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Measuring Levels of End-Users' Acceptance and Use of Hybrid Library Services

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ABSTRACT

This study concerns the adoption of Information Communication Technology (ICT) services in libraries. The study collected 445 usable data from university library end-users using a cross-sectional survey instrument. It develops, applies and tests a research model of acceptance and use of such services based on an existing UTAUT model by Venkatesh, *et al*. (2003). Results show that 'relevance' and 'social influence' have significant effects on intentions to use e-library services. Results further show that university communities in Uganda are inclined to use electronic library services due to social demands, relevancy of services, available facilitating conditions and benefits they expect from the services. Most importantly, the Service Oriented Unified Theory of Acceptance and Use of Technology (SOUTAUT) model explains 57% of variance towards acceptance and use of e-library services.

Keywords: H. Information Systems, Electronic Library Services, Hybrid Libraries, Technology Acceptance, End-Users, UTAUT, SOUTAUT, Developing Countries.

INTRODUCTION

The introduction of computers and other telecommunication technologies in libraries during the last quarter of the century has changed the concept of a library and the library profession. Information seekers are no longer confined to the walls of the library, (Kwak, *et al.* 2002; Bevis, 2003; Rosenberg, 2005; Vinitha, 2006). As ascertained by Kwak, *et al.* (2002), majority of university libraries in the U.S. are now hybrid libraries, depending on both electronic and print media based on network and physical facilities. Many university libraries including some in DCs are part of campus-wide networks, with Internet access (Alan, 1996; Kiondo, 1997; Martey, 2004; Rosenberg, 2005). Patrons are no longer confined to their own library holdings. Using networked technologies, patrons can get the information required electronically from wherever it is located on the web. The main role of a librarian is now to assist end-users in searching techniques and the use of technologies. Unlike in the traditional library where users require the ability to read, a skill acquired during all the schooling years, in an e-library services environment, users require to adopt ICT and have basic information searching skills.

The Problem

Despite the fact that modern technologies have been introduced in university libraries and the emerging of technology acceptance models, no study has attempted to evaluate levels of end-users' acceptance and use of electronic library services. With this in mind, there was need to carry out Venkatesh *et al*. (2003), direction to examine alternative measures of intention and usage behavior in expanding the Unified Theory of Acceptance and use of Technology (UTAUT) model to other contexts, this time in hybrid library services.

Objective of the Study

The objective of this study is to apply UTAUT model constructs and other constructs to measure levels of end-users acceptance and use of hybrid library services.

Research Questions

The study was set to answer research questions regarding end-users' levels of behavior intentions to use electronic library services.

i) What are the levels of acceptance and use of electronic library services by end-user communities in universities?
ii) How efficient is technology adoption in university libraries as determined by UTAUT model?
iii) What is the impact of various UTAUT variables and other variables not included in UTAUT model on end-users' acceptance of electronic library services?

Theoretical Model: The Unified Theory of Acceptance and Use of Technology (UTAUT)

The theoretical basis for this investigation steams from the study by Venkatesh, *et al.* (2003), which enables the studying of acceptance and use vis-à-vis none acceptance and none use of technology. UTAUT Model originates from eight acceptance and use of technology models (Venkatesh *et al.* 2003). The model theorizes that intention to use a technology is influenced by people's perceptions of performance expectance, effort expectance, social factors and facilitating conditions. The model constructs are moderated by gender, age, experience and voluntariness (Column 1, 2 & 4 of Table 1). To provide alternative measures of intention to use in other contexts, the model allows expansion or deductions.

Table 1: *UTAUT Model and SOUTAUT Model Variables*

	UTAUT 2003	**SOUTAUT 2009**	**DEFINITIONS**
Independent variables	Performance expectancy	Performance expectancy	The degree to which a person believes that using electronic library services will help him or her in accomplishing the various academic pursuit at a typical university
	Effort expectancy	X	The degree of ease in using the system
	Social influence	Social influence	The degree to which important others believed s/he should use the services
	Facilitating conditions	Facilitating Conditions	The degree to which an individual believes that an organizational and technological infrastructure exist to support e-services

	X	Relevance	The degree to which something is closely connected with the subject of concern or the situation one is thinking about (Thong, *et al.* 2004).
Dependent variables	Beheviour Intentions	Beheviour Intentions	When one finds out the usefulness of a technology, one plans (intends) to use it.
	Usage Behaviour	Usage Behaviour	The degree to which one plans to use a technology after he/she has found out its usefulness.
	X	Expected Benefits	Synonymous with 'perceived usefulness' defined as the "degree to which a person believes that using a particular system would enhance his/her job performance" (Davis, *et al.* 1989, p. 985).
Moderators variables	Gender	Gender	Gender roles have a strong psychological basis and are enduring
	Age	Age	Age has an effect on attitude
	Experience	Experience	Practical acquaintance with the required skills.
	Voluntariness	X	Is usage voluntary or mandatory
	X	Awareness	The degree an individual knows the existence of something, and its availability for his/her use (Nicholson, 2004).

Note: 'X' denotes non availability of variable in the model

RELATED LITERATURE

Technology Acceptance Model (TAM)

One of the first technology acceptance models to be developed was the Technology Acceptance Model (TAM) (Davis, 1989), which was based on Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). According to Davis (1989), perceived usefulness (PU) and perceived ease of use (PEOU) both affect people's intention to use, thereby, contribute to either usage or non-use. Davis (1989) indicates that usefulness was more significantly affected by usage than ease of use. Perceived usefulness had a stronger correlation with user acceptance of technology. TAM's major strengths are that it provides factors which lead to IS acceptance, provides room for extensions and elaborations better than other competing models (Taylor & Todd, 2001). Some observed shortcomings highlighted by the users of the model include its failure to determine barriers that hinder technology adoption (Taylor & Todd, 2001) and possibly its simplicity, which has led to its over-use at the expense of designing other models. TAM's acceptance in Information Systems (IS) research is documented in Lee, Kozar and Larsen (2003).

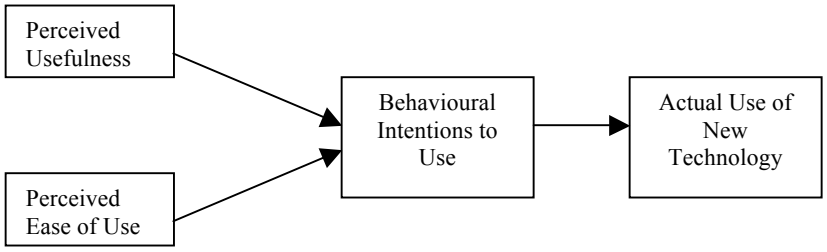

Figure 1: *Technology Acceptance Model (TAM). Source: Davis et al. (1989)*

The Unified Theory of Acceptance and Use of Technology (UTAUT)

A study of the determinants found in major acceptance and use models by Vanketesh, et al. (2003) reviews the subject literature systematically and compares eight previous models and the predictive factors specified by each. By so doing, the authors developed a new model the "Unified Theory of Acceptance and Use of Technology model" in Figure 2.

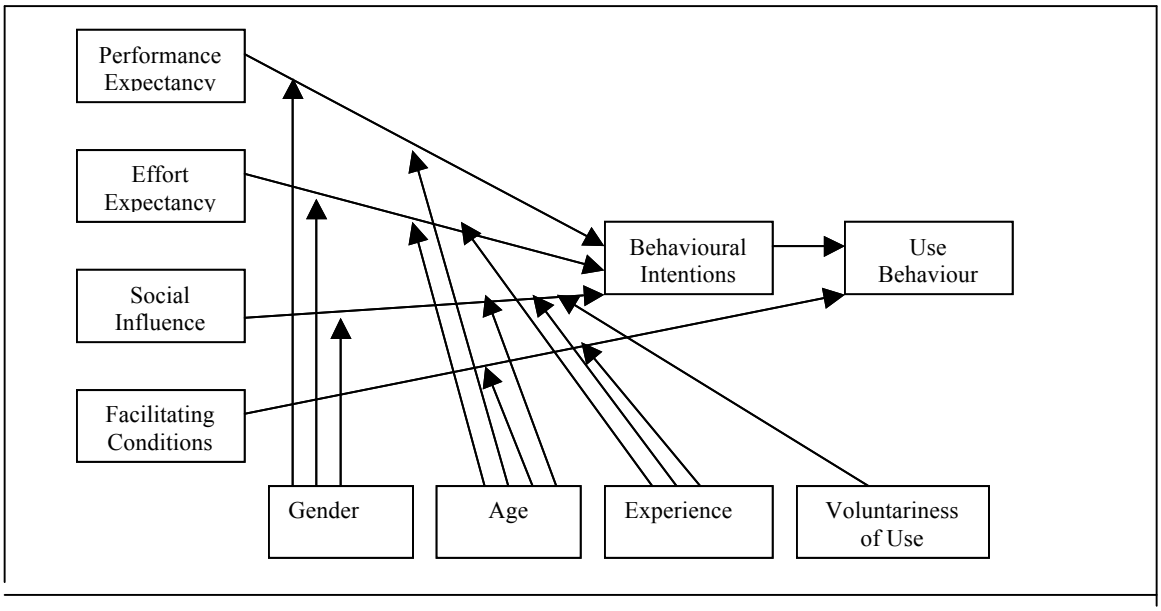

Figure 2. *UTAUT Model: Source: Venkatesh, et al. (2003)*

UTAUT has attracted a lot of research especially in Information Systems which include among others: Garfield (2005) who used its tool to analyze the acceptance of Computers in Bentley College; Pu-Li and Kishore (2006) studied web log systems to validate UTAUT constructs; Louho, Kallioja and Oittinen (2006) discuss factors that affect the use of hybrid media applications using UTAUT as the conceptual model; Calrsson et al. (2006) studied the adoption of wireless mobile communication in Europe using UTAUT, while Anderson and Schwager (2006) examined the

application of UTAUT to wireless LAN technology in smaller enterprises in the USA. Marchewka & Kostiwa (2007) studied course management software (the Blackboard®) to revalidate UTAUT model. Results of this study did not support UTAUT constructs probably due to the limited number of respondents. Engebretsen (2005), tested UTAUT constructs in health research project to study the acceptance of EpiHandy in Uganda and South Africa. Results of this study show that health workers in Uganda accept the EpiHandy more than those in South Africa.

Studies which have extended UTAUT constructs include; Moran (2006) who introduced "self efficacy" and "anxiety" as determinants because of their significance in other technology acceptance models to study College Students' acceptance of Tablet Personal Computers. Results of Moran show a high correlation between attitude toward technology use and anxiety. Cody-Allen and Kishore (2006) extended UTAUT by adding e-quality, trust and satisfaction constructs to develop an E-Business Quality Model. Heerink *et al*. (2006) used cooperation, empathy, assertion, self-control, responsibility, trust and competence to evaluate social abilities in the elderly people within an experimental setup. After the experiment, participants were interviewed using a questionnaire related to Venkatesh *et al*. (2003). The investigators used user data collected on human-robot interactions in nursing home for the elderly, and the experiences they went through were utilized to develop guidelines to support human-robot user studies in elderly institutions.

In general, these studies confirm the efficiency and robustness of UTAUT model to predict acceptance and use of a technology, thus the motivation for its use for this study.

Acceptance or Use of Hybrid Library Services

Factors which promote or hinder the adoption and usage of ICT especially in digital libraries include: *benefits/usefulness*: (Bar-Ilan, Peritz & Wolman 2003; Baruchson-Arbib & Shor 2002; Entlich *et al*. 1996; Harless & Allen 1999; Marchonini 2000; Theng, et al. 2007 & Thong, Hong & Tam, 2002 & 2004); *awareness*, (Bar-Ilan, Peritz & Wolman 2003; Bishop, 2002; Harless & Allen 1999 & Nicholson 2004 and others); *relevance*, (Kwak et al. 2002; Nicholson 2004; Vaidyanathan, et al. 2005, and Nov & Ye 2008) among others and *ease of use*, (Buttenfield 1999, Lagier 2002 and Nov. & Ye 2008) and many others**.**

In an effort to design an evaluation model for libraries, Nicholson (2004) developed a matrix conceptual framework for holistic measurement and cumulative evaluation of library services. He analyzed the relevance of information and introduced the concept of aboutness, which is based on a content match between the query and the documents being sought. In Nicholson's view, *aboutness* refers to the location of the information within the system (e-library in this case). *Usability* refers to how well the system can be used without one having problems. *Knowledge status* refers to how well one is aware of what is available, and is linked to the introduced concept of awareness. *Value of* works refers to the value/benefits that the material has to the user, which is largely influenced by the relevance of the work, and is linked to the introduced independent variable of relevancy where an information seeker puts in a query, the system searches through to answer the query. If e-library services are relevant or valuable to the information seeker, the query will be answered accordingly. Nicholson (2004) therefore views users' use of library services as being affected by their awareness and by the relevance to them of the library's offerings. The two factors are further stressed by Vaidyanathan, *et al*. (2005), who studied digital library system components' acceptability. The two concepts of relevance and awareness are introduced in the research model's variables to make the model appropriate to e-library services.

RESEARCH DESIGNS

Based on UTAUT (Venkatesh *et al.* 2003) theoretical base and within e-library services context, we develop a Service Oriented Unified Theory of Acceptance and Use of Technology (SOUTAUT) research model to answer the research questions. We employ multiple methods; cross-sectional survey, and observation check list.

A population is chosen to provide statistical evidence to test the relationships in the study variables. Due to limited resources and time available to the researchers, the study is carried out in Uganda's eight universities which have implemented ICT library services of which fifty percent are government (stared in Table 2) and fifty percent are private. Respondents are students and academic staff from faculties of Education, Social Science and Science/Computer Science which are common in Gulu (GU), Kyambogo (KYU), Makerere (Mak), Mbarara University of Science and Technology (MUST), Islamic University in Uganda (IUIU), Kampala International Univeversity (KIU), Uganda Christian University (UCU) and Uganda Martyrs University (UMU), the study sites. Both probability and non-probability methods are used to enable the studying of samples with similar characteristics but reasonably varied within the study sites. New technologies studied are electronic library services in Table 3. To determine a manageable number of respondents from a large universe, multiple sampling methods are used including purposive, stratified and random sampling. Random selected samples of four hundred ninety one (491) library end-users from the target faculties are studied. The number was determined by the standard z-statistic normal distribution of the level of significance, 1.96 of total population, (Fisher *et al*. 1985).

Instrument Development

The survey instrument was a pre-formulated written set of statements (46) adopted from Venkatesh *et al.* (2003) with a few modifications, where respondents were asked to record their answers, with a five-point likert scale. The instrument was based on the variables defined and proposed in the UTAUT (Venkatesh *et al.* 2003) with appropriate additional variables and wordings (in Table 1). It was constructed by modifying some constructs to enable us determine differences among library end-users' acceptance and use of e-library services. We eliminate "effort expectancy" and "voluntariness of use" variables, which we consider inappropriate for this context and replace them with "relevance" and "awareness" because of the significance laid on the latter constructs in library setting (Nicholson, 2004); digital environments (Saracevic, 2004, Kwak, *et al.* 2002 and Saracevic & Kantor, 1997) and IS environment (Davis, 1998). Due to some modifications, we piloted the instrument in two workshops involving 20 participants and results of the pilot study were presented at an International Joint Conference on Digital Libraries in Vancouver, Canada on 20th June 2007 where experts in IS and LIS fields made great inputs. The wordings and the statements in the questionnaire were critically scrutinized and approved by two IS experts. The checklist observation chart was generated from the survey responses and used to verify institutional ICT facilities and services.

STUDY RESULTS

By the end of field work, 475 subjects had responded of which 445 were recorded valid. The unreturned questionnaires account for only 3 percent of the total administered questionnaires. Of the valid responses, 37 percent were from females while 63 percent were from males respectively. The entire detail characteristics of all responses are illustrated in Table 2.

Table 2: *Demographic Characteristics of Respondents*

	Total Response	Type		Frequency	%
University	445	Public	Gulu University	40	9
			Kyambogo University	37	8
			Makerere University	210	47
			Mbarara Univ. of Sc. &	36	8
		Private	Islamic Univ. In Uganda	15	3
			Kampala International U	27	6
			Uganda Christian Univ.	46	10
			Uganda Martyrs Univ.	34	7
Faculty	445	Education		115	26
		Science & Computer Science		219	49
		Social Sciences		111	25
Gender	443	Female		165	37
		Male		278	63
Age Group	442	18-24		198	45
		25-34		160	36
		35-44		58	13
		45-60		26	6
Status	445	Academic Staff		123	28
		Post Graduate Student		100	22
		Undergraduate Student		222	50
Education Level	405	Ph. D.		27	6
		Master's Degree		93	21
		Bachelor's Degree		174	39
		Advanced Level Certificate		111	25
Ownership of Computer Or Laptop	445	Yes		254	57
		No		191	43
Computer Skills	445	Yes		227	51
		No		218	49

ICT Library Services

Respondents were asked to indicate whether ICT hardware facilities existed in their universities or not. Fifty percent respondents indicated that ICT hardware facilities and services were available. During the verification exercise which resulted in Tables 3, we observed that not all e-library services offered by the respective universities are known to end-users especially services that enhance the library collections like digitization, microfilming and interlibrary loan services.

Table 3: *State of Electronic Library Services in the 8 Universities by December 2007 Verification Exercises*

	Public Universities				**Private Universities**			
E-Library Services	**GU**	**KYU**	**Mak**	**MUST**	**IUIU**	**KIU**	**UCU**	**UMU**
Library Automation			√			√	√	√
Internet Services	√		√	√	√	√	√	√
University Domain E-Mail	√	√	√		√	√	√	√
Online Journals Service	√	√	√	√	√	√	√	√
Electronic Books Services			√			√		√
Online Catalogue (OPAC)			√			√	√	√
Bibliographic Database Services	√	√	√		√	√		√
CD-ROM Services	√	√	√	√	√	√	√	√
Library Website Services	√		√	√	√	√	√	√
Library Mailing List Server			√					
Document Scanning Services	√		√	√	√	√	√	√
Electronic Reference Services	√		√		√	√		√
Electronic Information Services			√			√		√
End-Users Training Services	√		√		√	√	√	√
E-Document Delivery Services	√		√		√	√		√
Bar Coded Circulation Service	√		√					√
Online Selective Dissemination of Information Services	√						√	√
E-Book Reserve Service	√		√	√	√	√		√
E-Interlibrary Loan Services	√		√	√	√	√		√
Printing Services	√	√	√	√	√	√		√
Photocopying Services	√	√	√	√	√	√	√	√
Digitization Services	√		√	√	√		√	√
Microfilming Services	√		√	√	√			√
Television Services						√		
Telephone Services	√	√	√	√	√	√	√	√
Faxing Services	√	√	√	√	√		√	√
Total available in each site	**20**	**9**	**24**	**13**	**18**	**21**	**15**	**24**
Percentage over 26	**79%**	**35%**	**92%**	**50%**	**69%**	**81%**	**58%**	**92%**

Legend: ✓ stands for availability

Reliability of Constructs

Reliability of individual constructs was evaluated and results depicting standard group alpha requirement of over 0.60 as used by Zhang *et al*. (2006) and Moran, (2006) are illustrated in columns 4 and 5 of Table 4.

Table 4: *Scale Reliabilities of SOUTAUT Constructs*

Construct	Before Factor Analysis		After Factor Analysis	
	Number of Questions	**Reliability of the Group**	**Retained Questions**	**Grouped Alpha**
Awareness of the e-library services	5	0.58	2	0.65
Performance Expectancy	5	0.77	2	0.76
Relevance of e-library services	6	0.62	3	0.66
Social Influence	4	0.67	3	0.64
Facilitating Conditions	7	0.60	5	0.61
Behavioural Intentions	5	0.83	4	0.91
Usage behaviour	8	0.81	6	0.70
Expected Benefits from using e-library services	6	0.79	3	0.77

Constructs Validity

Validity of the constructs was performed using the Principal Component and Factor analysis approaches as discussed by Venkatesh *et al.* (2003) and Straub *et al.* (2004). In addition, a validity coefficient as measured by Average Shared Variance (AVE) was computed by correlating the measurement constructs of the sample models (as in Table 6)**.** We then analyzed the research model and retained indicators with factor loadings greater than 0.70 considered explaining over 50 percent of the variations in a particular measure (Moran, 2006; Gerfen & Straub, 2005). Analysis results illustrated in Table 5 attest to this fact after the fourth loading which is between 0.70 in *usage behaviour* and *social influence* and 0.94 observed in *expected benefits*.

To measure the Average Shared Variance (AVE) between the constructs and their indicators according to Moran, (2006); Venkatesh *et al*. (2003) we evaluate the discriminate validity of the model construct. Discriminate validity is adequate when the constructs have the AVE greater than 0.5 (Moran 2006 and Chin 1998). The average shared variances and the correlation coefficients of latent variables are summarized in Table 6. Since all constructs have AVE greater than 0.5 and the diagonal elements (**in bold**) greater than correlation values in the respective corresponding rows or columns, the instrument demonstrates acceptance levels of efficiency, truthfulness and successful discriminate validity.

Table 5: *Factor Analysis and Weights of the Retained Indicators for the Research Model*

Individual Items	Item Loading	Fourth Loading	Weights
Performance expectancy			
Pe1	0.75	0.92	0.54
Pe2	0.82	0.92	0.54
Relevance			
Re1	0.62	0.72	0.39
Re3	0.67	0.81	0.44
Re4	0.80	0.80	0.43
Social influence			
So1	0.86	0.86	0.32
So2	0.84	0.84	0.31
So3	0.84	0.84	0.31
So4	0.70	0.70	0.26
Facilitating conditions			
Fc1	0.92	0.92	0.28
Fc2	0.82	0.84	0.25
Fc4	0.73	0.77	0.23
Fc5	0.76	0.78	0.23
Fc7	0.71	0.72	0.21
Behaviour intentions			
Bi1	0.91	0.91	0.27
Bi2	0.91	0.92	0.27
Bi3	0.90	0.90	027
Bi4	0.89	0.89	0.27
Behaviour Usage			
Bu3	0.73	0.70	0.18
Bu4	0.72	0.72	0.18
Bu5	0.80	0.83	0.21
Bu6	0.87	0.89	0.23
Bu7	0.79	0.82	0.21
Bu8	0.76	0.79	0.20
Expected benefits			
Eb1	0.70	0.89	0.40
Eb2	0.80	0.94	0.42
Eb3	0.71	0.72	0.32
Awareness			
Aw 1	0.75	0.87	0.57
Aw3	0.73	0.87	0.57

Table 6. *The Average Shared Variances and the Correlation Coefficients of Latent Variables*

Model (n=445)								
	AVE	**PE**	**RE**	**SI**	**FC**	**BI**	**UB**	**EB**
PE	0.85	**0.92**						
RE	0.60	0.35	**0.77**					
SI	0.76	0.35	0.38	**0.87**				
FC	0.66	0.36	0.44	0.74	**0.81**			
BI	0.82	0.21	0.38	0.50	0.52	**0.90**		
UB	0.63	0.37	0.47	0.24	0.28	0.23	**0.79**	
EB	0.73	0.34	0.36	0.63	0.67	0.55	0.42	**0.85**

Legend			
AVE	Average Shared Variance	FC	Facilitating conditions
PE	Performance expectancy	BI	Behaviour intentions
RE	Relevance	UB	Use behaviour
SI	Social Influence	EB	Expected benefits

Diagonal elements are the square root of the shared variance between the constructs & their measures, off-diagonal elements are correlations between constructs

Development of Service Oriented Unified Theory of Acceptance and Use of Technology Model (SOUTAUT)

We further use path coefficients and R^2 to evaluate the entire model analysis and goodness of fit. The goodness of fit values (R^2 and Adjusted R^2) measures how well the model parameter estimates are able to predict the model performance and also generate the sample covariance matrix (Table 6). The technique works in such a way that the postulated model is taken as true and adjusts the parameter estimates while minimizing the covariance difference between population parameters and the sample estimates. The study model is analyzed using PLS-Graph. Results of the PLS-Graph are depicted in Figures 3.

We used the bootstrap[i] method of 100 re-samples with sample size of 100 to assess the statistical significance of the path coefficients to major determinants of electronic library services acceptance. Considering the SOUTAUT structural and conceptual models in Figures 3 and 4, the R^2 values for each dependent variable generated by PLS – Graph illustrate that behavioral intentions predicts 30 percent of the variance of end-users' acceptance and use of electronic library services and that usage behaviour predicts 9 percent while expected benefits predicts 18 percent of the variance. The Research Model predicts 57 percent of variances of end-users' acceptance and use of electronic library services. Forty three percent variances to explain levels of end-users' acceptance and use of hybrid library services remain unexplained, hence the need for further research on the subject.

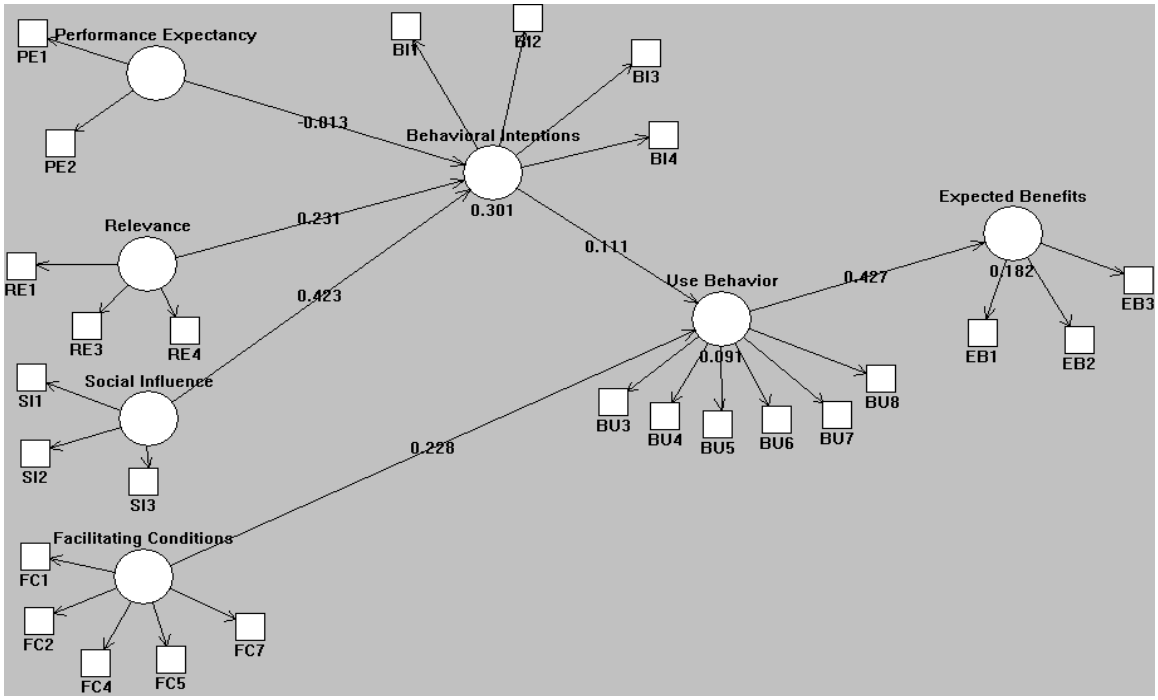

Figure 3: SOUTAUT Structural Model

Considering the path coefficients, Social Influence has the most direct influence (42 percent) on intention to use, followed by Relevancy (23 percent) and facilitating conditions (23 percent). Whereas the three independent constructs contribute positively to Intention and use, the fourth construct of 'Performance expectance' has a negative contribution (-1 percent) to the model. Moreover, usage bahaviour, contributes positively (43 percent) to expected benefits arising from using the e-library service.

Effects of Moderator Variables

We analyze the effects of moderator variables (defined in Table 1), on the independent constructs using Generalized Linear Model (GLM) in SPSS, version 10. The approach is used to find the difference in the effects of the independent construct with and without the moderators. Results show that the effects of Social influence and relevance on behaviour intention to use electronic library services are moderated by gender, age, experience and awareness such that it is more salient to younger women for Social influence and experienced males for Relevance construct. The effect of gender and experience on Social influence makes these factors significant determents of intention to use e-library services. The effect of Facilitating conditions on usage has a two-way interaction; the effect is moderated by age, experience and awareness.

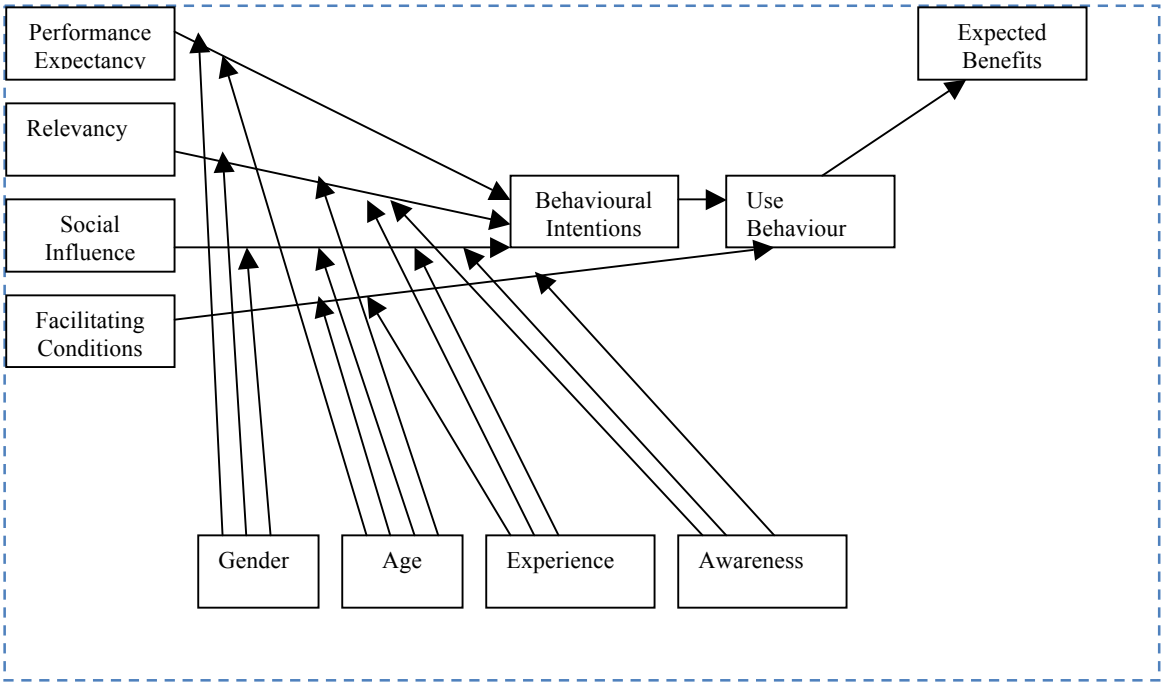

Figure 4. **Service Oriented Unified Theory of Acceptance and Use Model (2009).**
Source: **Modification from Venkatesh *et a*l. (2003)**

Significance of the Research Model Dependent Constructs

We use the significance measure to determine the level of inclinations the dependent constructs have towards the acceptance and use of electronic library services. Using the t-ratio test statistic on the dependent constructs, summarized results are illustrated in Table 7. All the dependent constructs in the table have a significant positive inclination (<0.001, <0.01 and <0.01) towards acceptance and use of electronic library services. The significance of influence is determined by the probability values of the t-test statistic (less than 1 percent or 0.01) and the contribution is determined by the values of squared multiple variances, (R^2). This is quite a significant finding; and an answer to the first research question, that majority of sample end-users in sample universities are inclined to accepting and using e-library services at 57percent variance. This also answers the second and third research questions as further discussed in the next paragraphs.

Table 7: *T-ratio test and R^2 for the Research (pooled model) Dependent Constructs*

Dependent construct	R^2	t-test statistic	Probability value
Behavioural Intentions	0.30	42.99	<0.001
Usage behaviour	0.09	86.58	<0.01
Expected benefits	0.18	44.72	<0.01

INTERPRETATION OF RESULTS AND DISCUSSION

The study data statistically support the research model in that for the universities studied, end-users have relatively high inclination towards behavioural intentions to accept and use electronic library services at 30 percent, followed by relatively low level of usage behaviour of the electronic library services at 9 percent and they moderately expect the benefits from the services at 18 percent variance. This result is in line with findings of Engebretsen (2005) who studied medical workers in South Africa and Uganda and found that Ugandan doctors were more responsive to new technology compared to those in South Africa. This result is an answer to research question on of this study.

The negative contribution of performance expectance construct in the study indicates that the construct does not have an effect on the behavioral intentions to accept and use the electronic library services within the study universities' environment. The finding is contrary to the findings of Moran (2006) and Venkatesh *et al.* (2003) whose studies were conducted in USA and demonstrate a high correlation between Performance Expectance and Behaviour Intentions. This answers research question two in that performance expectance construct is adapted from UTAUT model and contributes negatively towards the dependent construct of bahavour intention to use e-library services. The study context does not strongly support UTAUT model.

The relevance construct was included by the researchers (instead of effort expectancy) to this study for the purposes of establishing end-users' opinion on how relevant electronic library services were towards their learning, teaching and research. The respondents consider using e-library services relevant in their day-to day academic pursuits. This finding answers the third research question that supports additional variables to UTAUT and is also supported by other scholars who studied technologies in libraries including Vaidyanathan et al. (2005), Nicholson (2004), Kwak, at al. (2002) and Crawford & Gorman (1995).

Within the e-library services context, Social Influence construct is one of the driving forces of behaviour intention to use. The positive path coefficients of 0.42 from the construct towards behavioural intentions to use electronic library services, is the highest among the independent constructs in the research model. University library end-users in Uganda are influenced by their social groupings. The study findings are in line with investigations carried out in Developing Countries (Anandarajan, et al. 2002, Brown et al. 2006 and Napaporn, 2007) where social influence plays a significant role in the intention to use any new technology. This can be explained by the fact that studies in most DCs like Guinea, South Africa and Nigeria got similar results. These results are also consistent with those of Kaba, N'Da and Mbarika (2008), Uzoka, Shemi, & Seleka, (2007), Anandarajan et al. (2002) and several others, which show that social pressure is one of the determining factors that influence IT/ICT acceptance and use in African environment. The results are contrary to those of Davis (1998), Dishaw & Strong 1999, Chau and Hu (2001), Venkatesh, et al. (2003) whose studies were carried out in the developed world, e.g. USA and Japan. Whereas the Developing environments/cultures seem to favour social groupings, it is argued that the developed world is characterized by individualism (Maznevski and DiStefano, 1995). This finding answers research question three regarding the impact of UTAUT variables within the study context. The finding implies that knowledge derived from acceptance and use of technology studies in the Developed World should be applied cautiously to Developing countries (DCs)

The role of social influence in technology acceptance and use intention is subject to a lot of erroneous influences and moderations such as gender, age and experience (Davis, 2000). The suggestion that women are sensitive to others opinions and find social influence more significant when forming an opinion to use a new technology (Miller, 1976 & Venkatesh et al. 2000). Gender effects are also driven by psychological events within the society's gender roles (Davis, 2000). The study results show that old workers are more likely to put a lot of emphasis on social influences (Morris and Venkatesh, 2000). The social influence construct with moderation of

gender, age, experience and awareness contribute to answers for research questions two and three.

It is also worth noting that the expected benefits construct is one of the contributions to the model by this study. The purpose was to ascertain any possible benefits end-users expected as a result of accepting and using electronic library services. Results of this finding reaffirms Teo et al. (1999)'s results which show a significant relationship between benefits and Internet usage. In the absence of current print materials in university libraries especially in Developing Countries, end-users find e-library services more beneficial. This also answers research question three with respect to the influence of additional variables to improve UTAUT in other technologies context.

The study found that the most prominent factor that contributed to non-acceptance and use of e-library services was the lack of awareness amongst end-users and the facilities associated with the services. Academic staff were more aware of e-library services and intended to use the services at 33 percent variance. On the other hand, although the students had high perceptions of intentions to use e-library services at 30 percent variance, usage behaviour was found very low at only 8 percent variance due to lack of support from facilitating conditions. The students' low support was attributed to deficiencies within the service delivery mechanisms such as publicity and others associated university support which favoured faculty members more than students. The study noted that academic staff in universities stay longer at the university while students come and go and hence the problem of publicizing the services to students within their short stay at the university.

Makerere university population showed the highest perception of behavioural intentions at 38 percent variance and usage behaviour at 56 percent variance compared to the other seven universities (behaviour intentions at 30 percent and 3 percent variance usage behaviour). Acceptance and use behaviour at Makerere University was attributed to the best ICT infrastructure and e-library services compared to other universities as illustrated in Tables 3.

The effect of relevance construct being moderated by gender, age, experience and awareness on behaviour intentions to use e-library services was positive (beta coefficient = 0.096, $p<0.01$). The relevance construct was more salient for experienced individuals. Relevance construct was a strong determinant of individual's intention to use e-library services, and for older and experienced male workers.

Strengths and Limitations

The present study overcomes the limitation of previous technology acceptance research which relied on retrospective surveys (Venkatesh et al. 2003). By utilizing an acclaimed IS acceptance and use evaluation model, the (Unified Theory of Acceptance and Use of Technology) with validated instruments, it overcomes the limitation of Library and Information Science researches which use invalidated tools. The study discusses the subject's present change process using rich data from 445 respondents. The study findings present insight into current users in DCs' perceptions about the relevance of services provided using new technologies as well as the importance of facilitating conditions and social influence as critical points in the adaption and use decisions. The study has opened new avenues for future research.

Although the study results are a good representation of the situation in Ugandan Universities, it also gives some account of the situation found in DCs, using Uganda as a proxy. The authors are aware of the fact that not all developing countries have similar cultures and economic constraints which limit the extent to which the findings herein can be extrapolated to other DCs. Biases due to measurement error, sampling procedures, and social desirable responses need to be considered before applying the conclusions of this study to other contexts and other technologies

The study used a self-reporting instrument in cross-sectional survey which at times produces distorted research findings (Lederer et al. 2000; Karahanna and Straub 1997 and Szajna 1996). The study focused on four independent constructs of performance expectance, relevance, social influence and facilitating conditions; the dependent variable of behaviour intentions, usage behaviour and expected benefits and moderator variables of gender, age, experience and awareness as the construct affect e-library services acceptance in university communities. These may not be the only ones that influence end-users' acceptance and use of electronic library services since the model could only explain 57 percent of the variance. The model prediction level can be improved by identifying additional constructs which were not examined by this study. Besides, the study did not go into detailed analysis of all individual study sites' levels of acceptance and usage of e-library services since this was not included in its scope. Future research is recommended to look into this. The study was limited to measuring direct relationships between constructs; future research could measure the indirect relationships.

IMPLICATION AND AREAS FOR FUTURE RESEARCH

The findings from this study contribute to better theoretical understanding of factors that affect acceptance and usage of electronic library services especially in Developing Countries. The study has further demonstrated the importance and validity of UTAUT model in the context of developing countries such as Uganda. The validation exercise employed the necessary scientific measures that are relevant for psychometric studies, and this is one of the major strength upon which inference can be made to the data used in the study.

Due to relevance of electronic library services, social influence within the society and facilitation conditions in the universities, the study findings indicate a positive inclination of end-users in Uganda's universities towards acceptance and use of electronic library services especially by the academic staff who have strong support from management. However, the independent construct of 'performance expectance' in the study context has a negative effect on the model, in contrast to UTAUT model. Most independent constructs in the research model are moderated by gender, age, experience and awareness, the implications of which need further investigation.

With increased use of ICTs in libraries, it is recommended that established research models like TAM, UTAUT and many others which provide valuable insights into factors that influence users' adoption of electronic library services be adopted. Such studies will lead to better understanding of digital libraries and how to improve the services they offer.

CONCLUSION

Consistent with other studies (Heinrichs *et al.* 2007; Rosenburg 2005; Vinitha 2006; Kiondo 1997) ICT is changing the face of university libraries, their organisational structure and the way in which their services are delivered to end-users. This study looked at factors which lead to e-library services acceptance and use especially in Developing Countries where technologies are relatively new. Considering the study model (SOUTAUT), the study indicates that end-users in university settings in DCs accept and use e-library services at 57 percent variance. However, the usage of the services was only at 9 percent variance due to several factors which include among others lack of awareness of the services and the facilitating conditions. In the context of e-library services, Social Influence construct was found to be one of the driving forces of behaviour intentions to use. University library end-users in Uganda like their counterparts in DCs are influenced by their social groupings. The findings indicate that knowledge derived from

acceptance and use of technology studies in the Developed World be applied cautiously to Developing countries (DCs).

Librarians need to increase the visibility of e-library services in their libraries. Librarians should publicize the existence of e-library services and introduce orientation programme to promote acceptance and usage among potential users. Indeed, the success of e-library services in DCs like anywhere else, require favourable perceptions of facilitating conditions. It is hoped that the importance of facilitating conditions as shown by this study will improve with technology evolution in library services.

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[i] This is a Re-sampling procedure that assesses the significance of PLS Graph parameter estimates. It samples with replacement from the original sample data set until it reaches the sample size selected, and the bootstrap re-samples specified (Wildt, Lambert & Durand, 1982).