

Impact analysis of e-Databases' job relevance, output quality and result demonstrability on faculty research motivation

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Abstract

Purpose – The purpose of the study is to ascertain whether or not faculty members would be motivated to use e-Databases for research considering the impact of the Technology Acceptance Model2 (TAM2) cognitive instrumental processes of job relevance, output quality and result demonstrability.

Design/methodology/approach – The survey research design was applied. The selection of samples was based on a multistage sampling technique involving purposive, simple/systematic random and total enumeration procedures. Five colleges and departments each were selected from the three universities that provided the setting for the conduct of this study, out of which a sample of 135 was drawn from the total population of 209. The questionnaire method was used for data gathering. Ninety-five percent return rate of the administered instrument was observed. Descriptive and inferential statistical tools were employed for data analyses.

Findings – Job relevance, output quality and result demonstrability are motivators of faculty use of e-Databases for research with result demonstrability wielding the strongest influence. Use of e-Databases for research is based on the usefulness level perceived of them. Faculty are highly predisposed to using the technology for research with the chances of getting published in reputable journal outlets ranked highest among other factors that influence faculty use of e-Databases.

Originality/value – The conceptualization of TAM2 cognitive instrumental processes as system characteristics and motivators of e-Databases use among faculty towards research engagement advances the understanding of intention to use e-Databases for research.

Keywords e-Databases, Job relevance, Output quality, Result demonstrability, Research motivation, Cognitive instrumental processes

Paper type Research paper



1. Introduction

Research is a scientific method of inquiry for understanding the present and making future projections in order to: (1) increase knowledge and minimize ignorance (2) address the different challenges confronting mankind in terms of economy, security, healthcare, education, etc. and (3) make the best out of what is available for the benefit of the society. The application of the knowledge derivable from the process has a ripple effect on knowledge generation and use of the same for improving lives from different standpoints. From the science point of view, research is any scientific and systematic inquiry designed to verify and or improve existing knowledge and unearth new ones in the process for the benefit of humanity (Naidoo, 2011). The outcome of scientific inquiries has immensely advanced human lives through technology, which in turn, has impacted research in no small way. The emergence of technology, its exponential proliferation, universal acceptability and ubiquitous application have occasioned several paradigm swings in all fields of human endeavors. Besides the subject-application of technology, its prospects on research are phenomenal. For example, cross-disciplinary and international research collaborations are relatively easier today than it was some recent decades ago. Also, research outputs are now available and accessible, almost at the speed of light upon discovery or publication. Getting published in reputable scholarly outlets as well as gaining wider visibility through citations have all been simplified.

Furthermore, all forms of scholarly communications have improved dramatically due to the robustness of the avalanche of information encoded in literature. Besides the born-digital resources, technology has also made it possible to convert print and other conventional information into electronic formats and aggregate them into electronic database (e-Database) packages. e-Database is a collection of data or information structured for rapid search and retrieval with the aid of a computer system (Online Encyclopedia Britannica, 2019). Whereas these databases are broadly classified into *Index/bibliographic databases* (e.g. Scopus, CiteSeerX, WorldCat and Ulrichsweb) and *Full-text databases* (e.g. ScienceDirect, Springer and EBSCOhost), other forms also exist. For example; *Multidisciplinary databases* (e.g. Jstor, ProQuest and Web of Science), *Subject-based databases* (e.g. IEEE, Library and Information Science Source, Business Source Complete, AGORA and PubMed/Medline), *Meta-databases* (e.g. ConsensusPathDB, Entrez and Neuroscience Information Framework), *Statistics/numeric databases* (e.g. Bureau of Labor Statistics, American Factfinder – US Census Bureau and Balance of Payments Statistics – IMF eLibrary), *Image/video databases* (e.g. Pickup Image, 3D online action dataset and Audio-Visual Event (AVE) dataset), *Subscription databases* (e.g. IEEE, Emerald and ScienceDirect), *Free/Low cost databases* (e.g. ScienceOpen, CORE, Eric, Jstor, HINARI and PLOS), etc. (Scribendi, 2019; Fisher, 2019; University of California, 2019; Research Guide, 2019; USC Libraries, 2019). The aforementioned groupings notwithstanding, many databases overlap in classification. For example, ScienceDirect, ProQuest, EBSCOhost are multidisciplinary, full-text, and subscription databases). Similarly, Library and Information Science Source, AGORA and PubMed are also fulltext, subscription, but subject-based databases.

The emphasis on research, as well as its impact on scholarship, has put subscription to relevant e-Databases on the priority list of many research-minded institutions. Universities and research-based organizations spend substantially to provide access to quality e-journals, e-books, and other electronic information resources through subscription to relevant indexed/ bibliographic and or full-text e-Databases. The quantity and quality of scholarly publications faculty and research scholars produce from these sources are vital parameters for promotion in academia and, by extension, the ranking of world universities (Times Higher Education, 2016).

1.1 Theoretical background, constructs justification and definition

According to the Technology Acceptance Model 2 (TAM2), social influence and cognitive instrumental processes were proposed to advance the determinants of perceived usefulness (PU) in the earlier version of the model (TAM). Whereas the social influence process focuses on ascertaining PU through subjective norm and image, the cognitive instrumental process, on the other hand, attempts to determine PU considering job relevance, output quality, result demonstrability, and perceived ease of use. These factors were theorized in TAM2 as components of the cognitive instrumental construct and defined as individual mental judgment of technology usefulness (Venkatesh and Davis, 2000). Based on this understanding, this study considers the cognitive instrumental factors as system characteristics of e-Databases. As a result, the focus of the current research is to ascertain the motivating potentials of these system characteristics of e-Databases, otherwise known as salient technology characteristics (Daniel, 2011). These factors have been reported as information technology characteristics that positively expedite work procedures and results (Venkatesh and Bala, 2008).

Perceived ease of use will not be considered in this study among the cognitive instrumental constructs because it has featured in all versions of the Technology Acceptance Models (i.e., TAM, TAM2 and TAM3), respectively. Furthermore, the construct has been thoroughly examined in literature as a predictor of PU and behavioral intention to use technology from the inception of TAM (Hansen *et al.*, 2018). Additionally, other theoretical frameworks have also captured the construct as effort expectancy (EE) in the Unified Theory of Acceptance and Use of Technology (UTAUT) as well as complexity in Diffusion of Innovation (DoT) (Izuagbe *et al.*, 2019). In contrast, there is no known model/theory where job relevance, output quality, and result demonstrability were captured as hypothesized in TAM2, suggesting that they have not received much attention in the literature as perceived ease of use does. Accordingly, the determination of the extent to which the sub-constructs, operationalized in this study as system characteristics built into e-Databases stimulate research, justifies TAM2 as the theoretical foundation on which the study rests.

Several studies on databases have employed the Technology Acceptance Model (TAM) as a theoretical basis. Some examples include; “Graduate students’ acceptance of Google Scholar” (Cothran, 2011); “Factors influencing students’ use of Google Scholar” (Shen, 2012) and “Understanding students’ behavioral intention to use EBSCO” (Vaghela and Thaker, 2016). Whereas the focus of these studies differs significantly from the current study, that of Kim (2005) is partly related. The author examined factors affecting user acceptance of Web-based subscription databases by extending TAM2 to include constructs such as user training, accessibility, and technology clarity in addition to TAM2’s subjective norm, perceived ease of use, job relevance, output quality, and result demonstrability. Despite the similarity, several differences separate that of Kim’s from the current study. For example, Kim’s sought to unearth factors militating against user acceptance of Web-based subscription databases because of the observed underutilization of the databases. The study was based on testing an integrated model to advance knowledge of the predictors of online subscription databases acceptance among undergraduates. In contrast, the current study is an attempt to validate TAM2 using selected cognitive instrumental variables rather than expanding the model as Kim’s does. Similarly, while the former focuses on undergraduates, the emphasis of the current study is on faculty. Most importantly, theorizing e-Databases’ job relevance (usability for research), output quality (flexibility of output) and result demonstrability (tangibility of outcome) as the technology’s system characteristics and how they stimulate research engagement set the current study apart. Thus, it is assumed that analyzing the impact of these concepts on e-Databases’ use would advance empirical understanding of what motivates faculty towards research engagement.

1.2 Problem statement

Motivation and its determinants are subject of debate within and outside the academia due to the slippery nature of the terms. In other words, what motivates an individual in given circumstances demotivates another given same conditions. While it is evident from the literature that considerable effort has been made to advance understanding of the concept from divergent perspectives, some domains remain unexplored. For example, there is no consensus on what motivates research engagement among individuals due to the biased and highly prejudiced nature of the concept. Similarly, it is unclear from information system acceptance literature whether or not the system characteristics built into e-Databases would stimulate deep research interest and the willingness to share acquired knowledge through scholarly communication. To gain insight into this phenomenon with a view to bridging the inherent gap, the study intends to examine the extent to which TAM2 cognitive instrumental factors of job relevance, output quality, and result demonstrability would encourage the use of e-Databases for research among faculty in universities in Southwest Nigeria.

The general objective of the study is to examine the motivating influence that TAM2 cognitive instrumental processes of job relevance, output quality, and results demonstrability offers in the determination of e-Databases use for research among faculty. Specifically, the study intends to determine whether or not job relevance, output quality, and result demonstrability are factors of faculty research motivation, test their independent and joint effects on faculty research motivation, and draw inferences.

1.3 Delineation of faculty

According to the [National Universities Commission's \(2007\)](#) requirements for the appointment and promotion of academic personnel in the Nigerian University system, a Graduate Assistant (GA) must possess a good Bachelor's Degree with a minimum of 2.1 (i.e., 2nd Class Upper Division) from a recognized university. Whereas this is the entry-level requirement for the would-be academic staff who wants to pursue a career in the academic domain, a Master's Degree (in addition to the aforementioned) represents the basic requirement for undergraduates teaching positions as Assistant Lecturer (AS) in Nigerian universities. The [Grand Valley State University \(2017\)](#) lent credence to the Nigerian scenario when it states that for an individual to be qualified for faculty positions, he/she must hold a Master's Degree or higher degree in a discipline or subfield. From the foregoing, a faculty is defined within the context of this study as an academic staff who possesses a minimum of a Master's Degree in a relevant field, engaged by a recognized university with the responsibility of teaching and doing research.

Faculty members are facilitators of undergraduates and postgraduates learning and research experiences. Thus, their primary responsibilities are teaching and research ([Marsh and Hattie, 2002](#)). The [East Tennessee State University \(2017\)](#) defined a faculty as "regular or full-time personnel at institutions whose assignments include instruction, research, and/or public service as a principal activity, and who hold academic rank as professor, associate professor, assistant professor or instructor, senior instructor, or master instructor, and as senior vocational teacher, intermediate vocational teacher, and vocational teacher." Whereas it was argued that these functions had become the primary focus of faculty members in academic institutions, [Kezar and Maxey \(2015\)](#) are of the view that "between the 1890 and 1940s, faculty shifted their attention from student-focused endeavors to research." Whatever the narrative, this group of individuals are essential drivers of both research and scholarship in the higher education circle. It is, therefore, assumed that faculty members would be self-motivated to positively impact learning, address classroom, and societal problems through research.

2. Literature review and hypotheses formulation

Job relevance is based on users' subjective mental assessment of the usefulness of a system relative to important job-related tasks. The concept is reported as a critical factor for identifying the match between tasks to be performed and an appropriate system that could get the job done satisfactorily (Snicker, 2013). Therefore, if users can identify work efficiency potential with a given system, they are likely to consider it relevant in the execution of the identified tasks (Wu *et al.*, 2011). Consequently, the extent to which faculty will use e-Databases could be a function of the degree to which they perceive the technology will improve their research productivity and output.

Whereas job relevance denotes usefulness, output quality is concerned with how well the system performs the job. Ducey (2013) elaborated on this difference by showing that when two systems are equally relevant to a specific task, the quality with which outputs are produced by the systems will help users settle for the one that addresses work-related tasks more appropriately. Thus, the author defined output quality as users' perceptions of how well a system performs the tasks it was designed to accomplish. As valid as this argument seems, it may not apply in all socio-cultural contexts, especially when users are interested in other factors outside quality. e-Databases are structured differently with certain aims in mind. Whereas Scival, Scopus, WorldCat, etc., are bibliometric databases for monitoring and measuring the research performance of individuals and institutions, ScienceDirect, ProQuest, and a host of others are full-text databases that allow researchers to browse, download, print, and share complete text for research purposes. Again, how well the different databases meet the research requirements of faculty will determine their intention to use them.

Tan (2019) defined result demonstrability as the tangibility of results that a system offers. As the name suggests, users will form usage intention about a system if it potentially demonstrates work-related gains that are readily identifiable and communicable with less or without any difficulty. Once these can be ascertained, whether or not the process of obtaining the result is complex, users are likely to form a positive attitude about the system. This is an indication that even if a database is difficult to use, provided the information it offers is concrete enough to support quality research; usage intention would be formed. According to Venkatesh and Davis (2000), an easy to use system (efficient in this case) may still be rejected if users find it challenging connecting to the gains it offers. Thus, Ducey (2013) defined result demonstrability as how easily users can directly perceive performance increase from the use of the system. These positions may not be unconnected to why a correlation has been found between perceived ease of use and result demonstrability (Tan, 2019).

From the foregoing, it is evident that all the three cognitive instrumental determinants (i.e., job relevance, output quality, and result demonstrability) are majorly based on the user's subjective mental assessment necessary for forming usage intention from different standpoints. This claim is predicated on the belief that users possess unique knowledge of what their job description entails. This knowledge, in turn, empowers them to do an excellent mental assessment of the job situation in order to identify whether or not a given system can get the job done more efficiently. These constructs have been used extensively from different contexts with inconsistent outcomes despite belonging to the same theoretical framework. For example, it has been established that there is a relationship between job relevance and output quality (Tan, 2019). In another study, incompatibility of output quality and result demonstrability was observed with respect to IT Learning (Gronland, 2010). Still, all the cognitive instrumental constructs were also reported to significantly predict e-learning system acceptance except result demonstrability (Al-Gahtani, 2016). In sharp contrast to this result, only job relevance was found to wield direct and significant effect of intention to adopt camera mobile phone among the four cognitive instrumental determinants (Rouibah *et al.*, 2011). Guided by these inconsistencies, it is not certain if job relevance, output quality and

result demonstrability will significantly motivate faculty to use e-Databases for research engagement. Thus, the study hypothesizes that:

- H1. Job relevance, output quality and result demonstrability will not significantly motivate faculty use of e-Databases for research.
- H2. Job relevance, output quality and result demonstrability will not jointly expedite faculty use of e-Databases for research

Whereas H1 seeks to identify whether or not there is a correlation between the independent variables and the dependent variable, H2 captures the composite effect of the three independent variables on the dependent variable. The determination of the relative contributions and faculty level of predisposition to use e-Databases for research necessitated the formulation of RQ1 and RQ2.

RQ1. What is the relative contribution of job relevance, output quality and result demonstrability toward faculty use of e-Databases for research?

RQ2. What is the level of faculty predisposition to use e-Databases for research?

3. Methodology

3.1 Procedure and population

The survey research design was adopted for the study. The quest to ascertain factors motivating faculty usage behavior of e-Databases for research necessitated the choice of the research design. Multistage sampling procedure was further utilized to select sample for the study. Public and private universities in Ogun and Osun states of the Southwest geopolitical zone of Nigeria were *purposively* selected to provide the research setting for the conduct of the study due to the following factors: (1) the region pride some of the best, oldest and highest spread of universities in the country (Okoro *et al.*, 2014; Agboola, 2010), (2) it is ranked top in terms of literacy level in the country (Statitica, 2020; National Universities Commission, 2007), (3) according to the 2021 Times Higher Education world university rankings, five out of the six universities ranked in Nigeria during the period under consideration are from the Southwest region with the universities occupying the first four positions in the ranking (Times Higher Education, 2020). This is an indication that faculty members attached to universities in the region may be more exposed to using research-support tools like e-Databases for doing research than their counterparts in other regions.

Three universities (i.e., one public – Federal University of Agriculture Abeokuta; and two private – Babcock University, Ilishan-Remo and Bowen University, Iwo), respectively were randomly selected using the *ballot system of the simple random sampling procedure*. While the quest to spread the study across publicly and privately-funded universities necessitated the choice of university types, reducing the population to manageable scope due to the busy schedule of faculty members who hardly have time to respond to surveys (as personal field experiences have shown) informs the choice of three universities. It should be noted that the population density of faculty members in public universities generally outstrips those of their private counterparts in Nigeria despite the overwhelming number of private universities in the country. The same sampling procedure was further applied to select fifteen colleges and departments (i.e., five each of colleges and departments) from the three universities sampled, which produced a population size of 209 (Table 2). According to Krejcie and Morgan's (1970) Table for ascertaining sample size, a population size of 210 requires a sample size of 136. Since the population of the current study stood at 209, it, therefore, suggests that 135 would be representative. To determine the actual number of faculty that will provide the data from each department, the sample size of 135 was divided by the number of departments (15)

LHT 40,5 selected. Accordingly, nine faculty members each were drawn from the 15 departments (Table 2), after which *total enumeration* was employed to take a complete count of the sample

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Table 1.
Constructs definition

Construct	Description	Source
Job relevance	Individuals' subjective view of the extent to which a system is believed to support one's job	Venkatesh and Davis (2000)
Output quality	Individuals' perception of how well the system performs tasks and ensures the outputs are error-free	Snicker (2013)
Result demonstrability	The extent to which an individual perceives that the system outputs are convincing and tangible relative to specific tasks	Faqih and Jaradat (2015)
Research motivators	Factors and or conditions that stimulate the conduct of scientific and scholarly inquiry	Authors
e-Databases	Any internet-based collection of electronic resources aggregated into packages and accessible through various business models	Authors

S/N	University	School/College	Department	Population/ Sample
1	Federal University of Agriculture Abeokuta	Environmental Resources Management	Environmental Management and Toxicology	21-9
		Engineering	Electrical and Electronic Engineering	15-9
		Veterinary Medicine	Veterinary Anatomy	10-9
		Food Science and Human Ecology	Nutrition and Dietetics	12-9
		Agricultural Management and Rural Development	Agricultural Economics and Farm Management	18-9
Sub Total		5 out of 10	5 out of 46	76-45
2	Babcock University	Management Sciences	Business Administration and Marketing	13-9
		Science and Technology	Microbiology	12-9
		Education and Humanities	Education	11-9
		Medicine	Medicine and Surgery	30-9
		Law and Security Studies	Jurisprudence and Private Law	13-9
Sub Total		5 out of 9	5 out of 33	79-45
3	Bowen University	Law	Public and International Law	10-9
		Computing and Communication Studies	Computer Science	10-9
		Social and Management Sciences	Banking and Finance	11-9
		Health Sciences	Medical Laboratory Science	11-9
		Agriculture, Engineering and Science	Pure and Applied Biology	12-9
Sub Total		5 out of 7	5 out of 38	54-9
Grand Total				209-135

Table 2.
Distribution of the population of the study

Source(s): Field survey and university websites; <http://library.unaab.edu.ng/>; <https://www.babcock.edu.ng/assets/docs/programs.pdf> and <https://bowen.edu.ng/colleges/>

A preliminary study reveals that Nimbe Adedipe Library of the Federal University of Agriculture Abeokuta (FUNAAB) subscribes to the following e-Databases; AGORA, HINARI, OARE, EBSCOhost and TEEAL in addition to 25 Open Source Journals. Also, Laz Otti Library of Babcock University subscribes to EBSCOhost, AGORA, AJOL, DOAJ, HINARI, LEXISNEXIS, HeinOnline, Medline Complete and Nigerian Virtual Library. Lastly, the Timothy Olagbemiro Library of Bowen University subscribes to AGORA, HINARI, Springer, ProQuest, AJOL, GAOLI, Indian Kanoon, BAILII and Medline. It was gathered that the teaching and research focus of these universities inform the choice of these databases. However, the economic downturn and the dwindling library budget may also play a significant role in the quality and quantity of subscribed databases per time. Having obtained information on the list of databases each university subscribed to from the universities' websites (as provided), phone contacts were also made to relevant offices for verification.

3.2 Instrument

The questionnaire method was adopted for data gathering. Facts and objectivity of responses required inform the choice of this method. The scale developed to advance understanding of the determinants of perceived usefulness (Venkatesh and Davis, 2000) by incorporating two theoretical constructs of social influence and cognitive instrumental processes into TAM to have TAM2 so as to expand the explanatory power of the model was modified to suit the current study. The scale was adapted because it captured all proposed cognitive instrumental sub-constructs of job relevance, output quality, and result demonstrability with which to examine e-Databases. It was a seven-point Likert scale of agreement, ranging from Strongly Disagree (1) to Strongly Agree (7). The two items that measured job relevance in the scale are; "In my job, usage of the system is important" and "In my job, usage of the system is relevant." Also, "The quality of the output I get from the system is high" and "I have no problem with the quality of the system's output" measured output quality. Lastly, the following two items are among the four that measured result demonstrability, "I have no difficulty telling others about the results of using the system" and "I believe I could communicate to others the consequences of using the system." The Cronbach alpha of these sub-constructs ranged from; 0.80 to 0.95 for job relevance, 0.82 to 0.98 for output quality, and 0.80 to 0.97 for result demonstrability, respectively, since it was a longitudinal study.

Whereas some of these items were modified in the adapted scale, others were self-generated to accommodate areas not captured in TAM2. The revised version of the scale with which data were collect was grouped into the following five sections after being pretested to determine the internal consistency of the scale. Using the Cronbach's alpha, the scale exhibited high psychometric property with the following α values (i.e., A = Respondents demographic information; B = Job relevance of e-Databases (0.79); C = Output quality of e-Databases (0.84); D = Result demonstrability of e-Databases (0.88) and E = faculty predisposition to use e-Databases (0.93) and measured on a four-point scoring Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) as well as Very Predisposed (VP), Predisposed (P), Slightly Predisposed (SP) and Not Predisposed (NP). Out of the 135 copies of the questionnaire administered on the respondents, 129 copies, representing a 95 percent return rate was recorded – exceeding the 60 percent recommendation for analysis (Nulty, 2008). Data were personally administered and retrieved within the space of four months with the help of carefully identified research assistants from each university who assisted in the retrieval and collation processes. The busy nature of faculty members informs the ample time allowed for the collection of the instrument to ensure adequacy and objectivity responses.

3.3 Data analysis

Descriptive statistical tools like frequency, simple percentage, mean, standard deviation, charts and interval distribution table were employed to analyze RQ2 (Table 8). These tools were adopted because they allow for a simple presentation and analysis of a given dataset in order to extract relevant information and draw valid conclusions. Similarly, inferential statistical tools like Person Product Moment Correlation Coefficient (PPMCC) and multiple regression analyses were utilized to test and ascertain the direction and strength of the hypothesized relationships, make some comparisons, and draw inferences. Through PPMCC, for example, it will be established whether or not there are correlations among job relevance, output quality and result demonstrability, as motivators of e-Databases use for research among faculty. Similarly, the determination of the relative and joint effects of the independent constructs toward the independent variable necessitated the use of (multiple) regression analyses (see Table 3)

Where:

1.00 → 6.67 = *Low Predisposition*

6.67 → 13.34 = *Moderate Predisposition*

13.35 → 20.00 = *High Predisposition*

4. Data analysis and interpretation of results

4.1 Respondents' bio-data

Table 4 cross-tabulate the gender and educational qualification distribution of the respondents. From the analysis, male faculty are in the majority 73 (56.6%) against their female counterpart 56 (43.4%). While this result suggests a near-equal gender distribution of respondents in the studied institutions, the 129 male and female faculty all had master degrees – the threshold with which a faculty member was delineated in this study. Also, 75 (58.1%) of the respondents are PhD holders. In between these extremes are 54 faculty members currently on their doctoral programs.

Figure 2 analysis indicates that respondents with work experience age bracket of 6–10 years (41.1%) are in the majority. This is closely followed by those in the bracket of 11–15 years (31.0%). However, respondents with a work experience range of 21 years and above (3.9%) who have the highest work experience ranked least in the distribution. By implication, faculty members with work experience of 6–15 years who are in the overwhelming majority still have quite some years to put into the job than those having 16 years and above work experience.

Table 3.

Computation of interval distribution for measuring faculty level of predisposition to e-Databases use for research

Maximum Score	5 items x 4-point scale	=	20
Interval Score	20 ÷ 3 (levels of impact)	=	6.67
Average Mean	VP(4) + P(3) + SP(2) + NP(1) = 10 ÷ 4	=	2.50

Note(s): *VP = Very Predisposed; P = Predisposed; SP = Slightly Predisposed; NP = Not Predisposed

Table 4.

Cross-tabulation for gender and educational qualification

Gender	Educational qualification		
	Master degree	PhD in view	PhD
Male	73	33	40
Female	56	21	35
Total	129	54	75

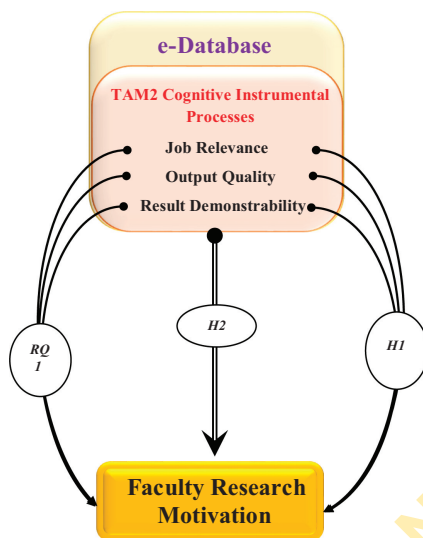


Figure 1. Hypothesized relationships

4.2 Testing of hypotheses

H1: Job relevance, output quality and result demonstrability will not significantly motivate faculty use of e-Databases for research. Table 5 tries to ascertain whether or not job relevance, output quality and result demonstrability will significantly motivate the use of e-Databases for research among faculty. From observation, the relationship yielded the following results; output quality ($r = -0.208^*$; $p = 0.018$); job relevance ($r = 0.184^*$; $p = 0.037$) and result demonstrability ($r = 0.205^*$; $p = 0.020$) respectively with $p < 0.05$ in all. The implication of this result vis-à-vis the hypothesized relationship is two-fold; (1) there is a correlation between the independent variables (i.e., output quality, job relevance and, result demonstrability) and the dependent variable (i.e., faculty research motivation); and (2) the correlation is significant in all cases. Since the p -values of the correlation tested are less than 0.05, all independent variables are strong motivators of faculty involvement in research using e-Databases. Therefore, the null hypothesis stating that “Job relevance, output quality and, result demonstrability are not motivators of faculty use of e-Databases for research” was not supported.

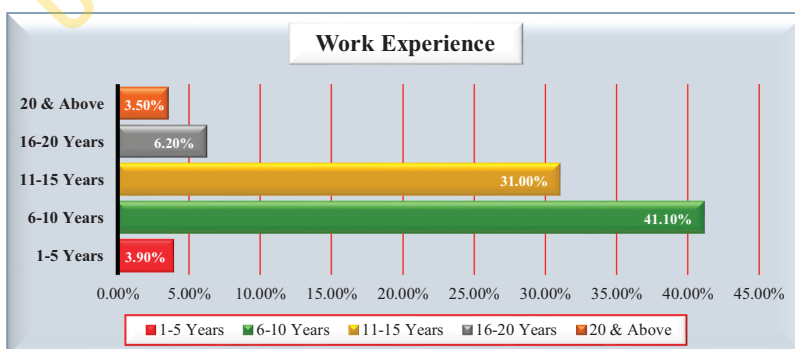


Figure 2. Distribution of work experience of respondents

Table 5.

Correlation matrix showing the relationship between output quality, job relevance, result demonstrability, and faculty research motivation

		Output quality	Job relevance	Result demonstrability	Faculty research motivation
Output Quality	Pearson Correlation	1	0.023	0.139	-0.208*
	Sig. (2-tailed)		0.796	0.116	0.018
	N	129	129	129	129
Job Relevance	Pearson Correlation	0.023	1	0.078	0.184*
	Sig. (2-tailed)	0.796		0.382	0.037
	N	129	129	129	129
Result Demonstrability	Pearson Correlation	0.139	0.078	1	0.205*
	Sig. (2-tailed)	0.116	0.382		0.020
	N	129	129	129	129
Faculty Research Motivation	Pearson Correlation	-0.208*	0.184*	0.205*	1
	Sig. (2-tailed)	0.018	0.037	0.020	
	N	129	129	129	129

Note(s): * Correlation is significant at 0.05 level (2-tailed)

H2: Job relevance, output quality and result demonstrability will not jointly expedite faculty use of e-Databases for research. Table 6 shows, among other things, the percentage of variance to which the independent variables explain the dependent variable. Accordingly, the coefficient of multiple correlations revealed $R = 0.358$ and R Squared = 0.128, suggesting that 12.8 percent of the variance of the dependent variable (i.e., faculty research motivation) is explained by the three independent variables of job relevance, output quality, and result demonstrability. The joint contribution of the independent variables vis-à-vis the prediction of the dependent variable was tested at $p < 0.05$. With an observed F -score of 6.137, where $p < 0.01$, explaining the variance for the regression analysis indicates that the joint contribution of the independent variables on the dependent variable is statistically significant. This suggests that there is a significant composite effect of job relevance, output quality, and result demonstrability on faculty research motivation. Therefore, the hypothesized relationship that “job relevance, output quality, and result demonstrability will not jointly expedite faculty use of e-Databases for research” was not supported.

RQ1: What is the relative contribution of job relevance, output quality, and result demonstrability towards motivating faculty use of e-Databases for research? Table 7 reveals the following relative scores; job relevance ($\beta = 0.172$; $t = 2.050$; $p < 0.05$); output quality

Model	R	R square	Adjusted R square	Std. Error of the estimate
1	0.358 ^a	0.128	0.107	0.907

Table 6.

Summary of regression showing the joint contribution of output quality, job relevance, result demonstrability, and faculty research motivation

Model	Sum of squares	ANOVA ^a			Sig
		Df	Mean square	F	
Regression	15.140	3	5.047	6.137	0.001 ^b
Residual	103.783	126	0.822		
Total	118.923	129			

Note(s): ^aDependent Variable: Faculty Research Motivation; ^bPredictors: (Constant), Job Relevance, Output Quality, Result demonstrability

($\beta = -0.243$; $t = -2.666$; $p < 0.05$) and result demonstrability ($\beta = 0.225$; $t = 2.886$; $p < 0.05$). Judging by these values, the relative contribution of independent variables towards faculty motivating to use e-Databases for research is high with result demonstrability wielding the strongest positive influence and followed by job relevance in terms of the direction of strength. In between these extremes is output quality, which exercised the second overall effect on the dependent variable but did so inversely. The unstandardized coefficient values of job relevance and result demonstrability show that for every increase in the variables' index, a B-value of 0.254 and 0.307 change respectively would result. For output quality, however, an increase in the variable index would mean a B-value of -0.294 decrease on the dependent variable. This result sufficiently satisfies RQ1 seeking to determine the relative contribution of the independent variables vis-à-vis the dependent variable.

RQ2: *What is the level of faculty predisposition to use e-Databases for research?* Table 8 presents an analysis of faculty predisposition to use e-Databases for research.

Accordingly, the possibility of getting published in reputable journals ranked highest with a mean score of 3.41. This is closely followed by the ease of doing research (Mean: 3.40). Next is flexibility and dynamism of e-Databases use relative to research (Mean: 3.02). Ranked least in the distribution is the speed with which research can be accomplished that e-Databases offer (Mean: 2.49). Since the observed average mean of 2.98 surpassed the estimated mean score of 2.50, it implies that faculty members are optimistic and positive about the research benefits of the technology.

Table 9 tries to determine the level to which faculty perceived e-Databases use to support research. From observation, the overall mean score (14.88), as obtained from Table 8 analysis, falls in the third and last interval distribution (13.35–20.00), which denotes a high impact level. This result undoubtedly indicates that faculty have a high tendency to use e-Databases for research. This result provides the answer for research question four—seeking to ascertain the level of faculty predisposition to use e-Databases for research.

5. Discussion

The results of this study offer valuable insights into faculty use of e-Databases for research within the Nigerian University environment considering job relevance, output quality, and result demonstrability of the cognitive instrumental processes of TAM2. The findings that emanated from the study are discussed as follows:

The research objective seeking to establish whether or not job relevance, output quality and result demonstrability are factors of faculty research motivation was found in the affirmative. In other words, the hypothesized relationship was not statistically supported, and so, the null hypothesis was rejected. Therefore, job relevance, output quality and result demonstrability, as well as faculty research motivation, are significantly and positively correlated, showing that the dependent variables are motivators of faculty use of e-Databases for research. This outcome corroborates the position of Izuagbe and Popoola (2017), who

Model	Unstandardized coefficients		Standardized coefficients		Sig
	B	Std. Error	Beta	t	
1					
(Constant)	1.612	0.613		2.630	0.010
Job relevance	0.254	0.124	0.172	2.050	0.042
Output quality	-0.294	0.102	-0.225	-2.666	0.009
Result demonstrability	0.307	0.115	0.243	2.886	0.005

Note(s): ^aDependent Variable: Faculty Research Motivation

Table 7. Multiple regression model for the relative contribution of output quality, job relevance, and result demonstrability on faculty research motivation

Table 8.
Mean and standard deviation scores for faculty predisposition to use e-Databases on research

S/N	To what extent would you agree with the following statements on faculty predisposition to use e-Databases for research?	Very predisposed		Predisposed		Slightly predisposed		Not predisposed		Mean	SD
		N	%	N	%	N	%	N	%		
1.	Ease of doing research	61	47.3	60	46.5	8	6.2	-	-	3.40	0.607
2.	Speed of research accomplishment	23	17.8	43	33.3	37	28.7	26	20.2	2.49	1.009
3.	Chances of getting published in reputable journals	66	51.2	52	40.3	9	7.0	2	1.6	3.41	0.692
4.	Flexibility and dynamism of scholarly communication engagement	33	25.6	74	57.4	13	10.1	9	7.0	3.02	0.800
5.	Growth and development in research	23	17.8	45	34.9	41	31.8	20	15.5	2.55	0.960

Note(s): *N = Frequency; SD = Standard Deviation

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reported that the features built into electronic information resources make use of the resources effective, thereby enhancing the job performance and productivity of the users. With specific reference to job relevance, the authors noted further that the extent to which job relevance predicts perceived usefulness of e-Resources is proportionate to the degree of research relevance perceived. For output quality, important system characteristics like ease of use, system reliability, and flexibility stimulate the use of technological innovations (Petter *et al.*, 2008). Lastly, result demonstrability encourages the use of technology if adopters perceived the benefits and utility of the system to be clear and able to satisfactorily satisfy set goals (Plouffe *et al.*, 2001).

Having established that job relevance, output quality, and result demonstrability are essential motivators of faculty research motivation through a test of correlation, it was also necessary to determine the joint effect of the independent variables on the dependent's. Accordingly, it was found that job relevance, output quality, and result demonstrability explained 12.8 percent of the variance of faculty research motivation. While this value appears somewhat low for making positive and definitive conclusions, low R-squared values obtained in the with statistically significant predictors in the behavioral sciences are taken as good models (Frost, 2020) due to the difficulty involved in determining behavior in the social sciences in comparison to physical processes in the natural sciences, where 50 percent R-squared is required (Hayes, 2019). The strength of this result is predicated on the *p*-value of 0.001, which represents a near-perfect significance – implying that the probability of obtaining this result by chance is less than 1 percent.

The composite effect of the independent variables on the dependent's is usually complimentary. In other words, a faculty may use e-Database for research purposes whether or not all the three variables are statistically significant because the strength of one or two variable(s) could make an individual ignore the weakness of the other(s). This claim had earlier resonated (Venkatesh and Bala, 2008) when it was found that output quality and job relevance are significantly correlated towards determining perceived usefulness, where an increase in the effect of the former make that of the latter stronger. But when all variables are statistically significant (useful, flexible and concrete), faculty members may be more inclined to regard them as essential motivators of e-Databases use for research. A similar position had earlier been reported from the e-Learning and social media contexts where the extent to which the platforms are perceived to be useful determines individuals' intention to use them (Elkaseh *et al.*, 2016). Furthermore, Izuagbe and Popoola (2017) also shared the same view on the extent of relevance determining the actual use of technology in the academic environment.

The composite effect of job relevance, output quality, and result demonstrability towards the determination of faculty use of e-Databases for research has been established. However, it is also statistically essential to ascertain the relative contribution of each construct to justify how their composite effect was adjudged significant (H2). With regards to the RQ1 seeking to establish the extent to which result job relevance, output quality and result demonstrability independently motivate faculty use of e-Databases for research, result demonstrability (i.e., the tangibility of outcome) emerged the strongest motivator. This outcome proved that faculty place more emphasis on the tangibility of results a technology offers than mere relevance and flexibility of output (i.e., output quality). Whereas this position is congruent with Venkatesh and Davis's (2000) submission that an efficient system is one that guarantees

Interval	Overall mean score	Predisposition level
1.00–6.67		Low
6.68–13.34		Moderate
13.35–20.00	14.88	High

Table 9.
Interval distribution
table for faculty
predisposition to use
e-Databases

users' desired results whether or not ways of deriving them prove unclear, it disagrees with those of (Faqih and Jaradat, 2015; Al-Gahtani, 2016) who found that all cognitive instrumental factors of TAM2 are constant significant predictors of perceived usefulness except result demonstrability.

To ascertain faculty predisposition to use e-Databases for research having established all hypothesized relationships concerning e-Databases system characteristics of job relevance, output quality, and result demonstrability, RQ2 was analyzed. Finding reveals that faculty are highly predisposed to use e-Databases for research. Prospect of getting published in reputable journals and the ease of doing research which the technology offer predisposes faculty most to using e-Databases than other factors. This result supports that of Ani *et al.* (2015), who reported that faculty members who constantly used e-Resources for research published more in reputable international journals than those who do not use them. Also, the flexibility, dynamism, and ease of use in research engagement that the tools offer was another compelling factor to use the technology for research as faculty indicated. These features of e-Databases lent credence to the views of faculty (who constitute the majority) in a study carried out to determine behavioral intention to use e-Resources. Besides the current level of e-Resources usage, faculty noted that they would continue to use the resources even in the future for research (Lwoga and Sukums, 2018). To sustain this intention among faculty, libraries should take both the intrinsic and extrinsic benefits of e-Databases use into cognizance when selecting them for inclusion in their collection stock to increase patronage. While this is necessary to justify the existence of libraries, it could also strengthen the argument for the release of more funds for library growth and development.

6. Research contributions

Studies on online/electronic databases, digital/electronic resources, and their impact on research are not new in literature; evidence of the existence of rich literature abounds in the following areas: availability and rate of subscription (Larson, 2017; Dadzie, 2005), ease of access and accessibility (Iroaganachi and Izuagbe, 2018b; Das and Maharana, 2013; Brooks, 2010), utilization (Iroaganachi and Izuagbe, 2018a; Oduwale and Sowole, 2006), types (Shaw Academy (2018), historical development (Kopal, 2015; Fortune, 2014) and challenges (Ugwu and Onyegiri, 2013; Hiemcrone *et al.*, 2012). However, this study has advanced the knowledge of databases and their impact on research by theorizing the sub-constructs of TAM2 cognitive instrumental processes of job relevance, output quality, and result demonstrability as e-Databases system characteristics and motivators of research engagement among faculty members. This unique perspective offers some important theoretical contributions. Presenting result demonstrability as the strongest sub-construct among the examined theoretical processes as against the widely reported job relevance (Faqih and Jaradat, 2015), the study debunks a preponderance of information system acceptance research that showed that result demonstrability is the weakest and most insignificant construct among the cognitive instrumental variables (Al-Gahtani, 2016). This shows that the result demonstrability potential that a system offers determines users' perception of the system job-relevance and output quality. Thus, the ability of research-based institutions to identify and adopt research-support systems that promise tangibility and concreteness of results will enhance their image, visibility, scholarly reputation and global prominence through quality and ground-breaking research. This departure from the norm notwithstanding, the study confirms the robustness and wider applicability of TAM2 theoretical underpinnings.

By examining the behavioral intention and use of e-Databases for research among faculty members, this study provides unique insights that transcend the academic environments to enhance the commercial prospects of publishers/vendors/aggregators of electronic resources if the identified factors that predispose faculty to use them are taken into cognizance at the development stage.

7. Research limitation and future directions

Restricting the independent variables with which the dependent variable was examined to three out of the four cognitive instrumental constructs of TAM2 (with the exclusion of perceived ease of use) may limit the applicability and generalizability of the findings. Therefore, the results may not be entirely representative of the cognitive theoretical construct. To fill this gap, perceived ease of use should be examined so as to ascertain the extent of digital proficiency among faculty members in the use of e-Databases as this may shed more empirical understanding into factors determining the use of e-Databases for research among the studied audience. A comparative analysis of the subject should be done considering social influence and cognitive instrumental factors to identify the strongest of TAM2 additional theoretical constructs. Data obtained from three universities and 129 respondents may be insufficient. Efforts should be made to broaden the geographical as well as subject scope for in-depth coverage so as to elicit more generalizable results.

9. Conclusion

The quest to establish what motivates faculty (within the scope delineated) to engage in research using information from e-Databases set the scene for this research. As a result, job relevance, output quality, and result demonstrability have been confirmed as motivators of faculty use of e-Databases for research. Having achieved this broad objective, the uncertainty of whether or not system characteristics employed from information system models/theories would encourage faculty to engage in research is therefore ascertained, and the identified gap filled. Whereas the factors are strong motivators of faculty towards using e-Databases for research (Figure 3), they do not wield an equal level of influence vis-à-vis the determination to use the technology for scholarly and scientific inquiries among faculty. Furthermore, there is a complementary relationship between e-Databases perception and using them. For example, when faculty members are motivated by the technology's system characteristics efficiency, they respond by using the technology. This then becomes a circle of reciprocity, where the extent of motivation perceived determines the use of the system. Through the examined cognitive instrumental sub-constructs of job relevance, output quality, and result demonstrability, this study has further lent credibility to TAM2 explanatory and predictive potential, particularly as it affects individuals' behavioral intention to accept or adopt and use technological innovations.

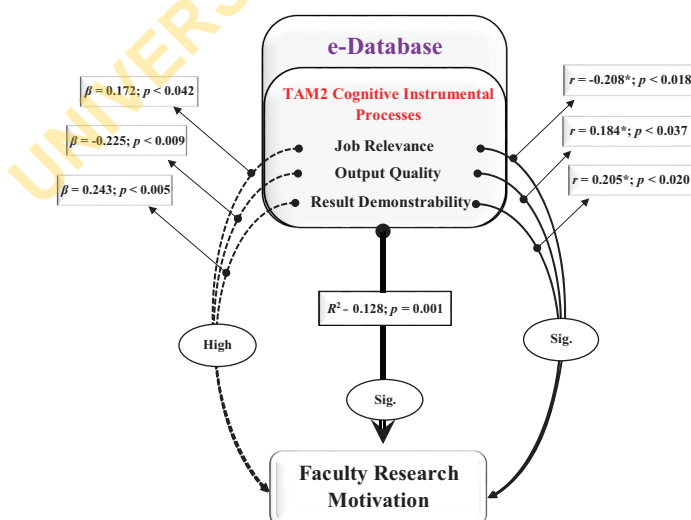


Figure 3.
Path analysis of
relationships tested
through inferential
statistics

Key

- Effect of the independent variables on the dependent variable (Correlation)
- Joint effect of the independent variables on dependent variable (Regression)
- > Relative contribution of independent variables on the dependent variable (Regression)

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