Testing Mediation Effects of Information Communication Technology Usage on Technological, Organizational and Environmental Factors and World Heritage Sites Performance

Theresia Mugobi
The Open University of Tanzania
E-mail: mugobit@gmail.com

Shogo Mlozi
National College of Tourism & The Open University of Tanzania.
E-mail: shogo04@gmail.com

&

Deus Ngaruko*,
The Open University of Tanzania
E-mail: ngarukoddp@gmail.com.
*Corresponding author

Abstract: This study seeks to explain the mediation effect of Information Communication Technology (ICT) usage on the relationship between the technological (i.e., perceived relative advantage, perceive compatibility and perceived complexity), organizational (i.e., ICT support infrastructure and ICT support skills) and environmental (i.e., perceived competitive pressure and perceived pressure from customers) factors and world heritage sites performance. The study proposes the mediation model of ICT usage and world heritage sites in Tanzania. Methodology: The proposed order of the model is that ICT usage depends on technological, organizational and environmental factors and ICT usage may further predict world heritage sites performance. These measures capture our research questions. Respondents included decision makers off all the seven UNESCO sites of Tanzania. Data were collected from August to February 2018; 353 filled questionnaires were gathered and 238 were usable for further analysis. Final questionnaires were analyzed using SPSS and Structural Equation Modeling (SEM). Main Results: The findings support that world heritage sites' decision makers may consider perceived relative advantage, perceived complexity, ICT support infrastructure, ICT support skills, perceived competitive pressure and perceived pressure from customer to be the main determinants of ICT usage toward influencing performance of the world heritage sites. Originality of the research: The paper strengthens theoretical arguments by indicating the mediation effect of ICT usage on the relationship between the determining Technological, Organizational and Environmental (TOE) factors and world heritage sites. Thus, this study adds to the literature as it has confirmed both TOE and Technological Acceptance Model (TAM) theories.

Keywords: Environmental, ICT usage, organizational, performance, technological, world heritage sites.

Introduction

The evolution of ICT has allowed World Heritage Organization to promote and distribute information about their attractions, on the other side; it has enlarged dramatically the possibility for interested people to reach rich and updated info about any World Heritage Sites (WHSs) [1].

In order to run online communication effectively and efficiently and win the currently tourism market share, WHS managers are supposed to invest on time, resources and effort to deliver accurate and clear message, update the contents on a regular basis, interact with online customers, provide feedback on online customers reviews as well as to offer a wide range of services, dialogues with users [37]. In 2016, 50% of the developed countries utilized ICT opportunities to choose holidays on the basis of available information at the internet [9]. In 2008 it was found that 82% of US online consumers have checked online reviews, blogs and other online feedback for their travel related purchasing decision [1].

Through the recognition of ICT in the range of economic and social activities in Tanzania, ICT enhanced productivity and efficiency led to increase in job, "ICT contribution to the Gross Domestic Product (GDP) from 1.5% in 2004 to 2.4% in 2013 and sector growth has increased from 17.4% of GDP in 2004 to 22.8% by 2013" [33]. Despite the contribution of ICT into tourism industry particularly the WHSs in promoting the identity of the country and provide livelihood to those employed in the industry, in Tanzania, the sector contains a number of challenges including low promotion and maintenance, poor publicity of the country image and many sites are still hidden with poor online content [35]. "Most people are not aware of the cultural heritage sites and cultural materials present in our country making these sites receive only minimal attention from the public which in turn leaves the heritage sites in poor condition and eventual deterioration" [35, p.53]. Inadequate institutional arrangements, inadequate communications and poor infrastructure, shortage of ICTs facilities and skills as well as limited data management capacity has resulted Tanzania WHSs being slow in ICT usage in the process of transforming their service delivery system [35]. Their ICT systems are out of date with poor access and less content, therefore, they are not able to promote, distribute information and potentially not able to compete on a level playing field in the global tourism industry [36], [46]. This paper taps into a literature

designed to explain how ICT usage mediates the relationship between determining TOE factors and World Heritage Sites' performance. The research model is grounded in technology acceptance model [15] and TOE framework [52] and is empirically tested by survey data gathered in 2018 within the Tanzania UNESCO World Heritage Sites.

Theoretical Background

Technological, Organizational, Environmental Theory

This study considers the mediation effect of ICT usage on the relationship between the determining TOE factors and World heritage sites performance. Specifically, the assumption grounding TOE theory is that, it describes both the existing technologies in use and new technologies relevant to the firm. Technology factors play a critical role in the way business operates by changing the organizational structures as well as the degree of competition. The assumption grounding technological factors for this article includes features such as perceived relative advantage (PR), perceived compatibility (PCT) and perceived complexity (PCL). Organizational factors include features within the organization that encourage or discourage ICT usage [3]. These features are: firm size, centralization, complexity of its managerial structure, executive support, human resource effectiveness and competencies, the amount of slack resources available internally [3], [23].

The assumption grounding organizational factors for this article includes features such as ICT support infrastructure (INF) and ICT support skills (SS). Environmental factors in the TOE theory include features in which the firms conduct business [32]. These features are influenced by the industry itself, its competitors, customers and the firm's ability to access resources supplied by others, and the firm's interactions with the government.

Reference [17] indicated that the environmental factors include different elements that facilitate a firm to use ICT and is thus driven by the competitors and customer pressure. The assumption grounding technological factors for this article includes features such as Perceived Competitive Pressure (PCP) and perceived pressure from customers (PPC).

Relatively few studies have looked into the mediation effect of ICT usage on the relationship between the determining TOE factors and world heritage sites performance in developing countries particularly in Tanzania [35]. Thus, this study presents a model of the mediation effect of ICT usage on the relationship between determining factors (TOE) and world heritage sites.

Proposed Model of the Study

The proposed model includes several theoretical constructs from the TOE factors influencing ICT usage and their sets of indicators chosen as testable. The independent variables are made up with the seven constructs under TOE factors. ICT usage mediates the relationship between the TOE factors and the dependent variable (i.e. World heritage sites performance). Earlier studies have, in other contexts than Africa, identified the organizational, environmental, firm's related context, decision maker's context as determinants of ICT adoption with actual usage levels and the value creation process induced by e-business application [17]. These insights build the basis to conceptualize and propose a general theoretical framework for Tanzania. In addition, the framework includes ICT usage variable to mediate the relationship between determining factors (TOE) and world heritage site performance. The inclusion of ICT usage as a mediating variable is one of the key contributions in the literature on explanation of the determining factors influencing ICT usage toward world heritage site performance. The proposed order of the model is that ICT usage depends on TOE factors and that ICT usage may further influence world heritage sites performance.

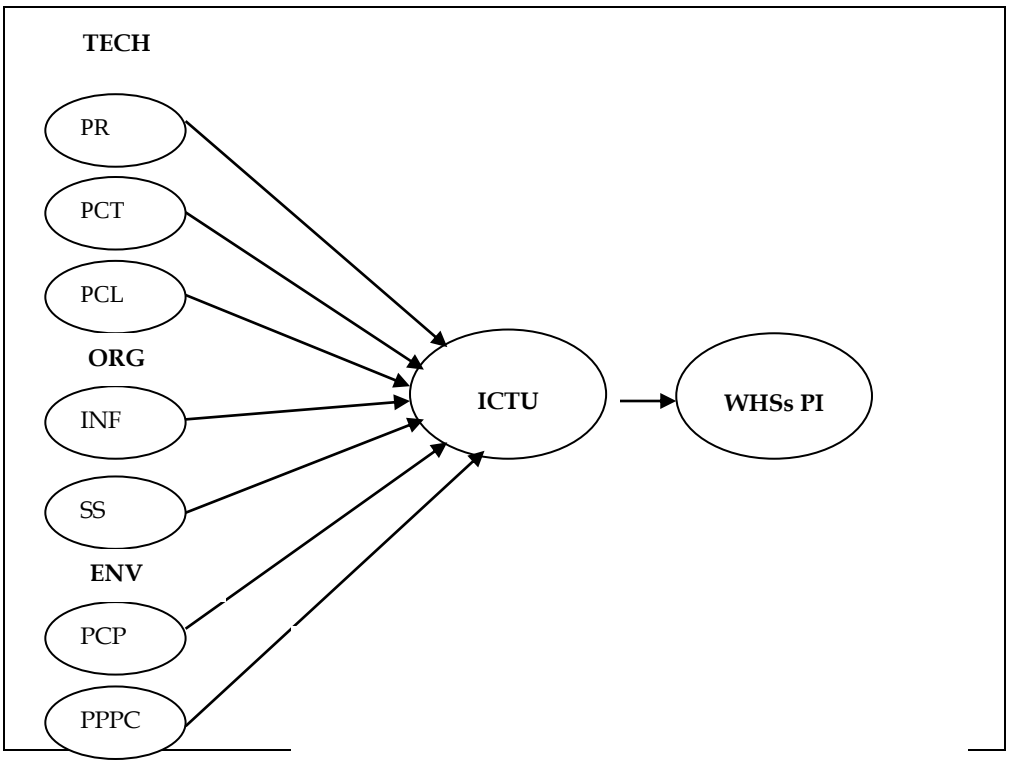

Fig. 1 Conceptual Framework of ICT usage mediation effects on T.O.E factors and WHSs

Theoretical Background of Constructs and Hypotheses

PR

Reference [17] provided the working definition of PR as the degree to which usage of new ICT system is considered to be better than the old system in terms of improving individual performance. When employees or business owner perceive a relative advantage to new ICT system then the chance of using ICT will increase [23]. "The greater the benefits received by SMEs, the higher the possibility of ICTs adoption" [17, p.58]. Several studies have proven the positive relationship between PR and ICT usage in tourism context SMEs (e.g. [54, [41]). PR has proven statistically to be positive significantly to determine ICT usage thus will lead to organization performance [11]. The concepts are linked with the gaps being addressed by the hypotheses in the current study. The authors are not aware of any study that has investigated the mediation effect of ICT usage on the relationship between relationship PR and WHSs performance. Thus, the hypotheses below are proposed:

(i) H1a: ICT usage mediates the positive effect of PR and WHSs performance (PI)

PCT

Reference [49] defines PCT as a degree to which new ICT system is compatible with the existing system. When the users perceive the new technology they wish to use will match their beliefs, culture and values and there is no resistance to change from the staff, they will use that technology. In case the potential users have a negative perception of their previous technology, then the new technology ideas will be evaluated from the previous ICT performance [39]. A study [2] proved the positive relationship between PCT and ICT usage in tourism context SMEs, while no significant effect was found between PCT and ICT usage in world heritage sites.

References [27], [30], [34] found that a statistically strong and meaningful relationship existed between PCT and ICT usage, while no mediation effect was found of ICT usage on the relationship between PCT and world heritage sites' performance. In this study, it is argued ICT usage fully mediates the relationship between PCT and world heritage sites performance. Therefore, the following hypothesis is proposed for this study:

(ii) H1b: ICT usage mediates the positive effect of PCT and WHSs performance (PI)

PCL

PCL refers to ICT usage being perceived as relatively difficult to understand

and use by user of new ICT system, the less complex of ICT usage, the higher chance of being used [44]. Several researchers met PCL in dealing with the study of ICT usage. The usage of ICT is highly related to the PCL of the users. Depending with the previous ICT usage experience, if the experience was negative to an organization, then the complexity will consequently be negatively associated with the new ICT and the future [9]. Researchers have agreed that PCL is a determinant of ICT usage [5],`[6], [48]. Organizations are less reluctant to accept using ICT if it expects that a high level of new expertise must be recruited to carter for the new system.

The present study suggested that ICT usage mediates the relationship between PCL and world heritage site performance. On the one hand, this concept is consistent with previous literature by [22] who reported that ICT usage positively mediates the relationship between perceived ease of use and business performance. On the other hand, [14] found that the most cited benefit by Macedonians SMEs as result of ICT use and adoption is improved quality of service. Therefore, the following hypothesis is proposed:

(iii) H1c: ICT usage mediates the positive effect of PCL and WHSs performance (PI)

INF

ICT infrastructure is defined to be one of the main components within the organization that enable a foundation of shared information technology capabilities upon which business depends [3]. Reference [23] strongly perceives ICT infrastructure as a technological framework that provides direction to organization in fulfilling business and management needs.

Reference [28] found that improved INF ensures effective use of ICT and increases the percentage of staff who have access to broadband and internet in the work place and this will support research innovation and service provision. Reference [19] found that lack of INF, poor, old, unmaintained hardware, lack of software, lack of internet connectivity were positively related to hindering ICT usage. Today, empirical studies on the relationship between INF and ICT usage are very limited in world heritage sites. The concepts are linked with the gaps being addressed by the hypotheses in the current study. The authors are not aware of any study that has investigated the mediation effect of ICT usage on the relationship between INF and WHSs performance. Thus, the hypothesis below is proposed:

(iv) H2a: ICT usage mediates the positive effect of INF and WHSs performance (PI)

SS

SS refers to elements such as computer and internet skills in terms of

operating, processing, changing, accessing and using software and hardware of computer and internet devices [32]. The implication is that, knowledge in operating the above elements is an essential and key as it influences ICT usage toward performance of WHS. Poor ICT skills within the organization are regarded as barrier to ICT usage thus cause difficulties in realizing the potential brought by ICT investment within the organizations [42]. In this study the two theoretical components, SS and ICT usage are related. References [50] and [54] reported that SS has a positive significant relationship with ICT usage. Reference [47] found that SS enables ICT usage which contributes positively significant to firm performance. The concepts are linked with the gaps being addressed by the hypotheses in the current study. The authors are not aware of any study that has investigated the mediation effect of ICT usage on the relationship between SS and WHSs performance. Thus, the hypothesis below is proposed:

(v) H2b: ICT usage mediates the positive effect of SS and WHSs performance (PI)

PCP

Reference [30] defined PCP as a driving force toward ICT usage in many organizations for them to remain competitive. When the level of competition is high, organizations may use ICT not on account of its relative advantage, but on account of the competitors who are already using it [31]. Companies invest in ICT driven by the need to keep up with competition. ICT usage helps the company to increase the value of their competitiveness by allowing them to improve the process value. Researchers have agreed that pressure from competitors increases ICT usage rate of an organizations [18, 34, 8]. Organizations who do not feel any pressure from competitor will also will fail to adapt to the fast pace and complexity of the business which will eventually lose from the growing globalization. This concept is consistent with previous literature by [20] who reported that increase level of competition has indeed induces innovation and ICT usage in OECD countries resulting into increase of productivity. The concepts are linked with the gaps being addressed by the hypotheses in the current study. The authors are not aware of any study that has investigated the mediation effect of ICT usage on the relationship between PCP and WHSs performance. Thus, the hypothesis below is proposed:

(vi) H3a: ICT usage mediates the positive effect of PCP and WHSs performance (PI)

2.3.7. PPC

PPC refers to the pressure given from the external factors including customers. Customer pressure represents a major force on WHSs. Indeed, it is widely acknowledged that the internet and other related technologies create 'powerful customers' who have a wealth of accurate, updated and unbiased [36]. Therefore, WHSs will have higher levels of performance if their customers exercise substantial pressure on them to be highly involved in ICT. Lacking pressure from customers, business owners and managers may perceive ICT usage as a waste of resources [16].

[8] Found that, PPC had a positive effect on ICT usage. [51] Indicated that small businesses are vulnerable to customer pressure thus they adopt and use ICT from their customer demand. Customer pressure is the significant determining ICT usage. [12; 45] found that external pressure from customer is a determinant effect of ICT usage for SMEs in Europe. [10] Proposed that in various developing countries, pressure from customers had a strong influence on ICT adoption and usage and it cost much less when compared to using telephone costs to contact their customer and it also keep their customer happy.

The concepts are linked with the gaps being addressed by the hypotheses in the current study. The authors are not aware of any study that has investigated the mediation effect of ICT usage on the relationship between pressure from customers and WHSs performance. Thus, the hypothesis below is proposed:

(vii) *H3b: ICT usage mediates the positive effect of* PPC *and WHSs performance (PI)*

Methodology

The data were collected in August to February, 2018. Data were gathered from world heritage site decision makers including; directors, senior managers, general park warden, managers, head of units, head of departments and zone warden officers as they are sought to be part of the decision making in regard to increasing performance of WHS through ICT usage. Drop-and-collect technique was applied by leaving a questionnaire with a respondent and going back later to pick it up after having filled it up. A total of 353 questionnaires were distributed in this study, in which 238 usable responses were retained for further analysis.

Table 1: Characteristices 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%

3.1. Measurement

The measurement scales used to collect data were adopted from the existing ICT measurement scales. The items were measured using five-point Likert-type scales. The technological factors were adopted from previous studies and adapted to fit WHSs from 21; 38; 43]. It consisted PR (8 items), PCT (8 items), and PCL (7 items). [17; 44] provided the basis for designing the items for measuring organizational factors which is measured by variables such as its ICT infrastructure (8 items) and ICT skills (6 items). We also adopted and items from [10] for measuring environmental characteristics. The items were measured by PCP (7 items) and PPC variables (8 items).

Structural Model Results

In testing the structural model for the overall sample, the analysis started by evaluating goodness-of-fit indices. The model met the recommended guidelines for goodness of fit (CMIN/DF =1.555, RMSEA= 0.0048, GFI= 0.790, CFI= 0.946, TLI= 0.942). In testing for mediation the initial process involves the removal of the mediator (i.e. ICT Usage), we need to show that the direct effect of determining factors (T.O.E) on WHSs performance indicators (PI) is significant. The model produced the following indices CMIN/DF= 1.375, GFI = 0.825, TLI = 0.965, CFI = 0.968 and RMSEA=0.040, thus, model fit confirms the suitability of the structural model to explain the mediation effect of ICT Usage on the determining factors (T.O.E) and WHSs performance (PI).

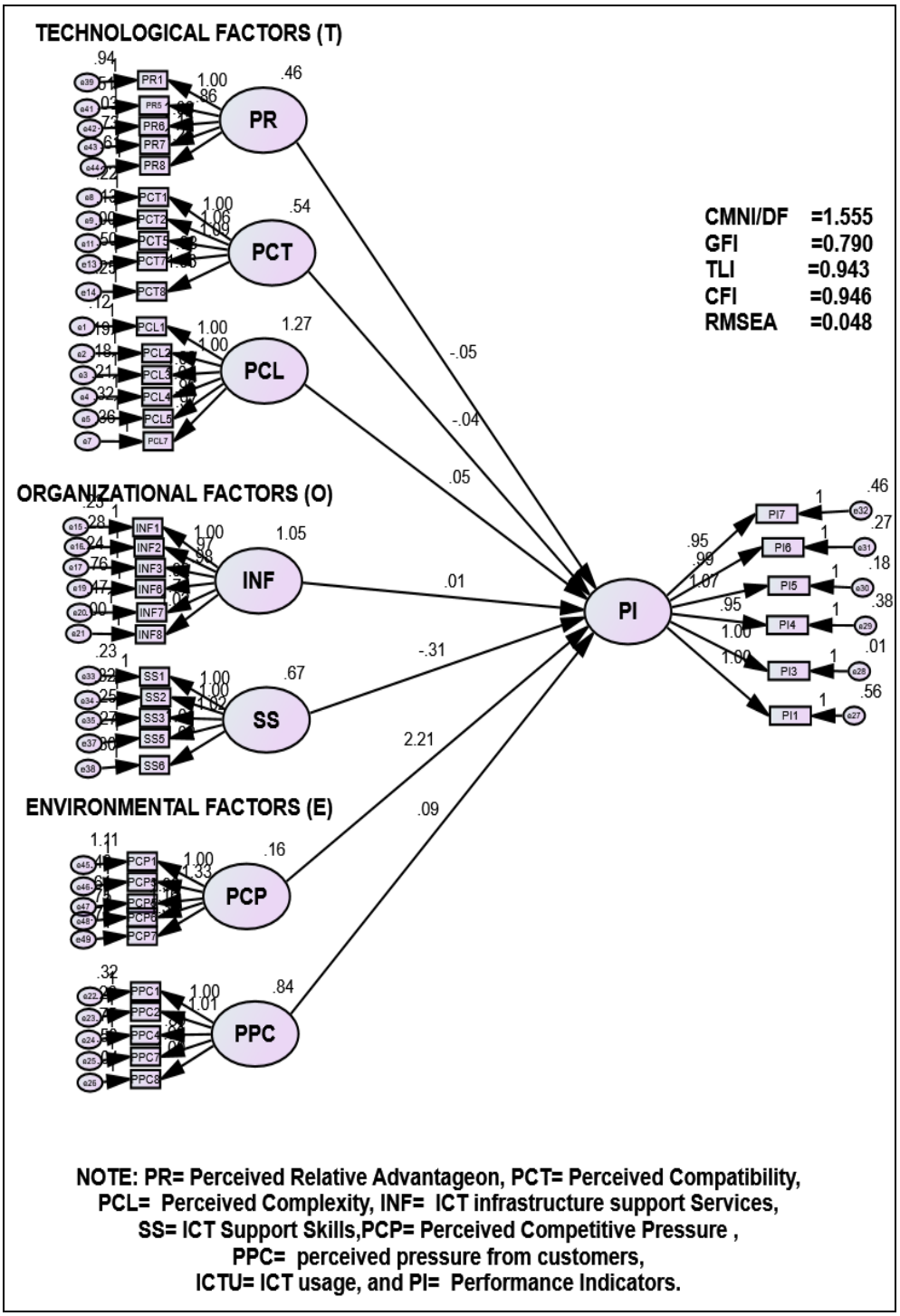

Fig. 2: The structural Model for Direct effect without a mediator (ICTU)

The magnitude of a direct effect indicated that the path coefficient from PI to PR (.11), PI to PCT (.11), PI to PCL (-.04), PI to INF (.10), PI to SS (.05), PI to PPC (.35) and PI to PCP (.17). Only two factor had a value below 0.10 (PI

to PCL=-.04 and PI to SS=.05) suggesting a small direct effect while other variables had small to medium effect. This help to compare the test of the indirect effect of the structural model when ICT Usage is entered as a mediator as presented in below.

4.1. The Mediation Test for both Direct and Indirect Effects with Mediator

The structural model is executed to test for both direct and indirect effect with a mediation variable of ICTU. This process is intended to test for direct and indirect effects. This is followed by confirmation of model fit to ascertain the legitimacy of estimates shown above. The model fit results for the structural model with the mediator are; CMIN/DF= 1.519, GFI = 0.796, TLI = 0.945, CFI = 0.950 and RMSEA=0.047. This confirms that the structural model is appropriate to explain the mediation effect of ICT Usage on the relationship between determining factors (T.O.E) and WHSs performance (PI).

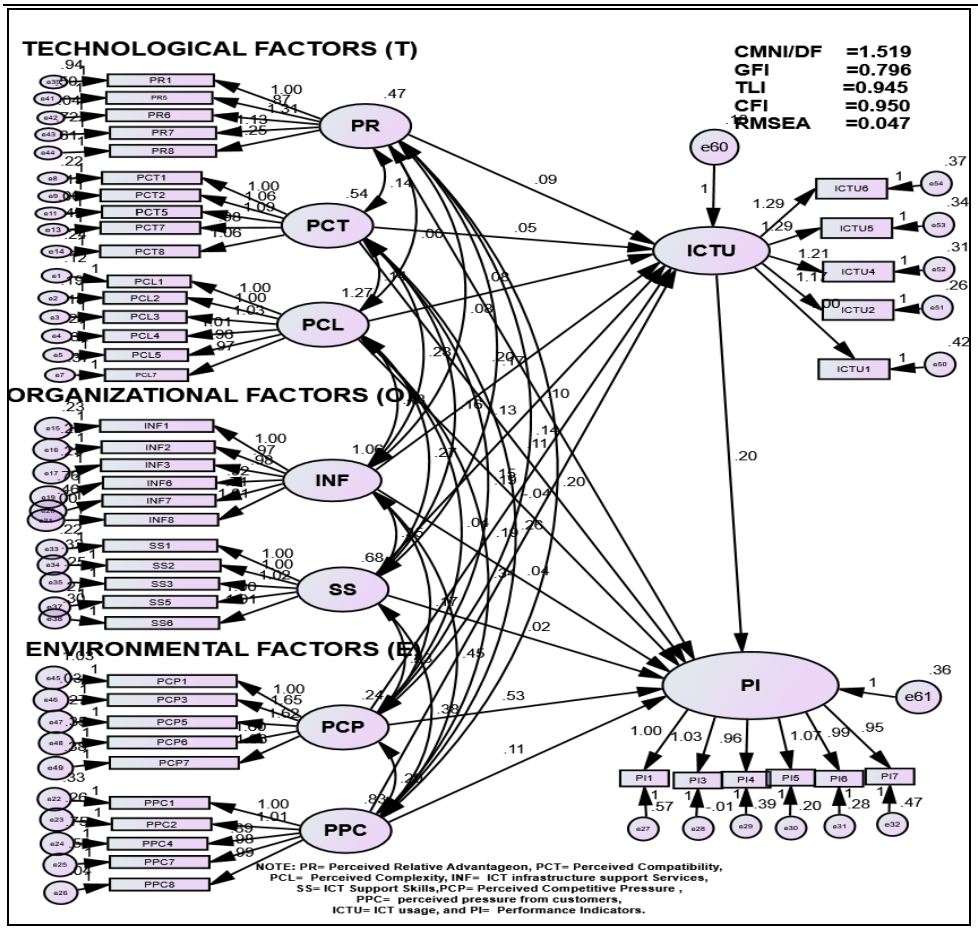

Fig. 3: The Standardized Regression weights for every path in the model

Results from the direct effect before mediation where PR has a direct relationship with PI supported the study by having a positive significant relationship between PR and WHSs Performance (PI) (γ = 0.120, p =0.041). However, when the mediator enter the model, the strength of the direct effect dropped while the relationship remained significant (γ = 0.096, p =0.050). Thus partial mediation occurs and H1a is supported. The study also examined the ICT usage mediate the relationship between PCT and WHSs performance (PI).

Results from the direct effect before mediation where PCT has a direct relationship with PI supported the study. The relationship between PCT and PI were observed to be positive and significant (γ = 0.130, p =0.025) when the mediation enter the model, strength of the direct effect dropped and the relationship was not significant (γ = 0.056, p =0.250) thus, ICT usage would not mediate the relationship between PCT and performance of WHSs (PI). Thus no mediation occurs and H1b is not supported.

The study went further to investigate the ICT usage mediation on the relationship between perceive complexity and WHSs performance. Results from the direct effect before mediation where PCL has a direct relationship with PI was weak, negative and insignificant (γ = -0.040, p =0.477). However, when the mediation enter the model, the strength of the direct effect increased and the relationship observed to be positive and significant (γ = 0.146, p =0.003) (refer to table 4.46). Thus fully mediation occurs and therefore, H1c is supported.

The relationship between INF and PI were observed to be positive and insignificant (γ = 0.112, p =0.063), when the mediation enter the model, strength of the direct effect increased and the relationship was very significant (γ = 0.329, p =0.000) thus, ICT usage would partially mediate the relationship between INF and performance of WHSs (PI), thus H2a is supported. Likewise, ICT usage partially mediated the relationship between SS and WHSs performance.

The results from the direct effect before mediation where SS has a direct relationship with PI was positive insignificant (γ =0.061, p =0.326). However, when the mediation enter the model, the strength of the direct effect increased and the relationship observed to be positive and significant (γ = 0.169, p =0.005), thus H2b is supported. On the other hand, the results from the direct effect before mediation where PCP has a direct relationship with PI supported the study. The relationship between PCP and PI were observed to be positive and significant (γ = 0.382, p =0.000) when the mediation enter the model, strength of the direct effect dropped and the relationship remained to be significant (γ = 0.148, p =0.170) thus, ICT usage

would partially mediate the relationship between PCP and WHSs performance (PI). Thus H3a is supported. Likewise, the result of a direct effect before mediation where PPC has a direct relationship with PI were weak, positive and significant ($\gamma = 0.181$, $p = 0.004$). However, when the mediation enter the model, the strength of the direct effect increased and the relationship observed to be positive and very significant ($\gamma = 0.285$, $p = 0.000$), thus partial mediation occurs and H3b is supported.

Discussion

This study was inspired by the need to learn more about the mediation effect of ICT usage on the relationship between the determining (T.O.E) factors and WHSs performance. The findings provide evidence that ICT usage fully mediates the relationship between PCL and WHSs performance, partially mediate the relationship between PR, INF, SS, PCP and PPC. It also shows ICT usage did not mediate the relationship between perceive compatibility and WHSs performance.

To start with, it was found that ICT usage partially mediates the relationship between perceive relative advantage and WHSs performance (H1a). The findings are not surprising given the nature of the study where WHSs decision makers need to perceive a high level of relative advantage for them to start using ICT thus they can increase organization efficient and effectiveness [11].

The finding was consistent with what [29] describe, ICT usage is being determined by PR by SMEs in Libya which in turn increase firm performance and gain competitive advantage. It was also found that ICT usage did not mediate the relationship between perceive compatibility and WHSs performance. The findings make sense on the account that WHSs decision makers has low perception level on compatibility associated with ICT usage because they have not been exposed to such technologies, in most case, WHSs decision makers would prefer to be the followers rather than leader in ICT usage within their sites. A study by [13] found that, the main barriers to ICT usage in Malaysia were lack of compatibility between existing systems and the new technologies. [2] PCT is less a determining factor to ICT usage especially when technology is a change from a traditional business model to e-commerce.

Furthermore, it was found that, ICT usage fully mediates the relationship between PCL and WHSs performance. This notion correlate with [22] ICT usage positively mediates the relationship between perceived ease of use and business performance. Similarly, [14] found that the most cited benefit by Macedonians SMEs as result of ICT use and adoption is improved quality of service.

ICT usage partially mediates the relationship between INF and WHSs performance. [28] Support the findings that INF ensure effective use of ICT and increase level of service provision. There are contradictory results in the empirical literature in this field, [4] found that, supported ICT infrastructure and ICT usage alone does not guarantee a good student performance. [40] Poor INF may form a barrier to ICT usage hence poor performance of the organization. This study was conducted in different field and different geographical areas where socio-economic, technological is quite different from that of Tanzania UNESCO WHSs. In order for tourism organization to use ICT, organization should implement INF.

ICT usage partially mediates the relationship between SS and WHSs performance. Any kind of performance in any industry needs people who are skills and expertise [24] articulated that in order to have this, there must be some costs incurred by WHSs decision makers facilitate the progress of ICT usage. WHSs decision makers need to provide ICT training for them to gain full potential brought by ICT usage.

Finally, ICT usage partially mediated the relationship between PCP and WHSs performance. This finding are supported by [18] who found that pressure from competitors has influenced business to gain performance after ICT usage firm are now cable of promoting services to customers, and staying competitive and be able to manage changes. [7] Emphasize that, there is a positive relationship between PCP results into ICT usage toward corporate performance. [53] Competition is the key in selecting firms that are able to seize the benefits of ICT and in making them flourish and grow.

The above results indicate that the PPC and ICT usage toward improving WHSs performance should not be overlooked. This is supported by [10] whom they proposed that, in various developing countries, pressure from customers had a strong influence on ICT adoption and usage and it cost much less when compared to using telephone costs to contact their customer and it also keep their customer happy because they don't use cash to buy their products. Regarding the full and partial mediation effect of ICT usage on the relationship between PR, PCL, INF,SS,PCP,PPC and WHSs performance, decision makers will need to focus more on ICT usage whilst to improve performance of their sites. This implies that WHSs decision makers have to positive perceive these variables to influence their ICT usage level which will eventually contribute to increase of sale, facilitate business and customer relationship. This is because, Tanzanian WHSs are not able to sustainably promote, distribute information and potentially not able to compete on a level playing field without a proper online media platform [36; 46]. Most people are not aware of the cultural heritage sites and cultural materials present in our country making these sites receive only minimal

attention from the public which in turn leaves the heritage sites in poor condition and eventual deterioration" [35.p53]. This call for WHSs decision makers to positively adopt ICT usage in their daily operation so as increase sales, and facilitate business and customer relationship. ICT reduces operating costs, raise value to customers, achieve strategic competitive customers, and achieve strategic competitive advantage [25; 26]. This notion, tells that, for the success of any tourism business, particularly WHSs ICT usage is inevitable to enhance sites performance.

Conclusion

ICT usage in tourism industry provided destination management organization with the possibility of reaching tourist and prospects in a direct way such as online promotion and marketing, distribution of tourism products, managing and coordination of all stakeholders involved in the creation and delivery of tourism product [1]. As this study confirms ICT usage full and partially mediates the relationship between PR, PCL, INF, SS, PCP, PPC and WHSs performance. Previous studies in ICT have focused on ICT determinant factors none of the study have looked on the mediation effect of ICT usage on the relationship between the determinant (T.O.E) factors and WHSs performance, thus to be one of the theoretical contribution of the study. Future studies in Tanzania and elsewhere can adopt this model also in other tourism organizations context. Moreover and specifically, this model can be applied to other UNESCO world heritage sites in other African destinations that are similar to Tanzania and compare the findings to the recent study in order to build more robust models.

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