Impacts of quality antecedents on faculty members' acceptance of electronic resources

Article *in* Library Hi Tech · February 2018

DOI: 10.1108/LHT-01-2017-0010

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Impacts of quality antecedents on faculty members' acceptance of electronic resources

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Citation:

Edda Tandi Lwoga, Alfred Said Sife, (2018) "Impacts of quality antecedents on faculty members' acceptance of electronic resources", Library Hi Tech, https://doi.org/10.1108/LHT-01-2017-0010

Abstract

Purpose – This study assessed whether quality antecedents and individual characteristics can influence faculty members' continued usage intention of electronic resources in selected public universities in Tanzania.
Design/methodology/approach – A total of 204 faculty members participated in the study from three public Universities in Tanzania. The study used structural equation modelling (SEM), ANOVA, and t-tests to perform analyses.
Findings – Better educated and middle aged faculty members with a wide experience of using e-resources are more likely to continue using e-resources. Information quality had positive relationship with continued usage intention of e-resources while service quality had indirect impact to continued usage intention through information quality and system quality.
Originality/value – Based on the DeLone and McLean Information Systems Success Model, this study integrates quality factors (information, service, and system quality) and individual characteristics as antecedents to the continued usage intention of e-resources. The study comprehensively documents empirical findings on impacts of quality factors and individual characteristics on e-resources in a developing country. The study reveals results that are useful for enhancing usage of e-resources by faculty in other institutions with similar conditions.

Keywords: Information quality, Service quality, System quality, e-resource, Structural equation modelling, Tanzania, information system success model

Introduction

Electronic resources (e-resources) have increasingly become major sources of information in supporting academic and research activities. E-resources refer to academic information materials in electronic formats which are made available to users through digital retrieval systems. It is now widely accepted that e-resources significantly contribute to improve research and academic activities. For instance, studies conducted in Tanzania (Manda and Nawe, 2008) and Nigeria (Ani, 2013) reported increased research productivity of academic staff following increased access to and use of a wide range e-resources.

In Tanzania, academic and research institutions jointly subscribe to over 34 online databases through the Consortium of Tanzania University and Research Libraries (COTUL). Furthermore, Tanzanian scholars have access to over 69,000 online scholarly publications through the

[1]Research4Life programme which provides free access to peer-reviewed e-resources to developing countries (Research4Life, 2017). However, there are concerns that the use of e-resources is still low in the Tanzanian institutions (Manda, 2005; Manda and Nawe, 2008; Angello and Wema, 2010; Mtega, Nyinondi and Msungu, 2013; Msagati, 2014; Mtega, Dulle and Malekani, 2014). Consistently, studies in other developing countries have reported similar patterns on access and use of e-resources (Adeniji, 2014; Nana *et al.*, 2014; Smeda, Shiratuddin and Wong, 2014). This calls for research to determine factors that influence continued usage intention of e-resources by faculty members in the country.

The present study employed the Information Systems (IS) Success Model to determine factors affecting continued usage intention of e-resources among faculty members who had attended e-resources training in the past six months in three public Universities in Tanzania. Specifically, the study assessed the usage pattern of e-resources, as well as the effects of quality factors and individual characteristics on continued usage intention of e-resources.

Literature review

In Tanzania, many studies have been conducted in recent years on availability, awareness, accessibility and usage of e-resources (Manda 2005; Manda & Nawe 2008; Park et al. 2009; Mtega et al. 2014; Angello & Wema 2010; Mtega et al. 2013; Msagati 2014). Manda (2005) reported that there was low usage of e-resources in ten institutions despite the fact that users had participated in e-resource training workshops. Similar findings were reported by other Tanzanian studies of academic staff at the Dar es Salaam University College of Education (Msagati, 2014), agricultural researchers (Mtega et al., 2014), and livestock researchers (Angello and Wema, 2010). It is obvious that there are still gaps on the factors that affect users' continued usage intention of e-resources in the country, although e-resources play a critical role in academic and research activities.

Factors that affect access to e-resources in Tanzania include institutional factors such as poor institutional ICT infrastructure, limited funds for subscribing to e-resources (Msagati, 2014; Mtega, Dulle and Malekani, 2014); individual factors such as lack of awareness (Angello and Wema, 2010; Msagati, 2014), inadequate search skills (Msagati 2014; Angello & Wema 2010; Mtega et al. 2014; Msagati 2014), domain knowledge, language, and interest (Park *et al.*, 2009); and system characteristics such as accessibility, library assistance, and relevance (Park *et al.*, 2009). Studies in other developing countries have also reported similar factors (Ahmed 2013; Kinengyere et al. 2012; Obasuyi & Okwilagwe 2017). This suggests that factors that affect users' continued usage intention of e-resources remain unknown. This is where the present study comes into play - would the Tanzanian faculty members intend to continue using e-resources in the future?

Various studies have assessed the continued usage intentions of information systems in various contexts such as acceptance of e-learning (Cho, Cheng and Hung, 2009; Ramayah, Ahmad and Lo, 2010; Lwoga, 2014; Lwoga and Komba, 2015). However, few studies have assessed the continued usage intentions of e-resources in the context of academic libraries (Joo & Choi,

[1]Research4Life is the collective name for four programmes – Research in Health (HINARI), Research in Agriculture (AGORA), Research in the Environment (OARE) and Research for Development and Innovation (ARDI) – that provide developing countries with free or low-cost access to academic and professional peer-reviewed content online.

2016). Based on the Expectation Confirmation Theory (ECT), Joo and Choi (2016) found that both usefulness and confirmation had a direct and indirect positive influence on continued intention to use e-resources. Further, resource quality had positive significant effects on continued intention. Therefore, it is imperative to investigate factors which influence faculty members' continued usage intention of e-resources. The relationship between the quality factors (service, information and system) and continued usage intention, and the influence of individual characteristics was also investigated in this study.

Research model and hypothesis development

Several models and theories have been used to explain information systems acceptance behaviour. These include the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Technology Acceptance Model (TAM) (Davis, 1986) and its modified versions such as TAM2 (Venkatesh and Davis, 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003) and the extended Unified Theory of Acceptance and Use of Technology (UTAUT2) (Venkatesh, Thong and Xu, 2012). Compared to other related models, TAM is widely applied and empirically tested, and it is thought to be more robust (Diniz, de Albuquerque and Cernev, 2011; Yucel, 2013).

There are many studies (e.g. Al-Suqri 2014; Barhoumi 2016; Park et al. 2009) in developing countries which have employed TAM to study faculty members' intentions to use e-resources. However, despite their widespread use, TAM and UTAUT have been criticized for paying no attention to the fact that technology acceptance may fluctuate over time (Venkatesh, Davis and Morris, 2007). TAM and UTAUT have also overlooked an attitude variable that could capture several individual beliefs (Chuttur, 2009). In addition, TAM and UTAUT have received criticisms for their dependence on self-reported data (Chuttur, 2009). These concerns call for research to develop a better understanding of acceptance of various types of technology, and in particular adoption of e-resources by faculty members in a university setting.

The Information System (SI) Success Model can be used to assess faculty's intention to continue using e-resources. This model has been widely accepted for assessing different aspects of information systems, whereby more than 8,000 studies have been reported to cite or empirically test the model since its inception in 1992 (Delone and Mclean, 2016). Initially, the IS Success Model had six major components namely system quality, information quality, use, user satisfaction, individual impacts, and organizational impacts (DeLone and McLean, 1992). The model was later on extended to incorporate service quality, intention to use and net benefits (Delone and McLean, 2002; Delone and Mclean, 2004). In 2016, the model was updated to include three quality factors namely "Use," "User Satisfaction," and "Net Impacts" (Delone and Mclean, 2016). While most criticisms of the IS Success Model have been addressed, DeLone and McLean (2003) emphasized that the interdependent relationships between constructs of IS Success Model should be continuously tested and challenged.

The present study adapted the IS Success Model to examine the continued usage intention of e-resources among faculty members in three Tanzanian universities. These were the Muhimbili University of Health and Allied Sciences (MUHAS), Sokoine University of Agriculture (SUA) and University of Dar es Salaam (UDSM). Based on the IS Success Model, this study

conceptualized that quality factors (system quality, service quality, information quality) to influence continued usage intention of e-resources, which is a surrogate measure of IS success (see Figure 1).

Continued usage intention of e-resources

Continued usage intention refers to a long-standing usage or continuous use of an information system (Cho, Cheng and Hung, 2009)**.** The more faculty members are satisfied with the experiences of retrieving e-resources, the more they will intend to continue with accessing e-resources. This study therefore examined the post-adoptive behavior in accepting e-resources among faculty members in three Tanzanian universities.

System quality

System quality refers to users' perception regarding the characteristics of an information system (Delone and Mclean, 2016). Measures of system quality include ease of use, system flexibility, system reliability, ease of learning, and system features of intuitiveness, sophistication, flexibility, and response times (Delone and Mclean, 2016). System quality was found to significantly impact the continued usage intention in previous IS studies (Petter and McLean, 2009; Ramayaha and Leeb, 2012). Faculty members are more likely to use the e-resources due to better interaction experience they have with the online databases.

Information quality

This variable refers to the characteristics of outputs generated by a particular information system (Delone and Mclean, 2016). Measures of information quality include relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, and usability (Delone and Mclean, 2016). Prior studies on IS success found that higher levels of information quality result in increased continued usage intention (Petter and McLean, 2009). Availability of current, reliable and relevant information is one important reason why researchers access e-resources (Angello and Wema, 2010). Information quality is therefore a significant factor in assessing the faculty's continued usage intention of e-resources.

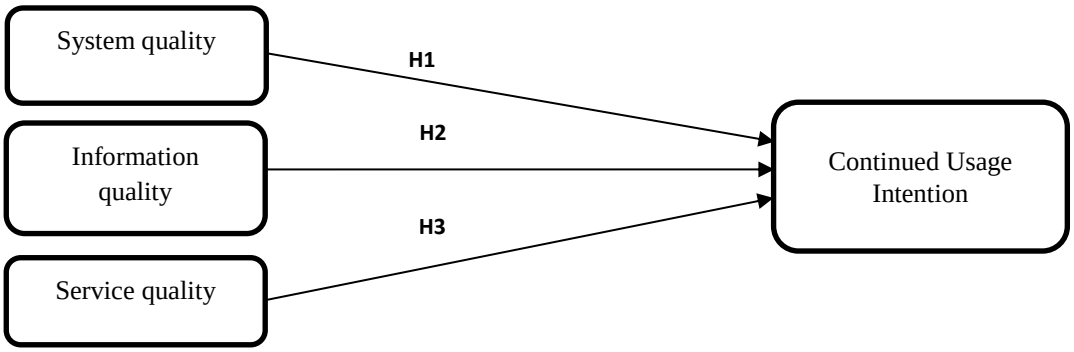

Figure 1: Proposed research model

Service quality

This construct refers to the user's perception on the overall quality of delivery of technical support. Service quality measures responsiveness, accuracy, reliability, technical competence, and empathy of IT personnel (Delone and Mclean, 2016). Service quality had been reported as having significant positive effects on perceived continued usage intention in IS studies

(Ramayah, Ahmad and Lo, 2010). Improved and efficient institutional technical and library support on the use of computers and e-resources are important factors to motivate faculty to use e-resources. Given the fact that most faculty members lack information literacy skills in Tanzania (Angello and Wema, 2010; Mtega, Dulle and Malekani, 2014), adequate user support can enable faculty to access and retrieve e-resources. Most universities provide technical support to faculty members through help desks, hotlines, service centers or the like. It is therefore imperative to measure whether these services are responsive, accurate and reliable to serve faculty members' needs.

Individual characteristics

Individual characteristics play a critical role in influencing the use of e-resources (Zha, Zhang and Yan, 2014). Venkatesh *et al.* (2003) identified a number of intervening or moderating variables (gender, age, experience and voluntariness of use) that can influence use and behavioural continued usage intention of technology. Al-Suqri (2014) found that younger male faculty tended to have higher levels of e-resources usage than females and older faculty in Oman. Similar findings were reported by studies conducted in Nigeria (Funmilayo, 2013) and Tanzania (Manda and Mukangara, 2008). Further, Mtega, Nyinondi and Msungu (2013) established that the preference to e-resources usage decreased with age among researchers in Tanzania. A study conducted in China found that there were significant variations among users with different experience with e-resources inside the library (Yan, Zha and Xiao, 2013). On the other hand, Ani (2013) found that demographic variables (discipline, gender, age, education and professional rank) did not influence access and use of e-resources in Nigerian universities. Similarly, Ahmed (2015) reported that there were no significant differences between genders in usage of e-resources. The present study assessed the effects of individual characteristics as control variables on the continued usage intention of e-resources by faculty members.

Hypotheses

This study had the following seven hypotheses:

H1: System quality has a positive effect on continued usage intention of e-resources among faculty members.

H2: Information quality has a positive effect on continued usage intention of e-resources among faculty members.

H3: Service quality has a positive effect on continued usage intention of e-resources among faculty members

H4: There is a significant difference between male and female faculty members in terms of their continued usage intention of e-resources.

H5: There is a significant difference among various age groups of faculty members in terms of continued usage intention of e-resources.

H6: There is a significant difference among faculty members with different education levels in terms of their continued usage intention of e-resources.

H7: There is a significant difference among faculty members with various experiences with e-resources in terms of their continued usage intention of e-resources.

H8: There is a significant difference among faculty members' research disciplines in terms of their continued usage intention of e-resources.

Methods

This study was conducted in March 2016 in three public Universities in Tanzania namely Muhimbili University of Health and Allied Sciences (MUHAS), Sokoine University of Agriculture (SUA) and University of Dar es Salaam (UDSM). These are the largest public universities in the country where a number of training workshops on e-resources have been conducted during the past few years. A total of 300 printed self-administered questionnaire were distributed, of which 204 (68%) were filled and returned back. The questionnaire was pre-tested at MUHAS to a convenient sample of 20 participants in order to assess validity of the questions. The questionnaire was reviewed by five experts in library and information science field at MUHAS.

Research instrument

The questionnaire had three sections namely: demographic characteristics; usage behaviour of e-resources; and factors influencing the use of e-resources. The indicators to measure the four research constructs are listed in Table 1. A five-point Likert scale, ranging from ‘‘1 = strongly disagree’’ to ‘‘5 = strongly agree’’ was used for all items in the questionnaire. Information quality was measured in terms of information completeness, relevance, and ease of understanding. System quality was measured through system reliability, availability, and usability. Service quality was assessed using three items namely service responsiveness, assurance, and reliability. Continued usage intention was measured using repeated visits to e-resources.

Data analysis

The structural equation modeling (SEM) approach was used to validate the research model. We analysed the generated hypotheses by using AMOS version 21.0. The study used the three-step analytical procedure whereby the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to examine the reliability and validity of the measurement model. We analysed the structural model to test the associations conceptualized in the research model. Further, the study used t-test for two groups of independent samples, and one-way ANOVA for more than two groups of independent samples to explore the influence of individual characteristics, research discipline and experiences of using e-resources on their continued usage intention of e-resources.

Measurement model validation

In EFA, Principal Component Analysis (PCA) was conducted by using the varimax rotation method. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.857 which is above the limit of 0.6 (Hair *et al.*, 2014). Bartlett’s test of Sphericity of 2218.058 ($p = 0.000$) indicated that correlations between variables were sufficiently large for factor analysis. Eigenvalues over Kaiser’s criterion of 1 and the Screen plot resulted into four-factor solution accounting for 75.198% of total variance, which was moreover consistent with the literature (Hair *et al.*, 2014). The average score of the four factors with 16 items was considered for confirmatory factor analysis (Table 1).

Table 1: Exploratory and confirmatory factor analysis

	Constructs	Factor loadings from EFA	Factor loadings from CFA	Sources
Information quality (INF)				
INF1	Scholarly literature provided by the e-	.778	0.64	(Delone and Mclean, 2003;

	resource databases is complete			Landrum and Prybutok, 2004)
INF2	The e-resource databases make it easy for me to get up-to-date literature	.676	0.84	(Landrum and Prybutok, 2004; Lee, 2006)
INF3	The e-resources databases can provide scholarly literature that I need	.760	0.84	(Delone and Mclean, 2003; Lee, Yoon and Lee, 2009)
INF4	Literature provided through e-resource databases is satisfactory	.755	*(Dropped)*	(Delone and Mclean, 2003; Hsieh and Cho, 2011)
INF5	Literature provided by the e-resource databases is easy to understand.	.709	0.58	(Delone and Mclean, 2003)
Service quality (SERV)				
SERV1	Librarians are promptly available for assistance with e-resources difficulties	.810	0.91	(Delone and Mclean, 2003; Landrum and Prybutok, 2004)
SERV2	Staff are available to respond to users' requests	.704	0.73	(Landrum and Prybutok, 2004)
SERV3	Librarians in my institution are knowledgeable about questions	.881	0.80	(Landrum and Prybutok, 2004)
SERV4	Librarians and ICT staff in my institution are willing to help users	.784	*(Dropped)*	(Landrum and Prybutok, 2004)
SERV5	Overall, support services of the e-resources are satisfactory	.852	0.71	(Lee, 2006)
System quality (SYS)				
SYS1	The layout of e-resource databases is user friendly.	.867	0.83	(Parikh and Verma, 2002)
SYS2	The e-resource databases that you can interact with are in a clear and understandable way	.884	0.95	(Landrum and Prybutok, 2004)
SYS3	Overall, user-interface design of the e-resources databases is satisfactory.	.820	0.88	(Cheng, 2012)
Continued Usage Intention (CUI)				
CUI1	I intend to continue using e-resources for my academic work	.846	0.86	(Hu *et al.*, 2009)
CUI2	I plan to continue using the e-resource for my academic work	.889	0.91	(Hu *et al.*, 2009
CUI3	I would continue using e-resources for my academic work	.916	0.88	(Hu *et al.*, 2009

On subjection of the measurement items to CFA, the initial results indicated a poor fit with χ^2/DF = 2.488, χ^2 = 243.804 and DF = 98 at p = 0.000, comparative fit index (CFI) = 0.933, Tucker Lewis's index (TLI) =0.918, Goodness of Fit Index (GFI) = 0.869, Adjusted Goodness of Fit Index (AGFI) = 0.819, and Root Mean Square of Approximation (RMSEA) = 0.086. Examination of factor loadings, standardised residuals and modification indices led to the deletion of two items with loadings below 0.5, standardized residual values above 2.5 and modification indices above 4 (Hair et al., 2014), and to the correlation of error variances of error terms that were theoretically supported to be correlated. Two items (INF4 and SERV4) were deleted. All other model-fit indices showed good fit for the measurement model. The thresholds below were adopted as suggested by Hair *et al.* (2010) as shown in Table 2.

Table2: Fit indices for measurement and structural models

Fit measures	Recommended values	Measurement model	Structural model
X^2/df	≤ 3.00	2.107	2.243

AGFI	≥0.80	0.858	0.850
GFI	≥0.90	0.907	0.900
CFI	≥0.90	0.959	0.953
IFI	≥0.90	0.960	0.954
RMSEA	≤ 0.08	0.074	0.078
NNFI(TLI)	≥0.90	0.946	0.939

Convergent validity was evaluated by examining factor loadings, composite reliability and average variance extracted from the confirmatory factor analysis. All factor loadings of the items in the confirmatory factor analysis were greater than 0.5 and were significant at p=0.001; demonstrating adequate convergent validity (Hair *et al.*, 1992) (See Table 1). The results of the convergent validity using CFA shown in Table 3 indicate that all composite reliability values are above 0.70 and the average variance extracted is above 0.50, which are the recommended thresholds (Hair *et al.*, 2010). Similarly, the findings indicate that the research instrument had satisfactory discriminant validity. This assesses the extent to which a concept and its indicators differ from another concept and its indicators (Bagozzi, Yi and Phillips, 1991). Discriminant validity is established when the square root of the Average Variance Extracted (AVE) is greater than its correlations with all other constructs (Fornell & Larcker, 1981). Thus, the findings in Table 3 indicate that the square root of AVE is much larger than all other cross-correlations for the sample. Reliability was evaluated by examining the Cronbach alpha whereby the values for variables from CFA were all above the suggested cut-off of 0.70 (Cronbach, 1951). Thus, all factors in the measurement model had adequate reliability and convergent validity. The CFA measurement model therefore had adequate reliability, convergent validity and discriminant validity.

Table 3: Composite Reliability (CR), Average Variance Extracted (AVE), correlations and (on the diagonal) square root of AVE

	CR	**Cronbach alpha**	**AVE**	**MSV**	**MaxR(H)**	**SYS**	**INFO**	**SERV**
SYS	0.918	0.914	0.789	0.342	0.939	0.888		
INFO	0.806	0.824	0.586	0.397	0.954	0.396	0.766	
SERV	0.869	0.877	0.626	0.342	0.968	0.585		
CUI	0.916	0.912	0.785	0.397	0.976	0.294	0.630	0.196

Results

The study findings in Table 4 indicate that most (61.8%; n=126) respondents were male and majority (71.6%, n = 146) were aged between 31 and 50 years. Three quarters (75%, n=150) of the respondents were either assistant lecturers or lecturers who possessed master degrees (70.6%, n=144). Most respondents were from health sciences (43.1%, n=88) followed by those from social sciences (30.4%, n=62).

Table 4: Respondent data

		Frequencies	**Percentages**
Sex	Female	78	38.2%
	Male	126	61.8%

Age	30 years or below	22	10.8%
	31- 40 years	80	39.2%
	41 – 50 years	66	32.4%
	51 years and above	36	17.6%
Education	Master degree	144	70.6%
	PhD	60	29.4%
Designation	Assistant lecturer	64	32.0%
	Lecturer	86	43.0%
	Senior lecturer	40	20.0%
	Associate Professor	8	4.0%
	Professor	2	1.0%
Research discipline	Health and Medical Science	88	43.1
	Engineering and Computer Science	18	8.8
	Life Science and earth science	24	11.8
	Social sciences	62	30.4
	Business, Economics and Management	12	5.9

The study findings in Table 5 indicate that more than half (54.5%, n=110) of the faculty members had experience of five years or more in using e-resources. Nearly two-thirds (62%, n=124) of faculty members used e-resources every day. Regarding their level of information search skills, 45.1% (n=92) of faculty members claimed that they were expert users of e-resources whereas 39.2% (n=80) reported that they were knowledgeable. However, the usage levels of library websites were low as only one third (33.3%, n=68) of faculty members used the websites frequently, as indicated in the "almost every day" and "several times a day" categories.

Table 5: Experience and usage of e-resources

		Numbers	**Percentages**
Experience of using e-resources	Less than 1 year	12	5.9%
	1-2 years	26	12.9%
	2-3 years	28	13.9%
	3-4 years	26	12.9%
	5 or more years	110	54.5%
Frequency of using library website	Once a month	18	8.8%
	A few times a month	96	47.1%
	A few times a week	22	10.8%
	Almost everyday	40	19.6%
	Several times a day	28	13.7%
Frequency of using e-resources	Once a month	0	0.0%
	A few times a month	48	24.0%
	A few times a week	28	14.0%
	Almost everyday	72	36.0%
	Several times a day	52	26.0%
Information searching skills	No skills	4	2.0%
	Low level of skills	2	1.0%
	Moderate	26	12.7%
	Knowledgeable	80	39.2%

	Expert user	92	45.1%

Structural Equation Modelling (SEM)

A similar set of goodness-of-fit indices was used to evaluate the structural model. The findings in Table 2 indicate that the observed normed χ^2 for structural equation model was 2.243 (χ^2=156.994 with df 70), which is smaller than 3 as recommended by Hair et al. (2010) indicating a good fit for SEM model. The results also indicate that all indices surpassed the recommended values, and thus the structural model of this study exhibited good fit (AGFI=0.850, CFI=0.953, IFI=0.954, NNFI = 0.939, RMSEA=0.078) (Table 2).

The SEM results indicate that information quality had significant positive influence on continued usage intention of e-resources (b=0.615), while system quality and service quality had no impacts on continued usage intention of e-resources (See Table 6 and Figure 2). This means that the second hypothesis (H2) was supported while the first (H1) and third (H3) hypotheses were not supported. The model adopted in this study shows that system quality, information quality and service quality can account for 39% of the variance in continued usage intention. New relationships as suggested by the validated model were also assessed and found significant. Service quality had positive relationship with information quality (b=0.333) and system quality (0.593).

Table 6: Standardized regression weights

Path			Standardized Estimates	P
INFO	<---	SERV	.333	***
SYS	<---	SERV	.593	***
CUI	<---	INFO	.615	***
CUI	<---	SERV	-.058	.510
CUI	<---	SYS	.107	.192

Note: p* <0.05, p**<0.01, p ***<0.001

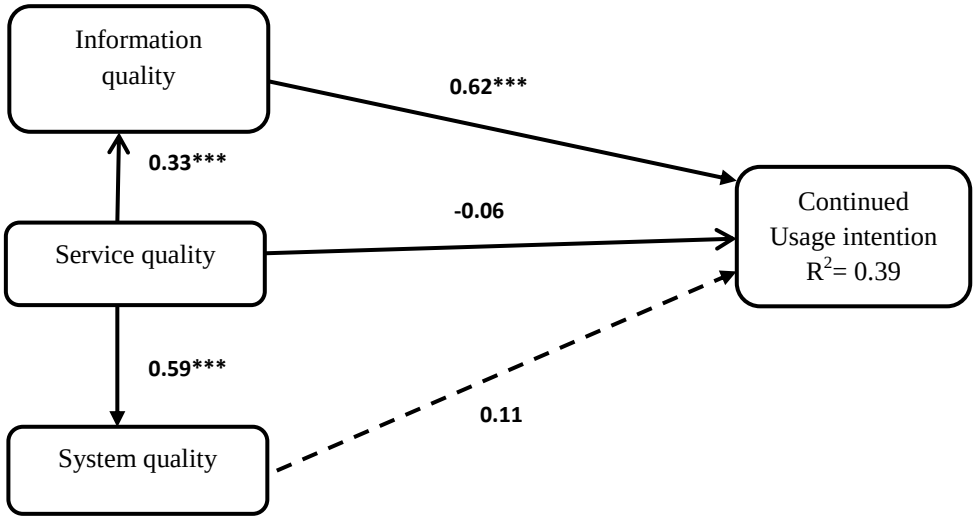

Figure 2: Hypotheses testing results: Standardized Path Coefficients and Significance
Note: p* <0.05, p**<0.01, p ***<0.001

Effects of individual differences on continued usage intention of e-resources

We investigated the effects of three individual characteristics (gender; age, education), research discipline and experience of using e-resources on continued usage intention of e-resources. An independent t-test was conducted to compare the means of the two gender groups (male and female faculty members) as shown in Table 7. The mean difference shows that the female faculty group has higher continued usage intention (4.3504) than the male group (4.2381). However, the t-test statistics indicated that there was no significant difference between the groups at the p-value of 0.299, and thus the fourth hypothesis (H4) was not supported.

Table 7: The effect of gender on continued usage intention of e-resources

Gender	N	Mean	Std. Deviation	t	Significance (2-tailed)
Female	78	4.3504	0.56827	1.042	0.299
Male	126	4.2381	0.83995		

Table 8 shows the results of one-way ANOVA grouped by age. The mean difference shows that the middle-aged faculty members with the age of 41 to 50 years had higher continued usage intention (4.4848) compared to other age categories. The results indicate that there were significant differences between the age groups at the p-value of 0.012. Consequently, the fifth hypothesis (H5) was supported.

Table 8: The effect of age on continued usage intention of e-resources

Age	N	Mean	Std. Deviation	F	Sig.
30 years and below	22	3.9091	0.81118	3.766	0.012
31- 40 years	80	4.25	0.73395		
41 – 50 years	66	4.4848	0.68233		
51 years and above	36	4.2037	0.77369		

A t-test was carried out to statistically examine the effect of education level on continued usage intention of e-resources. Table 9 indicates that there were mean difference between the two groups, whereby faculty members with high level of education (PhD) had higher continued usage intention (4.6) than those with master degrees (4.1481). A significant mean difference was observed between the two groups at the p-value of 0.005, and therefore the sixth hypothesis (H6) was supported.

Table 9: The effect of education on continued usage intention of e-resources

Education	N	Mean	Std. Deviation	t	Significance (2-tailed)
Master degree	144	4.1481	0.7662	-4.078	0.000
PhD	60	4.6	0.59755		

An ANOVA test was conducted to statistically examine the effect of experience on continued usage intention of e-resources (Table 10). A significant mean difference was observed among the five groups at the p-level of 0.001, and therefore the seventh hypothesis (H7) was supported.

Table 10: The effect of experience on continued usage intention of e-resources

Experience	N	Mean	Std. Deviation	F	Sig.
less than 1 year	12	3.1667	1	10.531	0
1 year to less than 2 years	26	4.0513	0.6373		
2 years to less than 3 years	28	4.1905	0.49215		
3 years to less than 4 years	26	4.4103	0.62757		
5 years or more	110	4.4485	0.71739		

An ANOVA test was conducted to statistically examine the effect of discipline on the continued usage intention of e-resources (Table 11). There was no significant mean difference among the five groups of faculty's disciplines, and therefore the eighth hypothesis (H8) was not supported.

Table 11: The effect of research discipline on continued usage intention of e-resources

Research discipline	N	Mean	Std. Deviation	F	Sig.
Health and Medical Science	88	4.2045	0.72614	1.691	0.153
Engineering and Computer Science	18	4.5185	0.74292		
Life Science and earth science	24	4.5556	0.54433		
Social sciences	62	4.2043	0.82173		
Business, Economics and Management	12	4.3333	0.7785		

Discussion

This study contributes to the on-going discussions about acceptance of e-resources among faculty members in developing countries. The findings indicate that most faculty members used e-resources, and their information literacy levels were above average. Similar findings were reported by Kinengyere, Kiyingi and Baziraake (2012) that most students and faculty members were knowledgeable and expert users of e-resources in Uganda. The usage of e-resources was high mainly because most respondents had received e-resources training. Unfortunately, the usage level of library websites was unsatisfactory. This suggests that faculty members were not aware that their library websites had subject catalogues and discovery tools that could link them to e-resources. Failure to use library websites may lead to low usage of e-resources since faculty may not be aware of new e-resources added to the library, training opportunities and online support regarding usage of e-resources.

The findings of the present study indicate that e-resources usage is growing. For instance, Msagati (2014) reported that less than 10% of researchers used scholarly databases daily, as compared to 62% faculty members using the e-resources almost every day and several times a day in the present study. The findings are similar to other studies in Africa (Scarboro, 2014), and other developing countries (Elavazhagan and Udayakumar, 2013), which revealed that faculty members were increasingly using e-resources more frequently. Although the usage statistics were self-reported in the present study, they can assist librarians to evaluate user's behaviour, including their preferences in an online environment and consequently improve library services.

On antecedents of e-resources acceptance, the findings indicate that the quality of information was considered as an important factor for continued usage intention of e-resources among faculty members. Similar findings were reported in previous information systems studies in which continued usage intention of technology was predicted by information quality (Ramayah, Ahmad

and Lo, 2010; Jeon, Kang and Lim, 2014). The findings of the present study suggest that e-resources were relevant for the faculty's research and academic activities. As a result, information quality had strong influence on continued usage intention of online databases among the surveyed faculty members.

Unlike some prior studies (e.g. Ramayah et al., 2010) that established significant positive relationship between system and service quality factors and the continued usage intention, this study found that system and service quality factors did not have any impact on continued usage intention of e-resources. Jeon et al. (2014) also reported that both system and service quality factors had no effects on continued usage intention of technology. The findings of the present study suggest that system and service quality might be important but not significant factors to shape user's beliefs to continue using e-resources. Nevertheless, librarians and ICT technical experts need to ensure that accessibility to e-resources is reliable and user friendly.

During data analysis, the model suggested new relationships among quality factors, which were assessed and found to be significant. The existence of new relationships demonstrates that quality factors can influence each other, and influence users to use e-resources. The study found that service quality was a significant contributor to achieving information quality and system quality. Hence, service quality had indirect impact to continued usage intention through information quality and system quality. With reliable and responsive librarians and ICT technical support, faculty members are more likely to find that the e-resources are relevant and the online databases are user friendly.

Of the four individual characteristics, three (age, level of education and experience) had influence on continued usage intention of e-resources among faculty members. The results indicate that middle-aged faculty members tend to have higher intentions to continue using e-resources than younger faculty. Yan et al. (2013) found that there was significant difference among various age groups of respondents concerning the extent of use of e-resources. Moreover, the findings indicate that faculty members with high level of education have more intentions to continue using e-resources. Faculty members with doctoral degrees are more likely to be engaged in research and publishing activities as compared to those with master degrees, which justifies their high usage of e-resources. This is contrary to some previous studies (e.g. Ani 2013) which reported that the level of education did not influence access and use of e-resources. Further, the findings reveal that faculty members with a wide experience of e-resources have higher intentions to continue using e-resources. This confirms Yan, Zha and Xiao's (2013) findings that experience with e-resources is a determinant as to whether or not faculty members will use it. In the present study, gender and research discipline had no significant influence on the continued usage intention of e-resources among faculty members.

Practical and theoretical implications

This study has several practical implications. The findings indicated that faculty's information literacy levels were above average, but their usage of library website was low. This finding suggests that librarians need to be proactive in marketing library websites and e-resources. Marketing strategies can include use of calendars, newsletters, posters, flyers and brochures, website and social media such as blogs. Librarians also need to include catalogues of e-resources and discovery tools on their library websites to motivate users to use their websites. Further,

librarians should provide selective dissemination of information (SDI) to faculty members regarding relevant list of e-resources that are available on library website. Although the study findings indicate that the usage of e-resources is growing, there is still a need for librarians to conduct regular user needs surveys. This will enable them provide demand-driven services and e-resources to their target groups

The study findings indicate that middle-aged faculty members particularly those with doctoral degrees had higher intentions to continue using e-resources than younger faculty. This finding suggests that librarians need to engage this group of faculty members as champions to influence their colleagues in using of e-resources. Moreover, librarians need to develop online courses and webinars to guide faculty members on how to access reliable and relevant e-resources according to their disciplines.

The findings show that service and system quality factors were not significant factors in enhancing continued usage intention of e-resources. On one hand, these findings suggest a need for librarians to provide reliable and adequate help desk to enable faculty to effectively use e-resources. Publishers and online database designers need to provide adequate online help services to enable faculty members to navigate and retrieve relevant content. On the other hand, librarians, publishers and online database designers need to design their databases while considering faculty's information needs, and online search styles and skills.

This study has made a theoretical implication on the contribution of continued usage intention of information system in e-resource context, where there have been scant studies on the topic in the African setting. The study tested the influence of quality factors and demographic characteristics on continued usage intention of e-resources, and further tested new relationships as proposed during analysis. Among all quality factors, only information quality influenced faculty member's continued usage intention of e-resources. Service quality was a significant contributor to achieving information quality and system quality, which offers a different perspective from prior studies. This finding suggests that further research is required to assess the effects of these quality factors and in particular, the influence of service quality on other quality antecedents.

Conclusion

Based on the study findings, it is concluded that the research into the applicability of the DeLone and McLean IS success model on continued usage intention of e-resources has been very successful. From the outcome of our research, it is safe to conclude that the use of e-resources has grown over the years among the surveyed faculty members, and that their information literacy level was above average. The study has shown that better educated and middle aged faculty members with wide experience of e-resources have more intentions to continue using e-resources. Among all quality factors, only information quality influenced faculty decisions to use e-resources. Theoretically, most studies have used technology acceptance models, and it therefore seemed important to use IS success model, and individual characteristics to understand faculty continued usage intention of e-resources. There are also new relationships found whereby service quality had indirect impact to continued usage intention through information quality and system quality. This finding provides a different concept from previous studies. The results of this study provide a better understanding of the way libraries can support faculty members in their institutions.

This study has some limitations. The study used convenient sampling method to select faculty members from three public Universities with previous exposure to e-resources training rather than all eleven public Universities in Tanzania. There is therefore a need to conduct a study in both public and private universities to obtain more generalized data. The R-squre value of the research model was low, which was only about 26%. Therefore, it is important to conduct more studies to test this research model with different user groups with various information seeking contexts. Future studies should investigate the applicability of the complete IS success model on faculty members' acceptance of e-resources. Future studies should combine both quantitative and qualitative methods to understand the reasons behind faculty usage behaviour and acceptance of e-resources.

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