
Contributions of Individual, Institutional and System factors to Utilisation of Research4Life Databases in National Agricultural Research Institutes in Nigeria

O.A. Okwilagwe

Department of Library, Archival and Information studies
University of Ibadan, P.M.B. 1, UI,
Ibadan, Nigeria.
E-mail: okwilagweandrew@yahoo.com

Luke Obasuyi

John Harris Library, University of Benin,
P.M.B. 1154, Benin City,
Edo State, Nigeria.
Correspondence: E-mail: lo.obasuyi@uniben.edu

Abstract

This study investigated the contributions of individual, institutional and system factors to utilisation of Research4Life databases by scientists in the NARIs in Nigeria. The study adopted the descriptive survey research design of the correlational type. Simple and stratified random sampling techniques were used to select 744 (62%) research scientists from a population of 1,205 in 13 NARIs. A validated and pre-tested questionnaire was the instrument adopted for this study and it consisted of 105 questions arranged in five sections A – E with 0.99 reliability coefficient based on Cronbach alpha method. Descriptive and inferential statistics - simple percentage, mean, correlation, multiple regression and analysis of variance were used to analyse the data. Result revealed that utilisation of Research4Life databases was low and the 22 individual, institutional and system factors individual and collectively significantly influenced utilisation of Research4Life databases in the NARIs. Individual, institutional and system factors showed varied levels of variances to utilisation of Research4Life databases in the NARIs with system factors contributing the highest followed by institutional and individual factors. For increased utilisation of Research4Life databases in NARIs in Nigeria, system and institutional factors have to be given utmost consideration.

Keywords: Individual factor; Institutional factor; System factor; Utilisation; Research4Life databases; Agricultural scientists.

Introduction

Research4Life is the collective name for HINARI - Health Internetwork Access to Research Initiative, AGORA - Access to Global Online Research in Agriculture, OARE - Online Access to Research in the Environment and ARDI – Access to Research for Development and Innovation databases. It provides developing countries with either free or low cost access to over 69,000 online resources including 21,000 quality peer-reviewed international scientific journals, 50,000 e-books, with several databases and millions of full-text journal articles. The total value of access to these collections is estimated to be in excess of US\$ 7,000,000 per year (Research4life, 2016a). Research4Life was designed to enhance scholarship, teaching, research and policy making of students, faculty, scientists, and medical specialists in the areas of health, agriculture, environment, and other life, physical and social sciences. The goal is to

help attain six of the eight United Nations' Millennium Development Goals by 2015 and Vision 20-2020 in order to reduce the scientific knowledge gap between industrialised and the developing world. Various stakeholders are committed to support Research4Life programmes until 2020 (Research4Life, 2016b).

Research4Life databases were launched in 2002, 2003, 2006 and 2009 respectively and they have been in use in Nigeria. Utilisation of Research4Life databases has impacted positively on the productivity of agricultural scientists in some countries where the databases have been adequately used. The level of utilisation of Research4Life databases in Nigeria is not encouraging. Lwoga et al (2007) posit that the major challenges now are to ensure that Research4Life databases and contents are used to their fullest extent. According to ITOCA (2014) the present rate of utilisation of Research4Life among NARIs scientists in Nigeria is low due to several factors.

Various factors have been known to influence utilisation of different Information Technology (IT) and Research4Life databases. IT acceptance and utilisation literature classified these factors as personal/individual/users, institutional/organisational and system/technology factors (Buabeng-Andoh, 2012; Park, 2009; Rahim, 2008; Zabukovsek, and Bobek, 2013). In this study, individual, institutional and system factors were adopted. Individual factors include demographic (e.g., traits or states of individuals, gender, and age), personality and cognitive styles that can influence individuals' perception of the use of IT (Harrison and Rainer, 1992; Zmud, 1979). Agarwal and Prasad (1999), Scott (2007) and Angello (2010) opined that individual factors are important determinants of acceptance and utilisation of IT, while Shih and Huang (2009) posit that the success of an Information System (IS) is predicted especially by the individual user's acceptance or resistance. Six individual factors investigated in this study include: intention to use, task at hand, computer anxiety, prior ICT experience, ICT searching skills and computer/Internet self-efficacy.

Institutional factors are range of conditions including technical infrastructure provided by institutions to support the use of IT and IS. Institutional or organisational factors are synonymous and used interchangeably. Institutional factors have also been found to influence the use of various ICT in different settings (Anandarajan, Igbaria and Anakwe, 2002; Angello, 2010; Buabeng-Andoh, 2012; Lu, Lu, Yu and Yao 2003). Six institutional factors investigated in this study include: accessibility of databases, availability of password, fast Internet access, adequate training, adequate ICT infrastructure and help/technical support services.

System factors include information content, physical design features and quality of an IS that can help individuals develop favorable perception to use the system. Al-Mamary and Aziati (2014) state that system factors are the desirable characteristics of IS such as perceived ease of use, flexibility, reliability, intuitiveness, sophistication, database system design, system features, information contents, relevance, functionality and response time. Hong, Thong, Wong and Tam (2002) found significant relationships between system factors and TAM's constructs. Ten system factors investigated in this study include: availability of full text articles, quality of content, currency of content, free download of articles, local journal content, database design features, quick access to journal articles, databases compatibility, perceived usefulness and perceived ease of use.

The influence of individual, institutional and system factors on utilisation of IT and Research4Life databases has not been constant across nations including Nigeria. There is extreme variance among findings noting that factors found to be important for one innovation study are found to be considerably less important, not important at all, or even inversely important in another study. For instance, Miller and Khera (2010) opined that the patterns of interaction of factors influencing digital libraries and Research4Life databases are not constant across institutions, culture and users. Individual factors show more predictive power

in some studies (Agbonlahor, 2008; Deng, 2009; Zabukovsek and Bobek, 2013); while institutional or system factors are more relevant in others (Davis, 1993; Park, 2009; Angello, 2010; Buabeng-Andoh, 2012). The predictive and contributory powers of these factors to utilisation of Research4Life databases are yet to be determined especially in the NARIs. The aim of this study therefore, is to determine the contributions of individual, institutional and system factors on utilisation of Research4Life databases in the NARIs. Specifically, the study attempts to determine the level of utilisation of Research4Life databases in NARIs. Secondly, to find out the individual, institutional and system factors influencing utilisation of Research4Life databases, thirdly to determine the joint influence of these factors on utilisation of the databases, and finally to establish their contributions on utilisation of Research4Life databases by scientists in NARIs in Nigeria.

Research Question: The following research questions guided the study:

1. What is the level of utilisation of Research4Life databases by scientists in NARIs.
2. What are the individual, institutional and system factors influencing utilisation of Research4Life databases by scientists in NARIs.
3. What is the joint influence of individual, institutional and system factors on utilisation of Research4Life databases by scientists in NARIs.
4. What are the contributions of individual, institutional and system factors on utilisation of Research4Life databases by scientists in NARIs.

Literature Review

Agricultural information technology research often focus on ICT implementation and design but perhaps not enough on how agricultural researchers and scientists the individual end-users react to implemented ICT. Today, there is more to ICT success than design or purchasing a functional technology. Many recent studies on the unexpected consequences of agricultural ICT show that the fit between ICT and the agricultural scientists research work will lead intended end-users to accept or reject the ICT, to use and to incorporate it into their work or routine activities or not. Therefore, the success of IS and IT is decided especially by the individual user's acceptance or resistance (Shih and Huang, 2009).

An earlier study by Agarwal and Prasad (1999) posit that individual factors are important in information technology acceptance. In the light of the foregoing, Hong, Thong, Wong, and Tam (2002) opined that research emphasis has now shifted from technology development research to user-focused research because digital library research has shown that potential users may not use the systems in spite of their availability. Commenting on the imperative of user-focused IT research, Deng (2009) investigated the extent of usage and to identify critical factors for the effective use of digital resources in the university environment. The study revealed that usage of digital portal resources was significant in higher education, and utilisation was dependent on the individual users and purpose.

One of the factors that can motivate users to accept and use IT in developing countries such as Nigeria includes institutional factors. While institutional factors may be adequate in developed countries, the reverse may be the case in developing countries like Nigeria. Institutional factors have been found to influence the use of various ICT in different settings. Anandarajan, Igbaria and Anakwe (2002) study of 143 computer users in nine organisations in Lagos found that perceived usefulness and perceived enjoyment did not motivate users to accept the microcomputer but organisational support and social pressure. Exploring how different factors influence user intentions to accept Wireless Internet via Mobile Technology (WIMT) in China, Lu, Lu, Yu and Yao (2003) found facilitating conditions as one of the factors influencing acceptance and use of WIMT in China. In the areas of e-commerce, Unsal

and Movassaghi (2008) survey of literature uncovered environmental factors, knowledge factors, organisational factors and technology factors as four broad set of factors that seem to have influence on the utilisation of IT systems in general among small and medium-sized (SMEs) companies around the world.

Writing on access to health literature, Smith et al (2007) posits that HINARI and other initiatives could be more effective with strong institutional endorsement and management support to promote and ensure access. Bhattacharjee and Hikmet (2008) examined the role of organisational factor (infrastructure support and technical support) in motivating IT usage in health care using TAM. The study confirmed that organisational support played a critical role in shaping user perceptions toward IT and their subsequent IT usage. In another study, Shih and Huang (2009) found that top management support had a positive direct effect on the use of Enterprise Resource Planning (ERP) systems. Using the UTAUT model, Dulle and Minish-Majanja (2011) reported significant influence of facilitating conditions on researchers' actual usage of open access in public universities in Tanzania. It can be seen that different variables constitute institutional factors in the studies reviewed above.

System factors have the potentials to directly and indirectly affect utilisation of any IS including Research4Life databases. System factors are usually divided into two broad groups. They are the system's information components and the physical system quality. Nelson, Todd and Wixon (2005) developed a model consisting of nine fundamental determinants of quality in an IT context. This study confirmed the fact that there are both information and physical system aspects of IT. Al-Mamary and Aziati (2014) identified 11 desirable characteristics of an IS. These factors are capable of attracting or distracting potential users to adopt and use any database as their sources of information. Several studies that included system features as factors influencing utilisation of various IT and IS in different contexts were found to have significant relationships between the system factors and utilisation of the technologies and systems (Davis, Bagozzi and Warshaw, 1989, Davis, 1993, Hong et al, 2002, Rahim (2008) Tella, 2012, Lee and Park, 2013).

Individual, institutional and system factors influenced utilisation of various IT and IS at varied degrees. Harrison and Rainer (1992) findings indicate that individual difference variables accounted for 56% of the variance associated with computer skill to use IT in a Southern United States University. Venkatesh et al (2003) validated the UTAUT in a longitudinal study and found it to account for an impressive 70% of the variance in behavioural intention to use technology. Exploring behavioural intention and actual usage of Enterprise Resource Planning (ERP) implementation among manufacturing and service industry in Taiwan based on TAM, Shih and Huang (2009) found that total actual usage variance was 0.25 or 25% of the model. In two Balqa Universities, Allahawiah and Tarawneh (2015) regression analysis showed that the skill of teacher in using ICT explained 36.3% variance of extent to which faculty members uses ICT. Fadare, Babatunde, Akomolafde and Lawal (2011) found that m-learning computer self-efficacy explain the highest (70%) of the variance in behavioural intention to use m-learning at Joseph Ayo Babalola University (JABU), Ikeji-Arakeji in Osun State, South-West, Nigeria. Investigating individual employee's adoption of innovation in Australia, Talukder (2012) result showed that 53.1% of the variance in usage was explained by organisational, individual and social factors.

It can be seen from the review that individual, institutional and system factors have their degrees of influence on utilisation of IT and IS in various contexts. This finding could have serious implication on utilisation of Research4Life databases especially in the NARIs. Therefore, investigating the contributions of these factors becomes imperative as it will reveal what factor to consider most when designing and implementing the use of the databases.

Methodology

This study adopted the descriptive survey research design of the correlational type. The study population consists of 1,205 research scientists in the 15 NARIs. Simple random and stratified random sampling techniques were used to select 13 of the 15 NARIs, and 744 research scientists which is 62% of the total population of scientists in NARIs respectively. The questionnaire was the instrument used and it consists of 105 questions arranged in five sections A – E. Section A dwelt on demographic information; section B on individual factors; section C centred on institutional factors while section D addressed the system factors. Section E covered the dependent factors which is utilisation of Research4Life databases. The questionnaire adopted the four point liker scale technique for answering questions. Each degree of agreement or disagreement is given a numerical value from four to one (strongly agreed (4), agreed (3), disagreed (2) and strongly disagreed (1). For the weighted means to be significant, the decision rule was based on the mean being more than or up to 2.5. The questionnaire was assessed for face and content validity by five experts and pre-tested using 30 lecturers in the Faculty of Agriculture, University of Benin, Benin City. The psychometric property or reliability of the questionnaire was assessed using the Cronbach Coefficient Alpha method. The reliability coefficient for the whole questionnaire was 0.99 alpha while the values obtained for individual, institutional and system factors were 0.97 alpha, 0.97 alpha and 0.94 alpha respectively and utilization was 0.96. Simple percentage, mean, correlation, multiple regression and analysis of variance were used to analyse the data using SPSS 17.0.

Results and Discussion

Research Question 1: What is the level of utilisation of Research4Life databases by scientists in NARIs.

To ascertain the level of utilisation of Research4Life databases in NARIs, the scientists were asked to respond to six questions on their use of the databases. The result in Table 1 indicates that the six questions recorded a mean of 2.13 and a standard deviation of 1.14 indicating that the level of utilisation of Research4Life databases was not significant. The results further indicated that majority (60.4%) of the scientists were not using Research4Life databases while only 39.6% are using the databases. Therefore, the level of utilisation of Research4Life databases by NARIs scientists in Nigeria is low.

Table 1: Level of utilisation of Research4Life databases by scientists in NARIs

Items	SD	S	A	SA	Mean	S.D
I have downloaded articles from Research4Life databases	218 43.9%	53 10.7%	122 24.5%	104 20.9	2.23	1.21
I use Research4Life databases regularly for my research	198 39.8%	84 17.0%	134 27.0%	81 16.2%	2.20	1.13
My intensity of using Research4Life databases is high	210 42.3%	72 14.15%	124 25.0%	91 18.3%	2.20	1.17
I spent at least 1 hour anytime I use Research4Life	225 45.3%	61 12.4%	119 24.0%	91 18.3%	2.15	1.18
I use most features in Research4Life databases regularly	225 45.3%	102 20.5%	107 21.5%	63 12.7%	2.02	1.08
I use Research4Life databases on a weekly basis	233 46.9%	122 24.5%	77 15.5%	65 13.1%	1.96	1.07
Total	218 43.9	82 16.5	114 22.9	83 16.7	2.13	1.14

SD: Strongly disagree; D: Disagree; A: Agree, SA: Strongly agree

This result agreed with various findings of Angello and Wema (2010); ITOCA (2014); Kwadzo (2015) and Okwilagwe and Ogbomo (2012) that utilisation level of Research4Life databases by livestock researchers in Tanzania; agricultural scientists in Nigeria; graduate students at the University of Ghana and university lecturers in Nigeria was low respectively. The problem of low utilisation of Research4life databases across universities and research institutes in developing countries will gradually disappear if the result of this study is implemented.

Research Question 2: What are the individual, institutional and system factors influencing utilisation of Research4Life databases by scientists in NARIs.

Six individual factors were tested in this study. Result in Table 2 shows that there were significant relationships between intention to use, ($\beta = .519^{**}$, $P(.000) < .05$), task at hand, ($\beta = .567^{**}$, $P(.000) < .05$), computer anxiety, ($\beta = .651^{**}$, $P(.000) < .05$), prior ICT experience, ($\beta = .613^{**}$, $P(.000) < .05$), ICT searching skills, ($\beta = .629^{**}$, $P(.000) < .05$), computer/Internet self-efficacy, ($\beta = .644^{**}$, $P(.000) < .05$) and utilisation of Research4Life databases. The result also showed a strong correlation between the individual factors and utilisation of Research4Life databases as their correlation value range from 0.519 to 0.651. This result means that all the individual factors were significant and thus influenced utilisation of Research4Life databases by scientists in NARIs.

Table 2: Correlation matrix showing the significant relationships between Individual factors and Utilisation of Research4Life databases by ARIs scientists in Nigeria

	Utilisation of Research4Life	Intention to use	Task at hand	Computer Anxiety	Prior ICT Experience	ICT Searching Skills	Computer/Internet Self Efficacy	Mean	S.D
Utilisation of Research4Life	1							34.16	19.07
Intention to use	.519** .000	1						28.95	14.85
Task at hand	.567** .000	.805** .000	1					26.45	12.84
Computer Anxiety	.651** .000	.659** .000	.772* .000	1				30.59	15.28
Prior ICT Experience	.613** .000	.726** .000	.757* .000	.829** .000	1			25.81	12.89
ICT Searching Skills	.629** .000	.688* .000	.718* .000	.782** .000	.864** .000	1		25.93	13.58
Computer/Internet Self Efficacy	.644** .000	.719** .000	.735* .000	.767** .000	.497** .000	.878** .000	1	27.11	14.28

Six institutional factors were also tested in this study. Results in Table 3 showed that there were significant relationships between accessibility, ($\beta = .718^{**}$, $P (.000) < .05$), availability of password, ($\beta = .684^{**}$, $P (.000) < .05$), fast Internet access, ($\beta = .684^{**}$, P

(.000) <.05), adequate training, ($\beta = .652^{**}$, $P (.000) <.05$), adequate ICT infrastructure, ($\beta = .643^{**}$, $P (.000) <.05$), help/technical support services, ($\beta = .663^{**}$, $P (.000) <.05$) and utilisation of Research4life databases. The result also showed a strong correlation between the institutional factors and utilisation of Research4Life databases as their correlation value range from 0.643 to 0.718. The result implied that all the institutional factors were significant and influenced utilisation of Research4Life databases by scientists in NARIs.

Table 3: Correlation matrix showing the significant relationships between institutional factors and utilisation of Research4life databases by ARIs scientists in Nigeria

	Utilisation of Research4life	Accessibility	Availability of Password	Fast Internet Access	Adequate Training	Adequate ICT Infrastructure	Help/Technical Support	Mean	S.D
Utilisation of Research4life Databases	1							34.16	19.07
Accessibility	.718** .000	1						26.54	13.09
Availability of Password	.684** .000	.841** .000	1					22.68	12.03
Fast Internet Access	.684** .000	.843** .00	.764** .000	1				26.19	13.59
Adequate Training	.652** .000	.817** .000	.721** .000	.917* .000	1			26.36	13.96
Adequate ICT Infrastructure	.643** .000	.739** .000	.688** .000	.797* .000	.848** .000	1		23.23	12.61
Help/Technical Support	.663** .000	.840** .000	.731** .000	.848* .000	.875** .000	.877** .000	1	24.91	13.33

Ten system factors were tested in this study. Results in Table 4 revealed that there were significant relationships between availability of full-text articles, ($\beta = .718^{**}$, $P (.000) <.05$), quality of content, ($\beta = .717^{**}$, $P (.000) <.05$), currency of content, ($\beta = .729^{**}$, $P (.000) <.05$), free download of articles, ($\beta = .704^{**}$, $P (.000) <.05$), local journal content, ($\beta = .753^{**}$, $P (.000) <.05$), database design features, ($\beta = .750^{**}$, $P (.000) <.05$), quick access to journal articles, ($\beta = .730^{**}$, $P (.000) <.05$), databases compatibility, ($\beta = .703^{**}$, $P (.000) <.05$), perceived usefulness, ($\beta = .714^{**}$, $P (.000) <.05$), perceived ease of use, ($\beta = .734^{**}$, $P (.000) <.05$) and utilisation of Research4Life databases. The result also showed a strong correlation between the system factors and utilisation of Research4Life databases as their correlation values range from 0.704 to 0.753. It therefore means that all ten system factors were significant as factors influencing utilisation of Research4Life databases by ARIs scientists in Nigeria.

Table 4: Correlation matrix showing the significant relationships between system factors and utilisation of Research4Life databases by ARIs scientists in Nigeria.

	1	2	3	4	5	6	7	8	9	10	11	Mean	S.D
1	1											34.16	19.07
2	.748* * .000	1										24.91	13.56
3	.717* * .000	.869* * .000	1									25.60	14.65
4	.729* * .000	.864* * .000	.920* * .000	1								25.17	14.54
5	.704* * .000	.819* * .000	.834* * .000	.870* * .000	1							24.68	12.68
6	.753* * .000	.870* * .000	.847* * .000	.868* * .000	.846* * .000	1						24.62	13.49
7	.750* * .000	.877* * .000	.872* * .000	.870* * .000	.822* * .000	.890* * .000	1					31.08	17.49
8	.730* * .000	.879* * .000	.851* * .000	.850* * .000	.819* * .000	.857* * .000	.916* * .000	1				24.31	13.85
9	.703* * .000	.847* * .000	.837* * .000	.831* * .000	.793* * .000	.828* * .000	.834* * .000	.869* * .000	1			25.91	14.82
10	.714* * .000	.848* * .000	.842* * .000	.826* * .000	.780* * .000	.831* * .000	.837* * .000	.857* * .000	.938* * .000	1		33.65	19.00
11	.734* * .000	.828* * .000	.810* * .000	.812* * .000	.785* * .000	.802* * .000	.814* * .000	.838* * .000	.899* * .000	.922* * .000	1	31.03	18.70

Key: 1. Utilisation of Research4Life databases; 2. Availability of full-text Articles; 3. Quality of content; 4. Currency of content; 5. Free download of articles; 6. Local journal content; 7. Database design features; 8. Quick access to journal articles; 9. Databases compatibility; 10. Perceived usefulness; and 11. Perceived ease of use

The overall results indicated that the 22 individual, institutional and system factors were significant and thus influenced utilisation of Research4Life databases in NARIs. Individual, institutional and system factors are therefore very important to utilisation of Research4Life databases. Daniel (2014) found the impact of individual, institutional and system factors on utilisation of e-learning in Divine Word University, Papua New Guinea. Miller and Khera (2010) also found that external (individual, institutional and system) factors influenced utilisation of The Essential Electronic Agricultural Library (TEEAL) in Kenya and Peru. Zabukovsek and Bobek (2013) findings also revealed that external factors of individual, institutional and system factors influenced ease of use, usefulness and work compatibility of

Entreprise Resource Planning (ERP) users toward the ERP system. In Scotland, Echeng and Usoro (2015) found perceived usefulness, motivation, performance expectancy, social factors, prior knowledge and facilitating conditions as predictors of Web 2.0 technology.

Research Question 3: What is the joint influence of individual, institutional and system factors on utilisation of Research4Life databases by scientists in NARIs.

To test research question 3, multiple regression analysis was performed on the mean scores of individual, institutional and system factors, and utilisation of Research4Life databases. Result in Table 5 showed that the joint effect of individual, institutional and system factors on utilisation of Research4Life databases was significant. The null hypothesis was therefore rejected. The table also shows a coefficient of multiple correlation ($R = .817$ and a multiple R^2 of .668. This implied that 66.8% of the variance was accounted for by the predictor variables when taken together. The significance of the composite contribution was tested at $P < .05$. The table also shows that the analysis of variance (ANOVA) for the regression yielded a F-ratio of 43.279 (significant at 0.05 level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

Table 5: Correlation of individual, institutional and system factors and utilisation of Research4Life databases by ARIs scientists in Nigeria

R	R Square			Adjusted R Square	Std. Error of the Estimate	
.817	.668			.652	11.2475	
A N O V A						
Model	Sum of Squares	DF	Mean Square	F	Sig.	Remark
Regression	120449.6	22	5474.984	43.279	.000	Sig.
Residual	59963.486	474	126.505			
Total	180413.1	496				

Research Question 4: What are the contributions of individual, institutional and system factors on utilisation of Research4Life databases by scientists in NARIs.

Results in Table 6 showed that the influence of individual factors on utilisation of Research4Life databases was significant. The table also shows a coefficient of multiple correlation ($R = .691$ and a multiple R^2 of .478. This implied that 47.8% of the variance was accounted for by the predictor variables when taken together. The significance of the composite contribution was tested at $P < .05$. The table also shows that the analysis of variance (ANOVA) for the regression yielded a F-ratio of 74.712 (significant at 0.05 level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

Table 6: Joint effect of the individual factors on utilisation of Research4Life databases

R	R Square			Adjusted R Square	Std. Error of the Estimate	
.691	.478			.471	13.8666	
A N O V A						
Model	Sum of Squares	DF	Mean Square	F	Sig.	Remark

Regression	86194.703	6	14365.784	74.712	.000	Sig.
Residual	94218.420	490	192.282			
Total	180413.12	496				

Results in Table 7 shows that the joint effect of the institutional factors on utilisation of Research4Life databases was significant. The table also shows a coefficient of multiple correlation ($R = .747$ and a multiple R^2 of .558. This means that 55.8% of the variance was accounted for by the predictor variables when taken together. The significance of the composite contribution was tested at $P < .05$. The table also shows that the analysis of variance (ANOVA) for the regression yielded a F-ratio of 102.917 (significant at 0.05 level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

Table 7: Joint effect of institutional factors on utiliation of Research4Life databases

R	R Square			Adjusted R Square	Std. Error of the Estimate	
.747	.558			.552	12.7633	
A N O V A						
Model	Sum of Squares	DF	Mean Square	F	Sig.	Remark
Regression	100591.50	6	16765.249	102.917	.000	Sig.
Residual	79821.627	490	162.901			
Total	180413.12	496				

Results in Table 8 shows that the joint effect of the system factors on utilisation of Research4Life databases was significant. The table also shows a coefficient of multiple correlation ($R = .796$ and a multiple R^2 of .634. This means that 63.4% of the variance was accounted for by the predictor variables when taken together. The significance of the composite contribution was tested at $P < .05$. The table also shows that the analysis of variance (ANOVA) for the regression yielded a F-ratio of 84.202 (significant at 0.05 level). This implies that the joint contribution of the independent variables to the dependent variable was significant and that other variables not included in this model may have accounted for the remaining variance.

Table 8: Joint effect of the system factors on utilisation of Research4Life databases

R	R Square			Adjusted R Square	Std. Error of the Estimate	
.796	.634			.627	11.6555	
A N O V A						
Model	Sum of Squares	DF	Mean Square	F	Sig.	Remark
Regression	114389.21	10	11438.921	84.202	.000	Sig.
Residual	66023.917	486	135.852			
Total	180413.12	496				

It can be deduced from the results that individual, institutional and system factors collectively made 66.8% composite contribution to utilisation of Research4Life databases in

NARIs. Out of this figure, individual factor contributed 47.8%, institutional factors contributed 55.8% and system factors contributed 63.4%. It therefore implied that system factors made the highest contribution to utilisation of Research4Life databases followed by institutional and individual factors respectively.

Conclusion

Based on the findings of this study, it can be concluded that there is varied levels of individual, institutional and system factors contributions to utilisation of Research4Life databases in NARIs in Nigeria with the system factors contributing the highest followed by institutional and individual factors. It therefore implied that for Research4Life databases to be maximally utilised, system and institutional factors should be given adequate attention.

References

- Agarwal, R. & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies. *Decision Sciences*, 30(2), 361-391.
- Agbonlahor, R.O. (2008). Gender, age and use of information technology in Nigerian Universities: a theory of planned behaviour perspective. *Revitalization of African Higher Education*. Babalola et al. ed. Ibadan: HERPNET. 286–304.
- Al-Mamary, Y.H. & Aziati, A.S. (2014). Factors affecting successful adoption of management information systems in organisations towards enhancing organisational performance. *American Journal of Systems and Software*, 2(5), 121-126.
- Allahawiah, S. & Tarawneh, S.A. (2015). Factors affecting information and communication technology use by southern college teachers in Balqa applied university. *The 2015 WEI Inter. Academic Conference Proceedings*, Barcelona, Spain. WEI, 138-145.
- Anandarajan, M., Igbaria, M. & Anakwe, U.P. (2002). IT acceptance of in a less-developed country: a motivational factor perspective. *International Journal of Information Management*, 22(1), 47-65.
- Angello, C. (2010). The awareness and use of electronic information sources among livestock researchers in Tanzania. *Journal of Information Literacy*, 4(2), 6-22.
- _____ & Wema, E. (2010). Availability and usage of ICTs and e-resources by livestock researchers in Tanzania: challenges and way forward. *International Journal of Education and Development Using ICT*, 6(1), 53-65.
- Bhattacharjee, A. & Hikmet, N. (2008). Reconceptualising organisational support and its effect on Information Technology usage: evidence from the health care sector. *Journal of Computer Information Systems*, 48(4), 69-76.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching; a review of the literature. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 136-155.
- Daniel, M. (2014). Factors that impact upon the use of e-learning. *Contemporary PNG Studies: DWU Research Journal*, 20(5), 59-65.
- Davis, F.D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioural impacts. *Int. Journal Man-Machine Studies*, 38, 475-487.
- _____, Bagozzi, R.P. & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Deng, H. (2009). An empirical analysis of the utilisation of digital library resources. In: *Handbook of Research on Digital Libraries: Design, Development, and Impact*. 344-351. Hershey, PA: Information Science Reference. Doi: 10.4018/978-1-59904-879-6.ch035.

- Dulle, F.W. & Minish-Majanja, M.K. (2011). The suitability of the Unified theory of acceptance and use of technology (UTAUT) model on open access adaption studies. *Information Development*, 27(1), 32-45.
- Echeng, R. & Usoro, A. (2014). Acceptance factors and current level of use of Web 2.0 technologies for learning in higher education: a case study of two countries. *International Journal of Advanced Computer Science and Application*, 5(5), 9-14.
- Fadare, O.G., Babatunde, O.G., Akomolafe, D.T. & Lawal, O.O. 2011. Behavioural intention for mobile learning on 3G mobile Internet technology in South-West part of Nigeria. *World Journal of Engineering and Pure and Applied Sciences*, 1(2), 19-28.
- Harrison, A.W. and Rainer, R.K. (1992). The influence of individual differences on skill in end-user-computing. *Journal of Management Information Science*, 9(1), 93-111.
- Hong, W., Thong, J.Y.L., Wong, W. & Tam, K. (2002). Determinants of user acceptance of digital libraries; an empirical examination of individual differences and system characteristics. *Journal of Management Information System*, 18(3), 97-124.
- Information Training and Outreach Centre for Africa (2014). Research4Life and TEEAL training manual. 15 –17 July, 2014. University of Benin, Benin City: ITOCA, 2014.
- Kwadzo, G. (2015). Awareness and usage of electronic databases by geography and resource development information studies graduate students in the University of Ghana. *Library Philosophy and Practice (e-journal)*. Paper 1210. Retrieved May 4, 2016, from <http://digitalcommons.unl.edu.libphilprac/1210>.
- Lee, J. & Park, M. (2013). Factors affecting the Smartphone users to use the mobile portal services: focusing on Korean mobile portals. *Inf Syst E-Bus Manage*, 11, 235-252.
- Lu, J., Lu, C., Yu, C. & Yao, J.E. (2003). Exploring factors associated with wireless internet via mobile technology acceptance in mainland China. *Communications of the IIMA*, 3(1), 9 Retrieved November 20, 2015, from <http://scholarworks.lib.csusb.edu/ciima>
- Lwoga, E.T., Chimwaza, G., Aronson, B. & Vent, O. (2007). Building science information fluency in African universities: how libraries and researchers are benefiting from improved access to science scholarship. *WLIC/73rd IFLA Conference, 19-23 August*, South Africa. Retrieved May 9, 2011, from <http://www.ifla.org/iv/ifla73/index.htm>
- Miller, J. & Khera, O. (2010). Digital library adoption and the Technology Acceptance Mode: a cross-country analysis. *The Electronic Journal on Information Systems in Developing Countries*, 40(6), 1-19.
- Nelson, R.R., Todd, P.A. & Wixom, B.H. (2005). Antecedents of information and system quality: an experical examination within the context of data warehousing. *Journal of Management Information Systems*, 21(4), 199-235.
- Okwilagwe, O.A. & Ogbomo, M.O. 2012. Computer skills as predictors of lecturers' use of scholarly electronic publications from research in Federal University Libraries in Nigeria. *PMLA Quarterly*, 76(3), 97-115.
- Park. S.Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioural intention to use e-learning. *Educational Technology and Society*, 12(3), 150-162.
- Rahim, M.M. (2008). A qualitative evaluation of an instrument for measuring the influence of factors affecting use of business-to-employee portals. *International Journal of Human and Social Sciences*, 4(13), 945-954.
- Research4Life. (2016a). A total of 69,000 online resources now available in Research4life. Retrieved June 1, 2016, from <http://www.research4Life.org/69000-online-resources-available/>
- _____ (2016b). A look at AGORA usage in the world. Retrieved June 13, 2016, from <http://www.research4Life.org/look-agera-usage-world>.

- Scott, J.C. (2007). HINARI/AGORA usage review. Unpublished report. Arlington: Center for Public service Communications.
- Shih, Y. & Huang, S. (2009). The actual usage of ERP systems: an extended technology acceptance perspective. *Journal of Research and Practice in Information Technology*, 41(3), 263-276.
- Smith, H., Bukirwa, H., Mukasa, O., Snell, P., Akeh-Nsoh, S., Mbuyita, S., Honorati, M., Orji, B. & Garner, P. (2007). Access to electronic health knowledge in five countries in Africa: a descriptive study. *BMC Health Services Research*, 7, 72. DOI: 10.1186/1472-6963-7-72.
- Talukder, M. (2012). Factors affecting the adoption of technological innovation by individual employees: Australian study. *Procedia: Social and Behavioural Sciences* 40, 52-57.
- Tella, A. (2012). System-related factors that predict students' satisfaction with the blackboard learning system at the University of Botswana. *African Journal of Library, Archival and Information Science*, 22(1), 41-52.
- Unsal, F. and Movassaghi, H. (2008). An analysis of key factors in the adoption and use of web-based technologies by small and medium-sized companies around the world. *Paper presented at the 18th Conference of the International Trade and Finance Association, Meeting at Universidad Nova de Lisbon, Portugal, May 23, 2008.*
- Zabukovsek, S.S. & Bobek, S. (2013). TAM-based external factors related to ERP solutions acceptance in organisations. *International Journal of Information System and Project Management*, 1(4), 25-38.