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Influence of Perceived Usefulness and Computer Skills on Automation System Adoption in Academic Libraries

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Utilization of information and communication technology (ICT) in libraries has greatly advanced library's operation to be automated base. This arouses the need for new computer skills and amount of benefits to be in place. Automation system as one of the significant changes in the new trend of libraries plays a vital role toward actualizing the mandate of libraries. However, the scenario is different especially in African countries like Nigeria where the rate at which automation systems adoption by libraries can be adjudged to be slow and unsteady. It is against the afore mentioned, that this study assesses the influence of Perceived Usefulness(PU) adopted from Technology Acceptance Model (TAM) and Computer Knowledge(CK) on automation system adoption by academic libraries in Bauchi state. The study adopted cross sectional survey as its research design and 199copies of structured questionnaires were administered to the respondents in order to obtain data for the study. A total number of 185 copies of the questionnaires were retrieved and used for data analysis. Mean, standard deviation, t-test statistics, and regression analysis (multiple regressions) were used to conduct the various analysis of the study. The results obtained from the analysis revealed significant influence of PU and CK on automation system adoption by Bauchi state academic libraries. PU has a P-value of 0.005 and Beta value of 0.211 (β= .211), likewise CK has a P-value of 0.001and Beta value of 0.251 (β= .251). In line with the study findings, it is recommended that all stake holders and management of those libraries should continue to give more support to the regular training of staff and purchase of more useful and reliable ICT facilities in order to actualize the expected benefit of the automation system.

Key words: Technology Acceptance Model, Perceived Usefulness, Computer Knowledge, Automation System and Academic Libraries

INTRODUCTION

Libraries are indispensable components to higher institutions of learning. The increased use and demand of information by educational communities necessitate the need for simple, easy and convenient means of providing, storing and disseminating information to every member of the user community. The collections of the libraries are in both print and non-print format, though in the ancient times of libraries, access to the library collection was done through accessing the library building room. But as technology continues to evolve, all protocol

of library access changes whereby patrons accesses library collections online (Dinesh, Aravindhan and Rajeswari, 2015). As such the need for computer skills is necessary. Libraries are regarded as one of the fastest growing organism, therefore this dynamism made the old methods of maintaining the daily routines insufficient. For clients to have better and fastest service in terms of quick information retrieval, storage and dissemination, application of modern techniques to automate the entire system became exclusively indispensable (Neelakandan *et al.,* 2010)

Borgman (1997) remarked that library software burst in to existence since 1960's being a period of expansion in higher education and increasing fund for library materials. As the pace of publications persist, libraries realized that they could not cape up with the traditional method of acquiring, storing and disseminating information very fast, therefore the need for automation is necessary particularly to save labour, cost and improve efficiency in operations. And this must require computer skills and benefits (usefulness) to be derived from the automation project.

Despites this, most libraries are yet to fully adopt technology for their services delivery due to some certain factors that accounted for. Rosengberg (2005) surveyed some libraries in African continent and revealed that out of 40 libraries, majority of them represented by 56% are yet to complete the automation process in their libraries. Most libraries began with cataloguing, but have neither finished that nor moved to other services that need to be automated. The author further revealed that 13 (21%) have not yet started the automation while 9(15%) have been able to achieve full automation of their library services. Similarly, Chisenga (2004) while surveying some public libraries in African countries to ascertain the degree at which they adopted automation system found limited use of ICT and computers in Botswana, Ghana, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, Zambia and Zimbabwe which seriously brought slowly face of automation of their services.

The story is even worst in the Nigerian context where Gbaje (2012) reported that very few academic libraries are automated particularly university libraries and sited the instance at which Ahmadu Bello University is using Virtual system for management of its Library. This has been connected to the inadequate computer skills of librarians and lack of indicating the benefits of the automation to the institutions authorities. With this unprecedented changes, growth and development in knowledge and information, Aguolu (2011) suggested that for academic libraries to satisfy the tremendous research and reading demand of their clients in various disciplines, they must need computer skills and automate their services that are regarded highly essential by the clients. This study aims at looking at the influence of perceived usefulness obtained from Technology

Acceptance Model (TAM) and Computer Skills on the rate at which automation system is being adopted in Bauchi state academic libraries.

LITERATURE REVIEW

Concept of Library Automation

The evolution of information and communication technology (ICT) coupled with the increased number of collections in libraries make it necessary for libraries to device new techniques that can enable them to handle the affairs of the libraries very efficiently. This is one of the reasons that gives rise to the application of automation system into our libraries. Although library automation has been variously defined by different authors and depending on their background, experience and orientation to what is called automation, but from traditional point of view, the concept has been view as the computerization of the entire housekeeping operation of the libraries which include acquisition, cataloguing, circulation and serial control. However as technology continues to evolve, library automation goes beyond that to mean handling of vast amount of data and information efficiently and quickly with the help of ICT. Bierman (1980) stress that, the utilization of computers and other associated technologies to carry out the exact functions and routines that have been done in the library with justification of reduced cost, efforts and/or increased performance is termed as automation.

Upon all the explanation in the above paragraph, Bhardwaj and Sukla (2000) concluded that library automation is a broad term used to refer to the diverse set of routines such as acquisition, cataloguing, serials, circulation that are carried out with the help of computing devices with an improved quality of products and services of library and information centers.

Perceived Usefulness and Automation System Adoption in Academic Libraries

Organizations and institutions will find it difficult if not impossible to fully understand the benefits and return on any investment they made on technology unless the technology is being actually utilized by the intended users. Despite of its affordable cost, technology is found to be underutilized by many organizations and sometime is even abandoned by such organizations due to the fact that users are not ready to accept such technology (McCarroll, 1991; King, 1994; Gillooly, 1998). Realizing the continuous growth of demand and reliance of automated system coupled with increased introduction of new technologies for various purposes, understanding the factors that promote effective adoption and utilization of automation system continues to be a fundamental

issue for researchers and practitioners (Mun &Yujong, 2003)

In the last two decades, several theoretical models were used by many researches to find out factors that influence the behavior of users' acceptance of new technology, out of which technology acceptance model was the major model that received serious attention and considered as more fit (Mun&Yujong, 2003). TAM was able to theorized that the actual usage of technology by individual is determine by the behavioral intention of that individual which in turn jointly determined by perceived usefulness and perceived ease of use (Davis, 1989). However, this study decided to consider one variable from TAM which is perceived usefulness and paired it with another variable called computer skill to determine their influence on the adoption of automation system in academic libraries of Bauchi State Nigeria. Perceived usefulness of TAM is aims at explaining job productivity and performance in relation to the adoption of a given technology, which is why Davis (1989) defined perceived usefulness as the extent to which a user believes that utilizing a certain technology would influence his/her job performance and productivity positively. Perceived usefulness explain that users adopt a system that they feel it can be very useful in satisfying the demand of which it is sought for. The TAM hypothesizes that positive relationship do exist between usage and performance, maintaining that individuals always want to use IT applications when they perceive such usage would lead to the desire job performance

With regard to library information, Rajput and Gautam (2010) acknowledged that automation can be applied profitably in the following library housekeeping operations; acquisition, classification, cataloguing, stock taking, serial control and circulation. Kocha and Sudarshan (2007) shared this in asserting that automation of acquisition unit enhances funds control, quick checking of approved books devoid of duplication and manages labour intensiveness in the manual system. Above all automation of library brings a lot of benefits that help in improving the general performance and enhance repaid productivity in library operation and service delivery (Peyala, 2011). Egunjobi and Awoyemi, (2012) acknowledge that easy access to library materials, execution of multiple task such as acquisitions, cataloging, circulation, and reference as well as better services renders by library staff to intended users is one of the beauty that automation provides in libraries.

To this extent, perceived usefulness plays a vital role in the decision as whether or not a particular technology should be adopted. From the a foregoing, it is clearly indicated that "there is positive relationship between perceived usefulness and automation adoption"

Computer Skill and Automation System Adoption in Academic Libraries

Proficiency in the application of information and communication technology (ICT) in academic libraries for effective services delivery is directly connected with the extent of skill librarians possess in this area. The new international Webster's comprehensive dictionary of the English Language (2010) described skill as the familiar knowledge of any science, art, or handicraft, as shown by dexterity in execution or performance or in its application to practical purposes.

For libraries to effectively and efficiently perform their professional jobs at this period of high expectations from them, they should possess appreciable level of ICT skills. Ademodi and Adepoju (2009) stress that necessary skills and competency acquisition by librarians particularly at this current information age is essential, hence advocated that librarians must obtain competence that are relevant in their profession, in which virtually all roles and responsibilities are performed with the use of computers.

Anyoku (2012) entails that most of the 21st century librarians' responsibilities involve dealing with computers and related components to render efficient services to clients, therefore, the need for additional computer skill necessary. This is closely in line with Tyson (2007) who asserts that with shaping of libraries, library staff should also be transformed to serve the present generation who anytime and anywhere demand information resources to deals with their information thirsty. The skills of librarians should be connected to the technological facilities used in contemporary libraries. Librarians in Nigeria are experiencing most frequently changing environment which made it necessary to diverse their thinking, skills and broaden their perspective to some extent (Tyson, 2007).

However, a number of researches revealed that librarians in academic libraries have no adequate computer skills that can enable them discharge their mandate appropriately. Ademodi and Adepoju, (2009) investigated the computer skill among librarians in academic libraries in Ondo and Ekiti State in Nigeria and found that the staff have inadequate computer facilities as well as skills to professionally operate the computers. Their study further recommended the need for more attention and sufficient fund to supplement the training and purchase of computer facilities to enhance librarian's capabilities in carrying out library services. Osagie (2009) also confirm that the number of professionals and skillful staff that can efficiently process, store and disseminate information using ICT is inadequate, which in turn affects the way and manner information services are handle in most academic libraries.

Furthermore, it has been empirically observed that ICT/computer skills and literacy among librarians has negatively affected the adoption and usage of automation

in libraries. This can be seen as Ajidahun (2007) studied the training development and education of library manpower in information technology in Nigerian academic libraries. The findings showed that out of 276 professional librarians working in 20 University libraries in Nigeria, only 89 (32.24%) were computer literate. The findings further revealed that the level of professional training in information technology received by the professional staff in Nigerian University libraries is generally inadequate.

Therefore it is hypothesized that "there is positive relationship between computer skill and automation system adoption in academic libraries". (see Figure 1)

Conceptual Framework
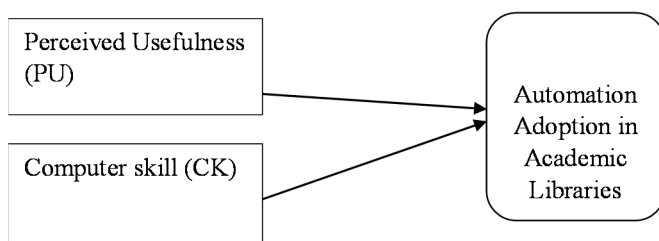
Conceptual Research Framework for the Study
Source: *Generated by the Researcher (2017).*
Figure **1**.

METHODOLOGY

Previously tested scales were adapted to measure all the constructs of the proposed model. Most of the scales were altered to suit the context of the automation system adoption. Six items adapted from Venkatesh and Davis (2000) were used to measure perceived usefulness and another six questions adapted from Fuller *et al.* (2006) were used to measure computer skill constructs. The needed data for this study was collected through a well self-administered questionnaire design for this study. A 5 point Likert scale was used to measure the respondents' level of agreement or disagreement with each question asked.

To ensure the validity of the instrument, the researchers sent the instrument to an expert in the field for face validity and later on retrieved them back after the assessment was done. In addition to that, other necessary measures to ensure construct validity of the instrument such as confirmatory factor analysis (CFA), Kaiser Meyer-Olkin (KMO) measure of sampling adequacy and Cronbach's alpha were conducted and found to be adequate and suitable. A value of 0.7 in the Cronbach's alpha is considered adequate to ensure reliability of the internal consistency of the questionnaires (Nnnually, 1978). Therefore, Cronbach's alpha value of

0.7 was used as a decision criterion in this study.

A cross sectional research design was considered fit to this study and therefore adopted. In cross sectional research design, the data mostly through questionnaires are collected at one point in time in such a way that it is possible to look for a relationships between all the variables of the study

Three hundred and ninety six (396) library staff drawn from all academic libraries in Bauchi state comprises the population of this study and the sample size of 199 respondents which is approximately equal to 50% of the total population was obtained using Yamane's formula. Hair, Black, Barry, Anderson, and Tatham(2006) stressed that the appropriate sample size for questionnaire method should be 100 or above, therefore the sample size for this study amounted to 199 is adequate enough and satisfy the requirement. Proportionate stratified random sampling technique was adopted in selecting the samples of this study. The technique involves categorizing the selected elements into different groups then taking an element from each stratum by means of simple random method (Sekaran, 2003). The data analysis involved both descriptive and inferential statistics and the collected data were statistically analyzed by means of percentage, mean score, standard deviation and multiple regressions with the help of Statistical Package for Social Science (SPSS) version 20.

RESULTS AND DISCUSSIONS

Demographic Variables of Respondents

The study findings revealed that majority of respondents represented by 43.2% are degree and H N D holders. While masters holders constitutes the minority as they represent only 13.0%. However, other category of qualifications falls in between. From the aforementioned, the study received the attention of qualify staff and hence the reliable result would emerge. Table 1 indicated the demographic variable just explained

Confirmatory Factor Analysis (CFA) was carried out and its results also satisfy the needed condition. All variables' constructs have factor loadings greater than 0.5 and Pallant (2011) strongly recommended that all the loading factors should be greater than 0.5 that for a construct to be retained it must have a loadings greater than five, as such it satisfied the needed condition. Also, all Eigen values of the variables are greater than 1 which clearly indicated that they all satisfied the needed condition. Pallant (2011) suggested that the Eigen values should be greater than 1. Similarly, variance explained have met the requirement by having the values above 50% and all the variables still have their Cronbach's alpha values above 0.7. All the conditions of CFA have successfully met as can be seen in table 2.

Table 1

Demographic factor	Category	Frequency	Percentage (%)
Respondents' qualification :	Masters	24	13.0
	Degree/HND	80	43.3
	Diploma /NCE	70	37.8
	Others	11	5.9
	Total	**185**	**100**
Respondents'years of experience			
	1-5	69	37.3
	6-10	49	26.5
	11-15	35	18.9
	16-19	17	9.2
	20 and above	15	8.1
	Total	**185**	**100**

Source field Survey, 2016

Table 2

Constructs	Items	Factor loadings	1st Eigen values	2nd Eigen values	Eigen values ratio	%of Variance explained	Cronbach's Alpha
PU	PU1	0.745	2.255	0.701	3.216	56.37%	0.740
	PU3	0.728					
	PU4	0.756					
	PU6	0.773					
CK	CK2	0.735	2.607	0.795	3.279	52.14%	0.763
	CK3	0.726					
	CK4	0.734					
	CK5	0.747					
	CK6	0.666					
AAD	ADD1	0.715	3.214	0.884	3.635	53.56%	0.807
	ADD2	0.733					
	ADD3	0.791					
	ADD4	0.746					
	ADD5	0.659					
	ADD6	0.739					

Source: SPSS Output

Correlation Test

In an attempt to determine the linear relationship between the study variables, correlation analysis was conducted. Sekaran (2003) stressed that one of the best methods employed in determining linear relationship between two or more variables is correlation analysis. As such, Pearson's correlation was employed to conduct correlation test on direct relationship between all the study variables. Pallant (2011) Maintained that a correlation of 0 is indicating absence or no correlation, a correlation of 1.0 is indicating perfect positive correlation, while a   correlation of -1 is indicating a perfect negative correlation. Cohen(1988)further provides the following as

guidelines: $r = 0.10$ to 0.26 as a little or small correction; $r = 0.30$ t o 0.49 as average or medium correlation; and $r = 0.50$ to 1.0 as high or large correlation. This result of correlation helped to reveal that multicollinearity problem does not exist. Field (2005) recommended that to avoid multicollinearity, the value of the correlation coefficient should be less 0.8. (see Table 3)

Multiple Regression Analysis

Model Evaluation

Model summary table 4 is one of the major tables of

Table 3. Pearson's Correlations between Study Variables Table

Pearson's Correlations		PU	CK	AAD
	PU	1		
	CK	0.359[**]	1	
	ADD	0.301[**]	0.327[**]	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 4. *Model Summary*

Model	R	R square	Adjusted R	Std. Error of the Estimate	F Change	Sig. F change
1	.382[a]	.146	.136	.48173	15.517	.000

a.   Predictors: (constant). PU and KN
b. Dependent Variable: Automation Adoption

interest in multiple regression analysis. This is because it provides the R, R^2, adjusted R^2 and the standard error of the estimate that are all aim at clarifying the fitness of the model in the study. Model Summary Table 4 revealed that the two independent variables (Perceived Usefulness and Computer Knowledge) explained 14.6% of the dependent variable (Automation Adoption); Meaning that the independents variables explained 14.6% ($R^2 = 0.146$) of the variance in automation adoption. Likewise the F change of Anova, revealed a very positive results by having F change = 0.000.

Coefficient and Hypothesis Testing

The analysis presented in table 5 revealed that all the independent variables (PU and CK) of this study were found to be statistically significant predictors of the dependent variable (automation adoption). Coefficient Table (table 5) indicated that PU has a significant value of 0.005 and CK has 0.001, which implies that their significant values are all less than 0.05 (P< 0.05) hence all positively influence the adoption of automation system in academic libraries in Bauchi state. Likewise, the column for Standardized Coefficients of Beta for all independent variables indicated how each contributes to the prediction of the dependent variable.The standardized coefficient Beta value for CK is 0.251(β= .251) which indicated that it makes the highest contribution of 25.1% to the automation adoption in academic libraries of Bauchi State and PU has the Beta value of 0.211 (β= .211), meaning it makes a contribution of 21.1% to the automation adoption in academic libraries of Bauchi State.

With this results therefore, hypotheses 1: *H[1.] Perceived Easefulness has a positive influence on automation adoption in academic libraries; H[2.] Computer Knowledge has a positive influence on automation adoption in academic libraries are all accepted.* (Table 5&6)

DISCUSSION OF FINDINGS

Through the use of theoretical basis derived from technology acceptance model, analysis of the collected data revealed that PU and CK are statistically significant predictors of automation system adoption in academic libraries of Bauchi state. The results exposed the fact that automation system adoption by academic libraries in Bauchi state can be positively influenced by PU and CK.

Result of influence of P U on automation adoption has shown that significant influence do exist on automation system adoption in the libraries. This signifies that librarians found the automation system in their respective libraries very useful in terms of operation, performance, productivity, effectiveness and energy saving. As such, the perceived usefulness of automation system in libraries as a determinant that can enable them adopt automation system in their libraries for good functioning of the libraries and better services delivery. Hak (2015) conducted nearly similar study and found a significant relationship between library automation adoption and PU in Senaya libraries, Indonesia. Davis (1989) maintained that when a new system is introduced, the first thing that people do is to evaluate its usefulness, from which they can decide as whether to continue or discontinue to use it, since people will only tend to use an application when they perceived it useful and significant to improve their

Table 5

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	1.864	.476		3.912	.000		
	PU	.297	.103	.211	2.874	.005	.871	1.148
	CK	.267	.078	.251	3.423	.001	.871	1.148

Source: SPSS Output

Table 6. Summary of Hypotheses Testing

Hypotheses	Hypotheses statement	P value	Decision
1	H_2. Perceived Usefulness has a positive influence on automation adoption in academic libraries	0.005	Accepted
2	H_2. Computer Knowledge has a positive influence on automation adoption in academic libraries	0.001	Accepted

Source: field Survey, 2016

skills and performance.

Result of CK also revealed that computer knowledge has significant influence on automation system adoption in academic libraries of Bauchi state. This is in line with a study conducted by Ayodele, Joseph, Ojoke and Felix (2013) who investigated the proficiency of the information providers in the area of IT. Their results showed that most of the respondents can effectively operate computer systems (46.4%), can operate computer systems (35.5%), can partially operate it (12.3%) and (3.1%) could not operate a computer system. This may have connection with the fact that most of the libraries now deploy ICTs in their libraries, because the authors further affirmed that 86.6% of the libraries surveyed have computer systems; 46.4%, cabling for multiple access; 39.2%, bandwidth; 81%, printers; 68%, telephones; 75.3%, Internet; 50.5%, scanning machines; 30%, digital camera; 39.2%, multimedia. All these IT facilities are very important for the smooth take-off of library automation with effective library software to run it.In contrast to that, Ademodi and Adepoju, (2009) investigated the computer skill among librarians in academic libraries in Ondo and Ekiti State in Nigeria and found that the staff have inadequate computer facilities as well as skills to professionally operate the computers. Eklof and Hellebore (2009) concluded that it is of great relevance that librarians are well familiarized with ICTs and possess the rudimentary knowledge of computers.

CONCLUSION

Perceived usefulness (PU) and Computer knowledge

(CK) are very essential in running the libraries since today's libraries now became more ICT integrated than before. Findings from the study revealed that both PU and CK are very relevant to the successful adoption of automation system; therefore academic libraries should pay a serious attention to those variables if possible and others so as to have a very successful automation system adoption in their libraries and for them to survive among the libraries of 21st century. The researchers further recommended that stake holders and management of these libraries should continue to give more priority to the deployment of automation systems that their benefits can simply be articulated and staff are trained on regular basis.

Suggestion for Future Study/Limitation of the Study

Base on the analysis of this study, it has been statistically indicated that the variables in the model explained only 14.6% of the variance of automation adoption in academic libraries of Bauchi State. Another 85.4% of variance remains unexplained, suggesting a need for further study to slot in additional variables and sample sin the model so as to have very comprehensive model of automation system adoption determinants in academic libraries. Future research should also look in to the possibility of covering a very wide area such as two states or even geo-political zone and include all types of libraries so as to understand the level at which automation adoption is being influenced by the benefits that are derived from it and computer knowledge of the staff.

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