous studies to study the adoption and use of ICT at cultural heritage sites in Tanzania. The insights derived from the theory are summarized by the model given in Figure 1.

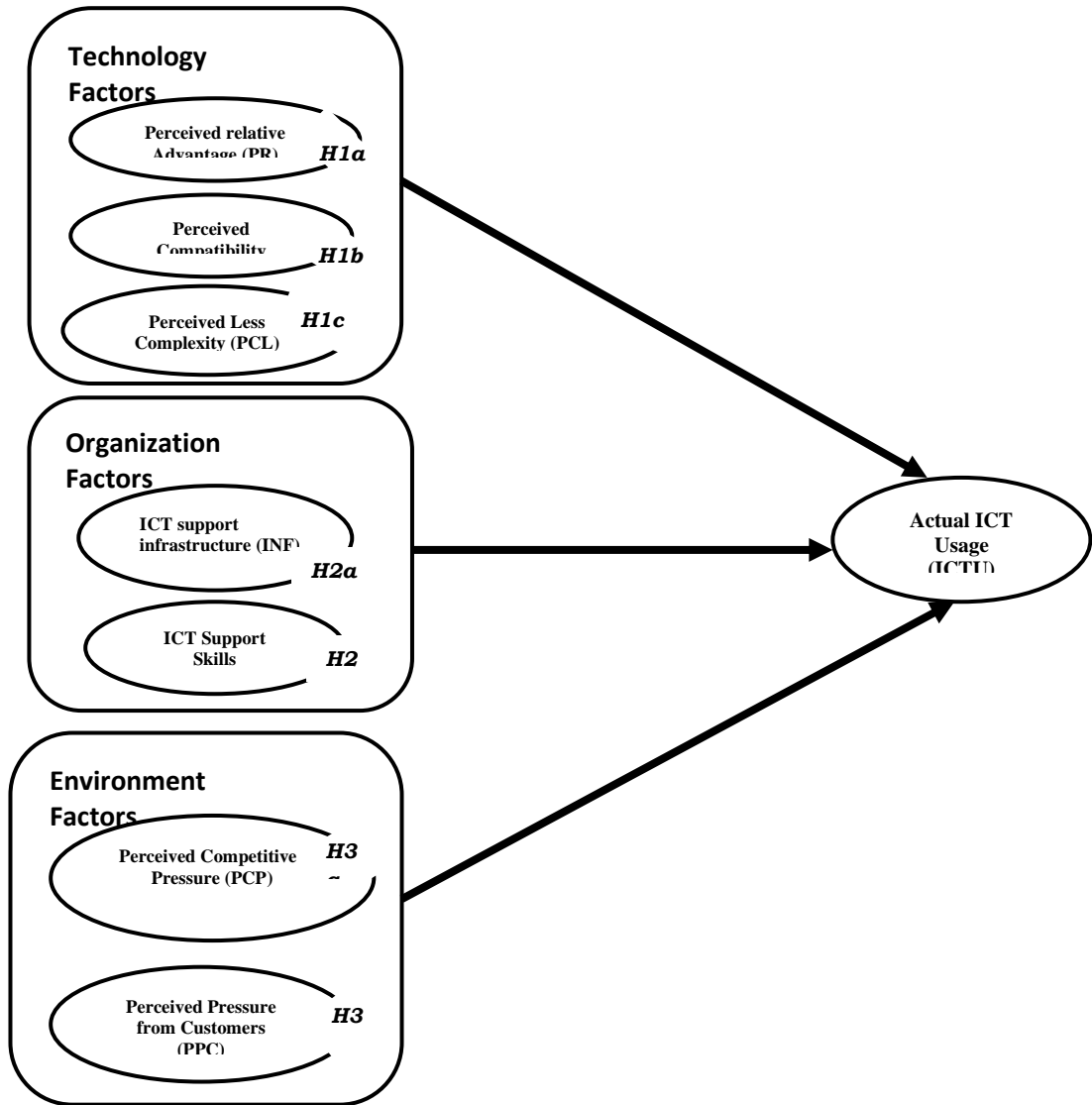


Figure 1: Conceptual framework. Source: Own work (2020)

As shown, the model is anchored on the finding that ICT usage depends on technological, organizational, and environmental factors. Technological factors are refined into three first-order variables; (1) perceived relative advantage, (2) perceived compatibility; and, (3) perceived less complexity. The basis for these technological contexts variables is grounded in the existing research by Aljowaidi (2015), Ibrahim *et al.* (2015), Isaac *et al.* (2016), Chong *et al.* (2009), Kante *et al.* (2017), Osorio-Gallego *et al.* (2016), Wagaw and Mulugeta (2018) who identified the issue of perceived relative advantage (PR), perceived compatibility (PCT) and perceived less complexity (PCL) as factors affecting usage. The organizational factors are refined into two first-order variables; (1) ICT support infrastructure (INF); and, (2) ICT support skills (SS). The basis for these organizational contexts variables is grounded in the existing research by Adeola and Evans (2019), Fuchs *et al.* (2010), and Otieno (2015); INF and SS have been identified and validated as measurable factors in understanding and describing the organizational context. The basis for environmental contexts variables is grounded in the existing research by Ismail and Mokhtar (2016); Chairuel and Riski (2018)

identified the issue of pressure from a competitor (PCP) and pressure from customers (PPC). They suggested that ICT usage in an organization might be able to alter the rule of competition and develop new ways of outperforming their competitors while meeting their customer demand. ICT usage is the dependent variable of the study. This variable identifies the user's acceptability level of the new ICT system. When a user is presented with new technology, the "perceived usefulness" and "the perceived ease of use" notably influence how and when users utilize it. This variable was measured using six indicators.

4. METHODOLOGY

4.1. Study area

The selected areas for this study were seven Tanzania UNESCO World Heritage Sites (WHSS) in different regions of the United Republic of Tanzania. These areas include; Ngorongoro Conservation Area (NCA) in Arusha Region (mixed site); [Ruins of Kilwa Kisiwani and Ruins of Songo Mnara](#) in Kilwa Kisiwani (cultural site); Serengeti National Park in Arusha and Mara Region (nature); [Selous Game Reserve](#) (SGR) in Iringa and Morogoro Region (nature); Kilimanjaro National Park in Kilimanjaro(nature); Stone Town of Zanzibar (culture) and the Kondoa Rock-Art Site in Kondoa District (culture). The sites were divided as natural sites, cultural sites, and mixed sites.

4.2. Sample design and data collection

Data for this study were collected from August 2017 to February 2018 from world heritage site decision-makers because of their prominent role in making a decision with regard to the adoption and use of ICT at WHS. The group consisted of directors, senior managers, general park warden, managers, head of units, head of departments, and zone warden officers. The study stratified these respondents into three strata based on UNESCO's categorization of WHSS type (nature, mixed, and culture). Systematic random sampling was then used to select respondents from each stratum according to their ratio in the population. The calculations were as follows: $149/407=0.366$, the ratio of decision-makers from the cultural site; $191/407=0.469$, the ratio of decision-makers from the natural site; and $67/407=0.165$, the ratio from the mixed site. The sample size was further computed as $0.366 \times 200 \approx 73$ cultural sites decision-makers; $0.469 \times 200 \approx 94$ natural sites decision-makers; and $0.165 \times 200 \approx 33$ mixed sites decision-makers. A sample size of 200 was adopted because it is a typical average in many studies where SEM was used (Byrne, 2010). Drop-and-collect technique was applied, i.e. leaving a questionnaire with a respondent and going back to pick it up after it has been filled in. A total of 353 questionnaires were distributed in the study, whereas, 238 (56.5%) usable responses were obtained for further analysis. Table 1 presents the relevant characteristics of the sample. The design of this study is based on a cross-sectional survey.

Table 1: Characteristics of Respondents

Characteristics	Distribution of answers
Gender	Male:68%; Female: 30%
Education	Primary school:4%; High school:8.2%; Certificate/Diploma: 13.2%; 4Bachelor degree: 47.7%; Advance Diploma:24.7%; Master degree:3.7%
Job position	Chief Park: 10.3%; Park Warden: 18.9%; Head of Department:18.1%; Head of Unit:21.4%; Others:28.4%
Job Experience	Less than a year; 12.3%; Between 1-5 Years: 8.2%; Between 6-10 years: 40.3%; Between 11-15 years: 32.1%; Between 16-20 years: 4.1%; More than 20 years: 0.8%
Number of Employees	40-60 employee's: 57.6%; 60-80 employee's:31.3%; 80-100 employee's: 5.8%; More than 100 employee's: 2.5%

4.3. Measurement and refining measurements

The measurement scales used to collect data in this study were adopted from the existing ICT measurement scales. The technological factors were adopted from previous studies by Ibrahim *et al.* (2015), Musa *et al.* (2015), and Osorio-Gallego *et al.* (2016). It consisted of perceived relative advantage (8 items), perceived compatibility (8 items), and perceived less complexity (7 items). Fuch *et al.* (2010) and Otieno (2015) provided the basis for designing items for measuring organizational factors. Here the variables were ICT infrastructure (8 items) and ICT skills (6 items). (See appendix 1: for details of the measurement). We also adopted items from Chairael and Riski (2018) in measuring environmental factors. The items were perceived as competitive pressure (7 items) and perceived pressure from customers (8 items).

To avoid wrong conclusions, testing for the multivariate assumptions was deemed inevitable. The first assumption in the application of SEM is that each variable in the study is normally distributed (Byrne, 2010). Measures of Skewness and Kurtosis were used in the current study to test for the normality of the collected data. As we progressed with our confirmatory factor analysis, modeling and following guidelines by Bagozzi and Yi (1988), we deleted variables with poor + loading. That is, only the variables that had acceptable loadings were taken into account. Five variables were deleted to strengthen the model because they had low loadings (less than .5) Out of the 58 observed variables, 41 were above the general agreed-upon lower limit of 0.70, which is satisfactorily reliable according to Hair *et al.* (2002). Fourteen (14) variables had a loading of less than 0.7 and were thus deleted to conform with Bagozzi and Yi's (1988) rule of thumb that loading should exceed 0.4, and be less than 0.95. For this study, nine factors were thus retained, because they contained at least a loading factor, which is greater than 0.4. For example, factor 1 represents ICT skills support (SS), factor 2 represents perceived complexity (PCL), factors 3 represents perceived compatibility (PCT), factor 4 represents perceived pressure from customers (PPC), factor 5 represents performance indicators (PI), factor 6 represents ICT infrastructure support (INF), factor 7 represents perceived relative advantage (PR), factor 8 represents perceived competitive pressure (PCP), and factor 9 represents ICT usage (ICTU).

5. STRUCTURAL MODEL RESULTS

In testing the structural model for the overall sample, the analysis started by evaluating goodness-of-fit indices to judge the strength of the model and to tell whether there is an acceptable fit between observable data and the model. The model met the recommended guidelines for goodness of fit (Iacobucci, 2010), Table 2 and Figure 2 (CMIN/DF= 1.559, GFI=0.812, TLI= 0.948, CFI=0.952 and RMSEA=0.049). As per graphical illustrations, we applied the same schematic symbols, as suggested by Weston and Gore (2006). Figure 2 and Table 2 present the structural model for the overall sample. Rectangles in Figure 2 represent composite scales, whereas ovals represent latent constructs.

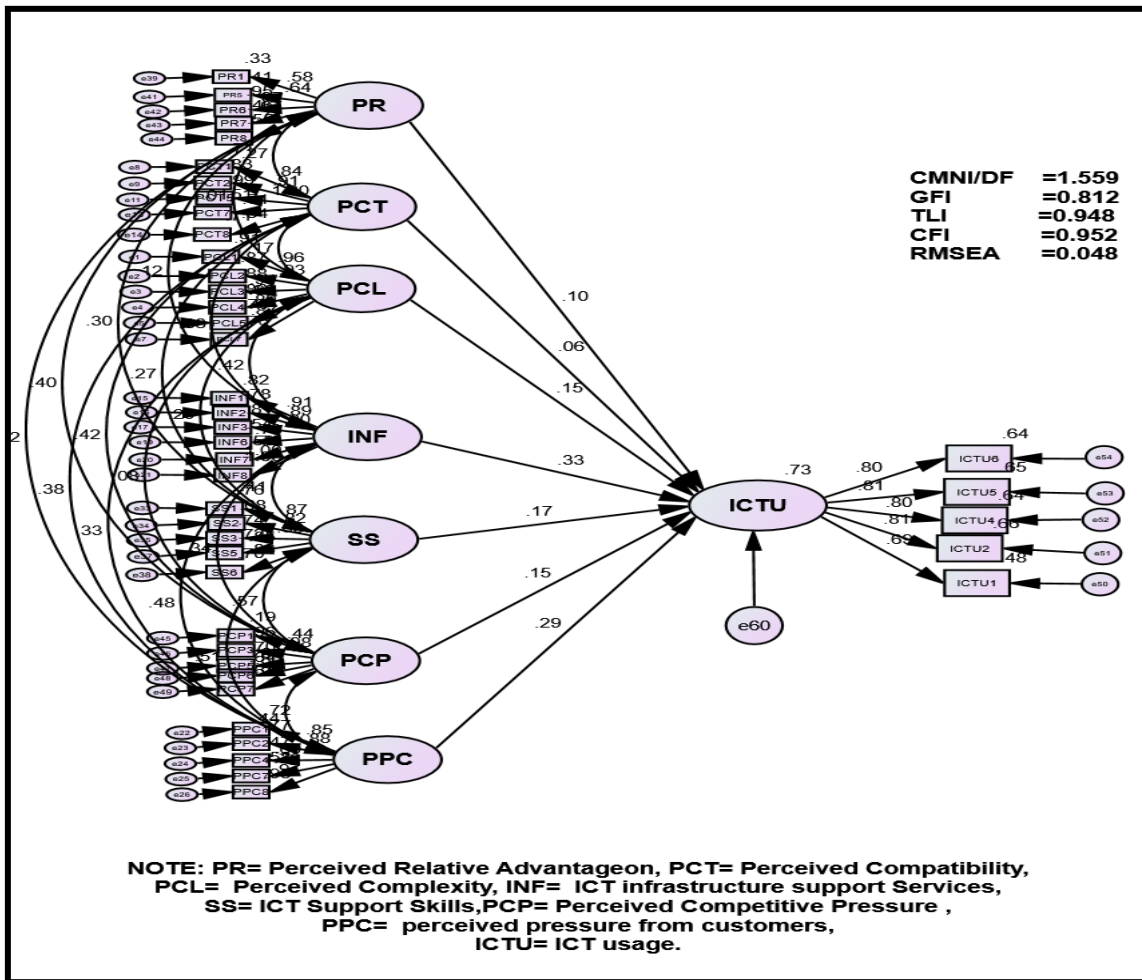


Figure 2: The Structural Model for the Overall Sample
 Source: Research Data, 2019

Table 2: Path coefficients for the overall sample (N=238)

	Path	Standardized Estimate	S.E.	C.R.	P	Standardized Estimate
H1a	ICTU <--- PR	.086	.045	1.922	.055	.095
H1b	ICTU <--- PCT	.047	.041	1.139	.255	.056
H1c	ICTU <--- PCL	.081	.027	3.002	.003	.147
H2a	ICTU <--- INF	.198	.035	5.588	***	.330
H2b	ICTU <--- SS	.126	.046	2.761	.006	.168
H3a	ICTU <--- PCP	.184	.078	2.359	.018	.148
H3b	ICTU <--- PPC	.193	.040	4.790	***	.285

6. RESULTS FROM VALIDITY MEASURES

After running a CFA Model, we ran a construct validity testing with AMOS version 24 with a plugin “Master Validity Tool” developed by Gaskin and Lim (2016). The plugin adopted the seminal study’s threshold values for testing the construct validity, viz. convergent validity, and Discriminant validity. The tests showed no valid concerns in the model (Table 3 shows). All the items in the measurement model achieved statistical significance at $p = 0.000$. As Table 3 shows, discriminant validity for each construct was achieved since the AVE estimate for each construct (shown in bold) was greater than the squared correlation estimate for each pair of constructs. The factor loading of every item was above 0.6 (Table 3). Therefore, CR was achieved in this study as $CR > 0.6$, as recommended by Awang (2011).

Table 3: CFA Model Validity and Reliability Analysis

	CR	AVE	MSV	MaxR(H)	PCL	PCT	INF	PPC	SS	PR	PCP	ICTU
PCL	0.960	0.776	0.199	0.975	0.881							
PCT	0.962	0.786	0.197	1.000	0.173*	0.886						
INF	0.942	0.702	0.467	0.996	0.422***	0.375***	0.838					
PPC	0.918	0.695	0.491	0.966	0.331***	0.379***	0.482***	0.834				
SS	0.948	0.753	0.422	0.971	0.321***	0.266***	0.431***	0.531***	0.868			
PR	0.857	0.507	0.173	0.945	0.000	0.280***	0.129*	0.330***	0.313	0.712		
PCP	0.888	0.626	0.333	0.972	0.084	0.416***	0.334***	0.437***	0.577***	0.416***	0.791	
ICTU	0.885	0.608	0.491	0.890	0.447	0.443***	0.684***	0.701***	0.649***	0.372***	0.559***	0.780

7. MODEL PATH COEFFICIENTS AND HYPOTHESIS TESTING

Results of the structural model for the overall sample are reported based on goodness-of-fit, referred to in Table 4; and on the direction, the strength of the standardized paths coefficient (β), the critical ratio (C.R), and significance level (p-value). The descriptions of the tested hypotheses are presented in Table 4.

Table 4: Goodness-of-fit indexes for control variables

	PR	PCT	PCL	INF	SS	PCP	PPC
CMNI/DF	1.524	1.424	1.941	1.350	0.964	1.735	1.819
GFI	0.901	0.961	0.867	0.906	0.938	0.893	0.882
TLI	0.953	0.990	0.954	0.982	1.003	0.946	0.933
CFI	0.956	0.992	0.964	0.986	1.000	0.959	0.950
RMSEA	0.075	0.042	0.101	0.061	0.000	0.089	0.954

Starting with H1a (perceived relative advantage (PR) <---ICT usage), we proposed that perceived relative advantage positively influenced ICT usage in WHSs, and that positive (+) effect increased with WHSs decision-makers' perception that the new ICT system was user-friendly. There is a support for this hypothesized relationship (H1a) between perceived relative advantage and ICT usages ($\gamma = 0.095$; C.R =1.922; $p = 0.055$). H1b (perceived compatibility (PCT) <---ICT usage) conjectured that perceived compatibility positively influenced ICT usage in WHSs; and that positive effect increased when WHSs decision-makers, perceived the new ICT system as compatible with the existing system. The relationship for the overall sample is positive but not significant; and thus not supported ($\gamma = 0.056$; C.R =1.139; $p = 0.255$). H1c (perceived less complexity (PCL) <---ICT usage) proposed that perceived less complexity of new ICT system positively influenced ICT usage and that positive effect increased with WHSs decision makers' perception that the new ICT system was user-friendly. The relationship for the overall sample is positive and significant and thus supported ($\gamma = 0.147$; C.R =3.002; $p = 0.003$).

H2a (ICT support infrastructure (INF) <---ICT usage) postulated that ICT support infrastructure positively influences ICT usage in WHSs and the positive effect increases as WHSs have already installed ICT infrastructures such as software, hardware, firmware and network. As we expected, there is support for the hypothesized relationship (H2a) between ICT support infrastructure and ICT usage ($\gamma = 0.330$; C.R =5.588; $p = 0.000$). H2b (ICT support skills (SS) <---ICT usage) conjectured that ICT support skills positively influence ICT usage, and the positive effect increase when WHSs employees are knowledgeable with ICT usage. There is a positive and significant relationship between ICT support skills and ICT usage ($\gamma = 0.168$; C.R =2.761; $p = 0.006$) which means H2b is supported.

H3a (perceived competitive pressure (PCP) <---ICT usage) proposed that perceived competitive pressure positively influenced ICT usage in WHSs, and that positive effect increased when WHSs decision-makers' perceived too much pressure from their competitors as a result of ICT usage. The hypothesized relationship (H3a) was relatively stable and supported ($\gamma = 0.148$; C.R =2.359; $p =0.018$). H3b (perceived pressure from customers (PPC) <---ICT usage) predicted that perceived pressure from customers positively influenced ICT usage in WHSs, and that positive effect increased as WHSs decision-makers' perceived high demand of ICT usage from their customers. Further, there was a positive and very significant relationship between perceived pressure from customers and ICT usage in WHSs ($\gamma = 0.285$; C.R =4.790; $p = 0.000$); thus, H3b was supported.

8. DISCUSSION

This study was inspired by the need to learn more about ICT usage at UNESCO WHSs in Tanzania. Firstly, the study found out that perceived relative advantage had a significant positive effect on ICT usage (H1a). The finding is consistent with Wagaw and Mulugeta (2018). Based on these findings, it can be extracted that the favorable opinion of users with regard to ICT usage may enhance employee's effectiveness toward achieving higher performance goals.

Secondly, it was found that perceived compatibility had a positive non-significant effect on IC usage (H1b). The general findings were consistent with previous studies such as Aljowaidi (2015) and Chong *et al.* (2009). Further, the examination of the hypothesized gap showed the existence of differences across a few studies. Kante *et al.* (2017) and Kilangi (2012), for instance, found that perceived compatibility had a significant positive effect on ICT usage. Third, it was found that perceived less complexity had a significant positive effect on ICT usage among WHSs; and that positive effect increased with WHSs decision-makers' perception that the new system was friendly. The findings of the study are consistent with Bakkabulindi (2012) who found that perceived less complexity, which means user-friendliness, correlated positively and significantly with ICT usage among Makerere University staff.

Fourth, it was found that ICT support infrastructure had a significant positive effect on ICT usage, and that positive effect increased when WHSs are already installed with ICT infrastructures (H2a). The findings are consistent with Petti and Passiante (2009) found that ICT support infrastructure is one of the conditions for effective usage of ICT for managing destinations. Adeola and Evans (2019) found that ICT support infrastructure had a positive, statistically significant relationship with ICT usage for tourism development. Mtwewe (2013) cited inadequate investment in innovation and infrastructure as a hurdle to the adoption of ICT at WHSs.

Fifth, it was found that ICT support skills positively affect ICT usage (H2b) and that a positive effect increases when WHSs employees are knowledgeable with the ICT system. In other words, it was hypothesized that employees at UNESCO WHSs in Tanzania are familiar, knowledgeable, experienced and have technical skills to enable them to use ICT system if installed and supported. The hypothesis was consistent with Leung *et al.* (2015) who found that ICT technical skills and experience of employees is a crucial determinant of ICT adoption among hotel in Hong Kong.

Six, it was found that perceived competitive pressure had a significant positive effect on ICT usage (H3a). WHSs decision-makers' perceived a stiff competition from countries in East and South Africa with almost the same attractions, but who have started using ICT in their daily operations. The growing importance of ICT usage in tourism industry caused several threats and opportunities which transform the value chain of the industry. This appeared to push stakeholders of tourism in Tanzania to adopt and use ICT to win the global tourist market from its competitors. The findings are consistent with Kilangi (2012), who found that the increase in market competition is one of the factors determining the usage of ICT in many developing countries. The author observes that a large number of SMEs in developing

countries adopt and use ICT as a means of communication and distribution due to the increase of pressure from competitors and suppliers. Most of SMEs in the tourism industry compete for the same tourism products and customers. Adopting and using ICT is thus the way of beating rivals.

Finally, it was found that perceived pressure from customers determines the usage of ICT (H3b). Decision-makers would be forced to adopt ICT in order to satisfy their customers' needs. This implies that the lack of pressure from customers can make WHSs decision-makers to be reluctant in adopting and using ICT. Ghobakhloo *et al.* (2011) and Kim and Kim (2017) also found that perceived pressure from customers significantly determines ICT usage and success in Portuguese manufacturing SMEs. Similarly, Taylor (2017) reported that small businesses bow to customer pressure in issues such as adopting and using ICT. The study findings indicate that most of the owner-managers have limited education levels such that they cannot adopt ICT without some pressure. Some initiatives are, therefore, needed to improve ICT at WHSs in Tanzania. Some of such initiatives can be introducing a course on ICT at the sites and lowering the cost of internet connection and ICT devices

9. THEORETICAL CONTRIBUTIONS

This study confirms TOE theory by Tornatzky and Fleischer, (1990), which postulate that decision to use new ICT system within the organization is determined by three factors: technological, environmental and organization (Angeles, 2014; Ismail and Mokhtar 2016; Oliveira and Martins, 2011). Significant and positive relationship between technological factors, (i.e. perceived relative advantage (PR), and perceived less complexity (PCL) organizational factor (i.e. ICT support infrastructure (INF) and ICT support skills (SS) and environmental factors (i.e. perceived competitive pressure (PCP) and perceived pressure from customers (PPC) suggests that the theory perfectly fits in explaining factors that influence ICT usage at UNESCO WHSs in Tanzania. An important contribution is that WHSs decision-makers would increasingly use ICT when they perceive a relative advantage (PR) and a higher level of perceived less complexity (PCL). Moreover, a higher level of ICT support infrastructures (INF) and support skills (SS) would result in a greater level of ICT usage. Lastly, a higher level of perceived competitive pressure (PCP) and perceived pressure from customers (PPC) would result in a greater level of ICT usage. Further, the study contributes to expanding the knowledge base of the use of ICT technologies in the tourism industry. The study could be used to develop more robust models concerning ICT determinant factors, not only to WHSs but to other tourism sectors such as training institutions, hotel, ICT vendors, consultants and the government in Tanzania. On the other hand, this is the first study in Tanzania that has comprehensively examined the explanation of TOE theory and its variables influencing ICT usage among WHSs in Tanzania

10. CONCLUSION

The present study aimed at assessing the determinants of ICT usage at UNESCO WHSs in Tanzania. It focused on as to whether ICT usage at WHSs relies heavily on technological, organizational, and environmental factors. As a result, seven factors were examined. Two variables proved to be the most underlying factors influencing ICT usage at UNESCO WHSs in Tanzania.

The study established that perceived less complexity, ICT support infrastructure, ICT support skills, perceived competitive pressure, and perceived pressure from customers positively affected the adoption and use of ICT at UNESCO WHSs in Tanzania. Only one variable, which is perceived compatibility (PCT), did not have a statistically significant relationship with ICT usage in the sites. The findings from this study call for WHSs decision-makers to invest positively and adopt ICT usage in their daily operation to increase sales and facilitate business and customer relationships. This notion, tells that, for the success of any tourism business, particularly WHSs ICT usage is inevitable.

Further, future research in the tourism sector in Tanzania and elsewhere can adopt the model of the study. The model could also be applied to WHSs in other African destinations with similar context to the Tanzanian cultural heritage sites.

REFERENCES

- Adeola, O., & Evans, O. (2019). ICT, infrastructure, and tourism development in Africa. *Tourism Economics*, <https://doi.org/10.1177/1354816619827712>.
- Ali, A. A. (2016). *Diffusion of Innovation Theory and adoption of e-Government by Medium Business Enterprises in Kenya: A case of Nairobi City County* (Doctoral dissertation, University of Nairobi).
- Aljowaidi, M. A. (2015). *A study of E-commerce Adoption Using the TOE Framework in Saudi Retailers: Firm motivations, implementation and benefits*. Melbourne Australia: School of Business Information Technology and Logistics RMIT University (PhD thesis).
- Angeles, R. (2014). Using the Technology-Organization -Environment Framework and Zuboff's Concepts for understanding environmental sustainability and RFID. *World Academy of Science, Engineering and Technology International Journal of Social, Education*, 7 (11), 1599-1606
- Awa, H. O., Ukoha, O., & Emecheta, B. C. (2016). Using T-O-E theoretical framework to study the adoption of ERP solution. *Cogent Business & Management*, 3 (11), 1-23
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science*, 16(1), 74-94.
- Bakkabulindi, F. E. K. (2012). Does use of ICT relate with the way it is perceived? Evidence from Makerere University. *International Journal of Computing & ICT Research*, 6(2).
- Byrne, B. (2010). *Structural equation modelling with AMOS: basic concepts, applications, and programming*, (2nd ed). New York: Routledge Taylor and Francis Group.
- Chairoel, L., & Riski, T. R. (2018). Internal and external factor influence ICT adoption: a case of Indonesian SMEs. *Jurnal Manajemen dan Kewirausahaan*, 20(1), 38-44.
- Chong, A. Y.-l., Lin, B., Ooi, K. B., & Raman, M. (2009). Factors affecting the adoption level of C-commerce: an empirical study. *Journal of Computer Information Systems*, 13-22.
- Cowie, B., & Jones, A. (2009). Teaching and learning in the ICT environment. In *International Handbook of Research on Teachers and Teaching*, (pp. 791-801). Springer, Boston, MA

- Fuchs, M., Höpken, W., Föger, A., & Kunz, M. (2010). E-Business readiness, intensity, and impact: An Austrian destination management organization study. *Journal of Travel Research*, 49 (2), 165-178.
- Gaskin, J., & Lim, J. (2016). Master validity tool. *AMOS Plugin In: Gaskination's StatWiki*.
- Ghobakhloo, M., and Hong, T. S. (2014). IT investments and business performance improvement: the mediating role of lean manufacturing implementation. *International Journal of Production Research*, 52(18), 5367-5384.
- Iacobucci, D. (2010). Structural equations modeling: Fit indices, sample size, and advanced topics. *Journal of consumer psychology*, 20(1), 90-98.
- Ibrahim, A. M., Ezra, G. S., and Mansurat, M. F. (2015). Perceived attributes of diffusion of innovation theory as a theoretical framework for understanding the non-use of digital library services. In *Information and Knowledge Management* (Vol. 5, No. 9, pp. 82-87).
- İlkan, M., Beheshti, M., Rahimi, S., and Atalar, E. (2017). The Role of Information and Communication Technology (ICT) in Tourism Education: A Case Study of Higher Education Students.
- Ismail, W., & Mokhtar, M. (2016). Application of T.O.E Framework in examining the factors influencing pre-and post-adoption of CAS in Malaysian SMEs. *International Journal of Information Technology and Business Management*, 49 (1), 26-39.
- Ismail, W., and Mokhtar, M. (2016). Application of a Framework in Examining The Factors influencing Pre-and Post-Adoption of Cas in Malaysian SMES. *International Journal of Information Technology and Business Management*, 49 (1), 26-39.
- Kamuzora, F. (2006). Enhancing human resource productivity using information and communication technologies: opportunities and challenges for Tanzania. In *Mzumbe University-CAFRAD Regional Conference, Arusha, Tanzania, February* (pp. 26-28).
- Kamuzora, F. (2016). Enhancing human resource productivity using information and communication technologies: Opportunities and challenges for Tanzania. (pp. 1-18). Arusha: CAFRAD Regional Conference.
- Kante, M., Chepken, C. K., Oboko, R., & Hamunyela, S. (2017). Farmers' perceptions of ICTs and its effects on access and use of agricultural input information in developing countries: Case of Sikasso, Mali. (pp. 1-8). Windhoek, Namibia: IST-Africa.
- Kessi, E. (2016). *Information and Communication Technology (ICT) Policy*. Moshi: Kilimanjaro Christian Medical University.
- Kessi, E. (2016). *Information and Communication Technology (ICT) Policy*. Moshi: Kilimanjaro Christian Medical University.
- Kilangi, A. M. (2012). *The determinants of ICT adoption and usage among SMES: the case of the tourism sector in Tanzania*. De Boelelaan : Vrije Universiteit.
- Kim, D., and Kim, S. (2017). The role of mobile technology in tourism: Patents, articles, news, and mobile tour app reviews. *Sustainability*, 9(11), 2082
- Lama, S., Pradhan, S., Shrestha, A., & Beirman, D. (2018). Barriers of e-Tourism adoption in developing countries: A case study of Nepal. (pp. 1-12). Sydney, Australia: Australasian Conference on Information Systems.
- Leung, D., Lo, A., Fong, L. H. N., & Law, R. (2015). Applying the Technology-Organization-Environment Framework to explore ICT initial and continued adoption: An

- exploratory study of an independent hotel in Hong Kong. *Tourism Recreation Research*, 40(3), 391-406.
- Ministry of Works, T. A. (2016). *National Information and Communications Technology Policy*. Dar es Salaam: The United Republic of Tanzania: Ministry of Works, Transport and Communication.
- Mndzebele, N. (2018). Factors affecting ICT adoption by SMEs in Swaziland. *Proceedings of 95th The IRES International Conference* (pp. 57-61). Kuala Lumpur, Malaysia: The IRES International Conference.
- Monko, G. J., Kalegele, K., & Machuve, D. (2017). Web services for transforming e-cultural heritage management in Tanzania. *I. J. Information Technology and Computer Science*, 12, 52-63
- Morais, E. P., Cunha, C. R., & Gomes, J. P. (2013). The information and communication technologies in tourism degree courses: The reality of Iberian Peninsula. In *Proceedings of the 21st International Business Information Management Association Conference* (pp. 832-840). International Business Information Management Association.
- Moya, M., & Engotoit, B. (2017). Behavioural intentions: A mediator of performance expectancy and adoption of mobile communication technologies by Ugandan commercial farmers. *ORSEA Journal*, 7 (1), 1-20.
- Moya, M., & Engotoit, B. (2017). Behavioural intentions: A mediator of performance expectancy and adoption of mobile communication technologies by Ugandan commercial farmers. *ORSEA Journal*, 7 (1), 1-20.
- Mupfiga, P. S. (2015). Adoption of ICT in the tourism and hospitality sector in Zimbabwe. *The International Journal of Engineering and Science (IJES)*, 4 (12), 72-78.
- Mwai, E. (2016). Factors influencing adoption of ICT by small and medium enterprises in the hospitality industry in Kenya. *Journal of Mobile Computing & Application (IOSR-JMCA)*, 3 (2), 12-19.
- Oliveira, T., & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation*, 14 (1), 110-141.
- Osorio-Gallego, C. A., Londoño-Metaute, J. H., & López-Zapata, E. (2016). Analysis of factors that influence the ICT adoption by SMEs in Colombia. *Intangible Capital*, 12(2), 666-732.
- Otieno, A. P. (2015). *Factors influencing ICT adoption and usage by small and medium-sized enterprises: the case of Nairobi based SMEs* (Doctoral dissertation, United States International University-Africa).
- Petti, C., & Passiante, G. (2009). Getting the benefits of ICTs in tourism destinations: models, strategies and tools. *Int. Arab J. e-Technol.*, 1(1), 46-57.
- Ramos-Soler, I., Martínez-Sala, A. M., & Campillo-Alhama, C. (2019). ICT and the sustainability of world heritage sites: Analysis of senior citizens' use of tourism apps. *Sustainability*, 11(11), 3203.
- Saunders, C., Wiener, M., Klett, S., & Sprenger, S. (2017). The impact of mental representations on ICT-related overload in the use of mobile phones. *Journal of Management Information Systems*, 34 (3), 803-825.
- Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students: 5th ed.* Prentice: Prentice Hall

- Shiue, Y. M. (2007). Investigating the sources of teachers' instructional technology use through the decomposed theory of planned behaviour. *Journal of Educational Computing Research*, 36(4), 425-453.
- Taylor, R. S. (2017). *Exit left: Markets and mobility in republican thought*. Oxford University Press.
- Wagaw, M., & Mulugeta, F. (2018). Integration of ICT and tourism for improved promotion of tourist attractions in Ethiopia. *Applied Informatics*, 5 (6).
- Weston, R., & Gore Jr, P. A. (2006). A brief guide to structural equation modeling. *The counseling psychologist*, 34(5), 719-751.