University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)   Libraries at University of Nebraska-Lincoln

Summer 2018

Technology Acceptance Model Limitations and Criticisms: Exploring the Practical Applications and Use in Technology-related Studies, Mixed-method, and Qualitative Researches

Patrick Ajibade
University of KwaZulu-Natal, ajibadep.sa@gmail.com

Technology Acceptance Model Limitations and Criticisms: Exploring the Practical Applications and Use in Technology-related Studies, Mixed-method, and Qualitative Researches

Patrick Ajibade (PhD)

NIHSS Research Scholar
Department of Information Studies
University of KwaZulu Natal, South Africa
Proxsy.sa@gmail.com; ajibadep.sa@gmail.com
https://orcid.org/0000-0002-8608-8378

Abstract

Many researchers have been citing the Technology Acceptance Model (TAM) because of the simplicity of the model without considering actual applications in their studies. This paper presented some of the criticisms and limitations of Technology Acceptance Model (TAM), taking into consideration, the use of the model technology-related studies across various disciplines particularly in social sciences, educations and management researches. The TAM limitations, critiques and criticism were presented based on the literature review, the model suitability and practical application of the model within enterprises and institutional context. The paper used a desktop research approach. The paper objective addressed the limitation and of the TAM model, and presented a modified model for LIS and social sciences research general applications. However, this paper argues that the TAM model was more appropriate for individual use and acceptance of technology rather than in a corporate or institutional application that requires integration of information technology. The paper uses literature as secondary data and insights gathered from attempts to utilize the model for doctoral studies to presents its limitations and impracticality in an institutional environment. However, based on the findings from the field research, a Technology Acceptance and Use Model was proposed which takes into account, the identified limitations and criticism of TAM, companies' rules and regulations regarding how technology is used for different business processes. The core argument is that staff IT proficiency and experiences promote the ease of use of technology, while technology acceptance and intention is moderated by the company's rules, policy, and IT guidelines.

Keywords: Information Technology, Information Systems, Library and Information Science, Millennium, TAM Model, TAM limitation, Theoretical Framework

Introduction and Background to the Problem

This paper attempted to resolve some of the challenges facing both postgraduate students and academic who are conducting research relating to technology adoption, use and integration. It is a common knowledge that most students often cite Technology Alignment Model (TAM) in their studies or paper because of the simple nature of the model (King & He, 2006). However, this paper argues that TAM is not suitable or practically applicable to firms, companies and most organizations such as libraries with rules and regulation, but for an individual use and adoption of technology. Firstly, this paper presented some of the criticism of TAM and limitations based on the literature and the difficulties encountered while trying to apply the theory. Secondly, during the conduct of a PhD research in information science, the model was applied to information

technology adoption and use by the small and medium-sized enterprises to validate the model, and the inadequacies were evident. Thirdly, the study found out that the model has not been particularly designed for the institutional or business context application but may be useful for personal use of technology purpose. However, the modified version of the Technology Acceptance and Use Model introduced in this paper is meant to address the shortcoming of TAM and help researchers that may want to apply the TAM model in a research context, or companies' scenario. For example, part of the criticism of TAM was that it was not designed or modeled for use in evaluating learning in electronic platforms or e-learning systems (Persico, Manca, & Pozzi, 2014). However, some studies have suggested that TAM is not particularly relevant to determine the use of an open-source software use especially in schools in the developing countries (Laugasson, Quaicoe, Jeladze & Jesmin, 2016). The argument by Laugasson et al. may be because, open-source platforms and software are free technology, which does create an incentive for the users because it is free. Hence, the perception regarding the ease of use and level of usefulness does not arise as the technology can be easily replaced with another free and open-source technology. Studies have been exploring the use of TAM to examine how users' perceive the usefulness of technology. It is debatable, but one can argue that the TAM model cannot fully explain the reason behind the acceptance and use of technology in the business environment. Although most literature have used, or try to apply this model on various topics such as cloud computing adoption (Gangwar, Date & Ramaswamy, 2015), learning resources in higher education (Chintalapati & Daruri, 2017), mobile learning adoption (Prieto, Migueláñez, & García-Peñalvo, 2014).

Problem Statement

Several studies have expressed inadequacies of TAM to address the nexus between technology and the actual adoption and use of technology. Findings showed weaknesses of TAM to explain users' behavior (Hai & Alam Kazmi, 2015; Lim, Osman, Salahuddin, Romle, & Abdullah, 2016). It was further argued that the TAM model could not sufficiently predict the acceptance of information communication technology (ICT) while another model was solicited to predict acceptance of technology (Hojjati & Khodakarami, 2016). Sufficient evidence from the literature indicated that TAM was inferred, that the TAM model was not able to provide comprehensive precursors to mobile use, or social influence and conditions that facilitate behavior (Napitupulu, 2017; Torres, & Gerhart, 2017). Further argument indicated that, although many studies have increased the popularity of the TAM model, Chandio et al. indicated that this mode is insufficient to explain users' adoption and use of new technology especially in the context of e-government (Chandio, Burfat, Abro, & Naqvi, 2017). Furthermore, one of the argument and criticism of the TAM model is the notion that the model could explain individual behavior. However, it was reported that the Technology Alignment Model is not robust enough to explain user's behavior about buying, rejecting or accepting to use technology (Hai & Alam Kazmi, 2015). Moreover, a study found that although past studies saw perceived usefulness as an important predictor in TAM model, this was not always true particularly in an online game using technology for entertainment purposes and not a problem-solving technology. Customers only use entertainment technology to relax usually and to 'kill time.' Hence, the effect of the user's perceived usefulness is not affected, but instead, passing the time and relaxing (Hsu & Lu 2004).

Literature Reviews

Debates on Theoretical and Conceptual Framework

It is essential to understand the distinction and differences between theoretical and conceptual framework. Theories represent attempts to interpret the world by observing particular phenomena and endeavoring to determine why they are as they appear to be (Anderson, Curtis, & Wittig, 2014). Acceptance of a theory dictates how researchers perceive and interpret phenomena according to the principles which are propounded by the theory. Theories facilitate analysis and allow predictions and inferences to be made, which are tested by the results which are generated by research studies (Myerson 2013) and provide explanatory frameworks. The theory pertaining to a particular phenomenon could be considered to represent a body of generally accepted knowledge (Thomas, 2007) and a well-formulated explanation or model can describe it scientifically in a manner which enables the theory to be verified (Schafersman 1994). Theoretical frameworks have been defined in a number of different ways by writers and researchers, depending upon how they are constructed and also the ways in which they provide the theoretical foundations of research studies. For D'Amour, Beaulieu, Rodriguez, and Ferrada-Videla (2004), a theoretical framework is a set of connections between different concepts which have been derived from a verifiable body of evidence in a particular body of knowledge. By contrast, Taillefer, Dupuis, Roberge, and LeMay (2003) describe a theoretical framework as a model which details the structure of a study, through the interconnected relationships between the explanations of which theory is comprised.

This limitation was pointed out by Ngulube, Mathipa, and Gumbo (2015), who maintain that even established researchers and others tend to equate theoretical frameworks with conceptual frameworks, which could suggest that they are either unaware of the distinction between a conceptual and a theoretical framework or do not believe that there is one. Ngulube et al. cited Ravitch and Riggan (2012), who maintain that a theoretical framework is a component of a broader conceptual framework (Ngulube et al., 2015, p. 44). It was also suggested by Ngulube et al. (2015) that models, concepts, and constructs constitute the building blocks of theories and that although conceptual frameworks are useful for explaining the world through the use of appropriate concepts, they provide an equally useful framework for performing analyses. However, the essential difference between conceptual and theoretical frameworks lies in the fact that conceptual frameworks are constructed from concepts which are related to a research topic and theoretical frameworks are from related theories.

The Technology Acceptance Model

The Technology Acceptance Model (TAM), which was developed by Davis (1989), assumes that when users perceive that a type of technology is useful and also easy to use, they will be willing to use it. Consequently, the more employees recognize that the systems will make their tasks easier to perform; the higher is the probability that they will use it and accept the new technology as being useful (Dillon & Morris, 1996). TAM model was based on the theory of reasoned action which posits that social behavior is motivated by an individual attitude which is design to predict information system use (Lin 2007). However, this paper argues that Fishbein and Ajzen argument

may be valid for personal use of technology, as they may be influenced by friends, colleague to buy and use a system or based on an expert recommendation through advertisement. Contrastingly, the technology used in the working environment cannot be influenced by an employee's friends, but the company rules guides the behavior of the employees. Hence, there is rule-governed behavior at work for using a system. Although the model is considered to be the most widely applied means of measuring the degree of acceptance of technology by users (King and He 2006). They also suggest that one of the main reasons for its widespread acceptance stems from the fact the model is simple and easy to understand (see figure 1), and not necessarily because of its suitability in a practical context (King & He, 2006).
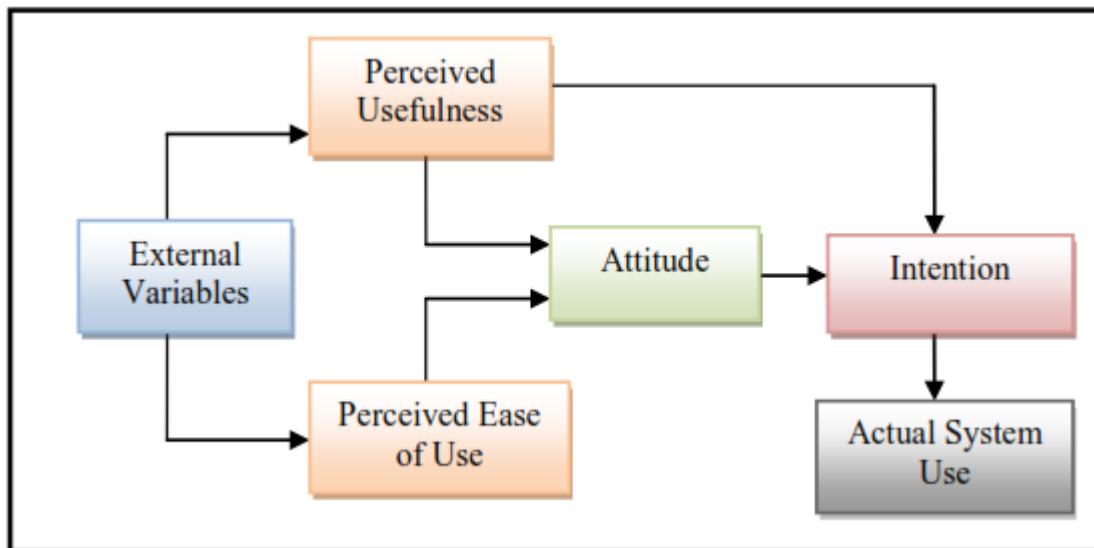

Figure 1: Technology Acceptance Model propounded by Davis (1989)

Technology Acceptance Model (TAM) Limitations and Criticism

Various considerations need to be taken into account in order to apply a theoretical framework and researchers need to be acutely aware of the multiple limitations which are inherent in endeavoring to do so. Maruping, Bala, Ventakesh, and Brown (2016) maintained that to obtain a proper understanding of the factors which promote increased use of IT, it is necessary to have a comprehensive theoretical and practical knowledge of the frameworks and models by means of which the use of IT is investigated. One of the limitations of the TAM concerns the variable which pertains to the behavior of users, which is inevitably evaluated through subjective means such as behavioral intention (BI) such as interpersonal influence. Nevertheless, interpersonal influence as the subjective norm is explained to mean when a person is influenced by words of mouth from a colleague, or a friend. While a superior can influence employee by directing a subordinate to perform a specific task with the use of technology, based on their IT policy, but a friend has no directive influence over staff who is a subject to the line manager. Another limitation is that, underlines of behavior cannot be reliably quantified in an empirical investigation, owing to a number of different subjective factors such as the norms and values of societies and personal attributes and personality traits. Hence, the argument that a relative, friends could influence the use of technology through exacting social pressure (Ang, Ramayah & Amin, 2015; Shan and King, 2015) is highly falsifiable. Although it may be true in theory or for personal use of technology, the

conceptualization may not be plausible or accurate in a work environment. Accordingly, Maruping, Bala, Ventakesh, and Brown (2006) proposed that behavioral expectations should be used to predict the intentions of employees about the use of technology, rather than behavioral intention.

Furthermore, it is also anticipated that as the information management of organizations attains maturity, information formality is likely to be promoted (Ajibade, 2017; 2016). Hence, there will be a well-establish process within the company or institutions and rules to use an Information Systems (IS) that is provided by the organisation. Consequently, behavioral expectations could, therefore, be measured in relation to the levels of compliance and not solely on the basis of the perceptions of employees. Accordingly, the guiding principles or frameworks of organizations would serve as mechanisms to control the behavior of employees and constitute a variable by means of which the extent to which technology is used by employees could be predicted. Therefore, suggesting that attitude toward the use of technology at work is based on the perceived usefulness and ease of use (Armenteros, Liaw Fernandez & Diaz, 2013) might have presented the TAM as a mere theoretical artifact. Preferably, this paper argues that perceive usefulness and ease of use might not influence the attitude of a librarian that must use an LIS system as complying and following the institutional and library system rules is mandatory because of the nature of services rendered. For example, a library adoption and use of Millennium architecture and Sierra Innovative LIS tools is compulsory for library services systems and relatives, friends and media could not change the attitude and intention of the librarian about the use or intention to use the systems.

Moreover, It needs to be added that several writers and researchers have criticised the model (Zahid, Ashraf et al. 2013, Bashange 2015). In her thesis of 2015, Bashange suggests that a great deal of the relevant available literature which refers to the TAM tends to regard it as a dependent variable, rather than a means of determining the factors which influence behavior. The criticism which is advanced by Zahid et al. (2013) suggests that the TAM does not consider factors such as age and education as external variables which could influence acceptance of and willingness to use technology. Conversely, it could be contended that it is extremely problematic to measure behavior, as hidden personality traits often motivate behavior. Accordingly, potential users of technology may not necessarily base their acceptance of and willingness to use new technology on their perceptions of the usefulness of IT and how easy it is to use, although the model does suggest that there may be other external factors which could be responsible for their acceptance of the technology.

Discussion and Presentation of a Modified Technology Acceptance Model

Companies and institution's policy pertaining to the use of IT and their rules take precedence over the attitudes and inclinations of employees. The author argues based on the field observations that, both the decisions which inform the rules that cover the use of information systems and the abilities of employees together determine the degree to which optimal use is made of systems. Although employees usually have personal and professional goals which need to be aligned with the rules of the organization in which they are employed, the personal and professional goals of employees (see figure 2) inevitably exert a considerable influence upon the degree to which IT is utilised optimally within their organization. As an employee wants to excel, and since the employers provide IT tools, the personal and professional goals of the employees become a motivating factor

to use IT infrastructure that the firm makes available to the employee in order to become a productive staff. Because there must be uniformity in business processes across various units (for example, accounting software) that a firm supply must be used to transfer and make payment and an employee has no choice and cannot refuse to use the provided technology. Hence intention or attitude does not influence the intention, attitude or use. The employees is obligated to use the system, as companies rules and guideline regarding how IT is deployed and used must be followed. Since the desire for promotion, career advancement remains a driving force. Hence, the degree to which a particular technology is adopted and used can, therefore, be measured by the employee's outputs and performance appraisal of the employee and not perceived ease of use by the employee as suggested by TAM. Consequently, the researcher has debated that the personal and professional goals of employees, the nature of the tasks which are to be accomplished through the use of IT, and the skills and capabilities of the staffs all influence the attitudes of employees towards the use of information systems. The modified TAM model is presented in (figure 2) below. Often, ambitious staff set personal goals and target, and the desire to succeed and be recognized as productive staff provides personal incentive and intention to use technology. So, staff examines tasks to be performs, and review organization's guidelines and align their personal goals with organizational guidelines on the use of technology to make sure of compliance and this moderates the intention of the staff. This intention is what improves the attitude towards the use of technology, and the attitude is what influence actual behavior and the actual use of the technology. In a corporate environment, it is impossible or impracticable to ignore the fact that the company's rule and regulation supersede individual intention and opinion about technology use. For example, a firm that invests in accounting software for processing payments have rules and processes to effect payment, and a member of staff cannot override this procedure and start using a different software or packages that have not been approved by the employer. Hence, the argument of TAM about intention and attitude is irrelevant in this context in a corporate business environment.
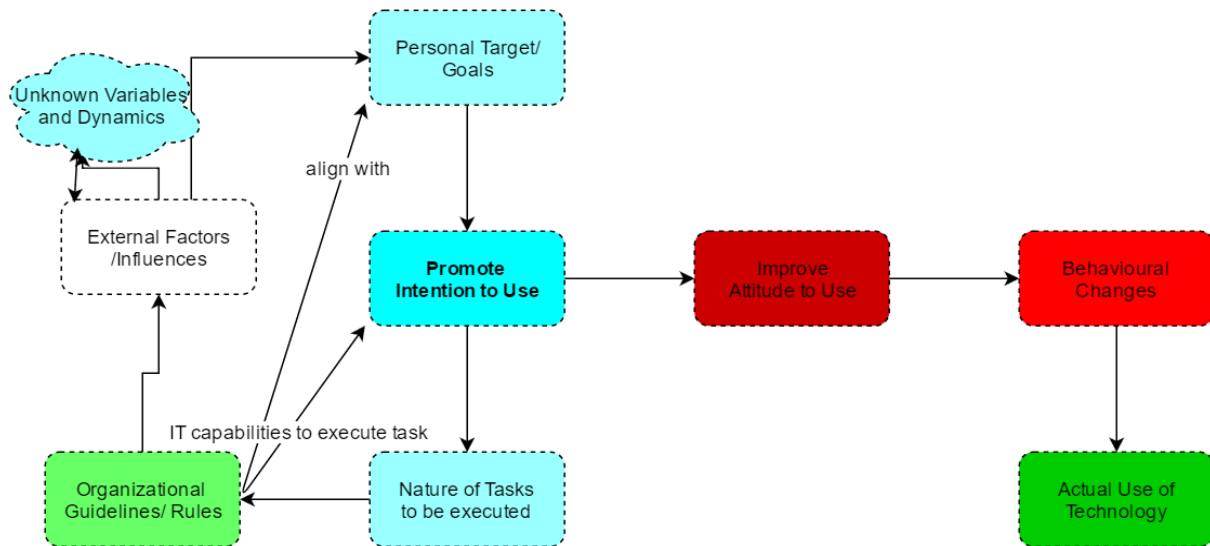

Figure: 2_ Theoretical Contribution: A Modified Technology Acceptance Model (TAM)

One of the arguments of this paper is to point out that, the way in which a system is used may be determined by the policies of the individual business organization and not on the personal intention of the employees (Ajibade 2018). Therefore, the perceptions of users of the usefulness of the

technology and the ease with which it can be used are likely to be formed once users have familiarized themselves with the systems based on their previous IT skill and experiences in using the system. Because a number of unknown external variables such as previous knowledge, skills, and experience, would also inevitably contribute to the perceptions of users of the usefulness of technology and how easy it is for them to use (see figure 3), as would the level of sophistication of the technology (IT capabilities). The nature of tasks to be implemented often determines the type of rules or guidelines that the companies use to guide the deployment and use of technology. A practical example could be provided by a finance department in a firm which has an IT infrastructure which includes point of sale, billing, purchases, and customer relations among its functions. In this instance, the organization would, of necessity, need to accept the utilization of particular information systems in order to carry out its operations in a uniform manner. Also, the auditing department can not deploy different systems for auditing purposes as this may impact the auditors negatively. The accounting department employees would be obliged to use whatever software or accounting systems that are provided by the organization, irrespective of the attitudes or intentions of individual employees.
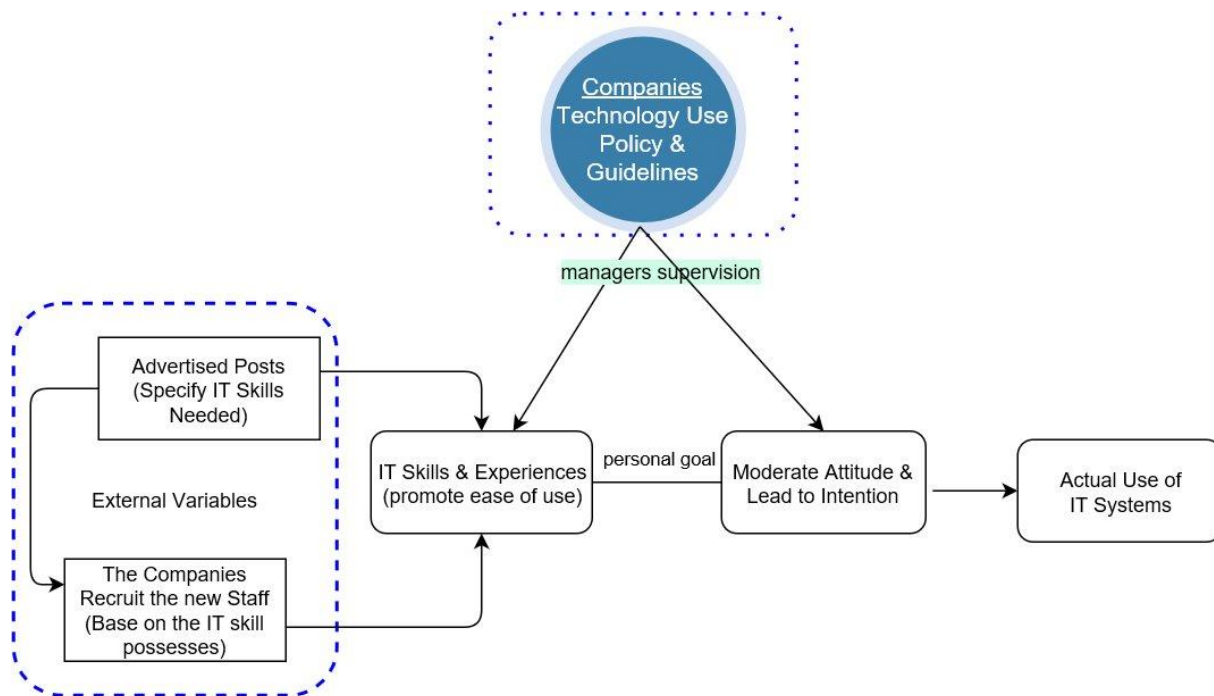

Figure 3: *Technology Acceptance and Use Model (TAUM)*

Technology Acceptance and Use vis-à-vis Advertised Post and IT Competence Rules

The argument for this construct is that many companies have established guidelines and rules concerning how technology is deployed. Hence, accounting and finance units have accounting software loaded on their computers to process payments. The human resources (HR) are supplied with a computer loaded with HR-related software. In the university, there are open access platforms, teaching and learning kits and software. In the library, there are platforms such as

Millennium architecture, Sierra Innovative Library Solution, databases and indexing technologies and other cataloguing development tools and software which the libraries have subscribed to. The argument that acceptance to use this technology is based on perceive ease of use (Elkaseh, Wong & Fung, 2016; Raza, Umer & Shah, 2017) is practically irrelevant. Hence, the university or the companies set out rules guiding the use of the technology, for example, issuing and checking out books in the library and returning books are done with the Sierra or Millennium library architecture platforms. Meaning that the library determines what technology to use as against the argument of TAM that suggested that acceptance of information systems (IS) is based on the perceived ease of use in relation to the intention and behavior of user of technology, in this case, an employee (Lee & Lee, 2011; Lee, Ham & Kim, 2013; Omar, Mat, Imhemed & Ali 2012). Even, Wu and Du, (2012) argued that many studies on user intention and behavior have not advanced understanding of the theoretical underpinnings of the model. So, this model (in figure 3) posits that the companies advertise and recruit staff based on certain IT skill, (external variables) which, if possesses, will determine their hiring. In most cases, an interviewee may be asked to demonstrate or use a system during an interview, probation or orientation processes before they are fully hired. In contrast with the view that external influence such as expert opinion, mass media reporting can be considered by a person while performing 'a behavior' (Lin 2007). The question remains, whether people perform a behavior, or employee performs tasks while using a system to execute the task is subject to further debates. Nevertheless, the recruit accepts the use of the technology provided by the library or the firm when the employee accepts the job offer. Thus, the employee accepts the use of technology in line with the institutional IT policy. Nevertheless, the use of the technology will be monitored by the line managers who determine the competency of the staff by monitoring the efficient deployment and use of the technology.

Attitude and Use of Technology vis-à-vis Employees IT Skill Supervision

After the use of technology has been accepted by the staff, the company or the library line manager supervises the deployment and use of technology by appraising the efficiency of the team. However, when there is a new system and technology that have been purchased, the staff are retrained to update their IT knowledge and ability to use the new systems. Hence the use of the IT is not merely based on the perceived ease of use, but organizational culture to train the staff in order to increase their ability to use the systems. For example, in a university library that migrates its services from Millennium to Sierra, the circulation librarian must ensure to update library interns and staff skills at the circulation desk. Since there are similarities in both Millennium architecture and Sierra interfaces, the learning curve might be short. Hence, on-the-job training will be used to improve the use, rather than the perception of the staff as suggested by the TAM (Hess, McNab & Basoglu, 2014). For personal use of technology, the use and acceptance may be influenced by these perceptions of an individual (Raza, Umer & Shah, 2017). But, if this model was meant for institutions applications such as libraries, university, and accounting department, the TAM model failed to consider factors such as institutional IT policy and company's rules and regulations that regulate and compel staff to use a system. In contrast to the view that perceived ease of use could significantly determine user perception of a system usefulness Marangunić & Granić, (2015) in which Joo, So and Kim (2018) also hypothesized that perceive ease of use and

usefulness has a positive relationship with the use of the system. Nevertheless, in the practical working environments, these assumptions may be regarded as a mere theoretical artifact based on the model in (figure 3).

IT Experiences and Skill Promote Attitude and System Use

The core argument is that staff IT proficiency and experiences promote the ease of use of technology, while technology acceptance and intention is moderated by the company's rules, policy, and IT guidelines. The desire to be promoted and personal or professional goals also moderate attitude towards the improved use of IT to performing better, which then enhances the intention to use the system. This view was justified by the study of Ding and Er (2018) which found that employees effectiveness or self-efficacy has a positive effect on ease of use and perceived usefulness of a system (Ding & Er, 2018: 4). The external variable that may influence the acceptance of technology is already previously discussed and not mere perceived ease of used suggested by the TAM (Joo, So & Kim, 2018; le Roux & Bresshears, 2016). Companies advertise for the job and the IT skills and requirements in the advertised positions, and when employees are recruited, the systems are provided to staff that came from outside the institution based on their IT skill, required job experiences and proficiency in the use of technology. For example, Libraries often include in their advertisement, job specifications for a circulation librarian, knowledge of, and an ability to use Millennium architecture and Sierra platform or any other Library and Information Science (LIS) technologies. Therefore, the actual recruitment, acceptance of post also means an approval by the employee to accept and use the technology. Hence, the use of technology, in this case, is based on demonstrable experiences and IT skills as moderating factors influencing the user's attitude, intention and use of technology.

Conclusions and Recommendation

The core argument is that, staff IT proficiency and experiences promote the ease of use of technology, while his or her acceptance and intention is moderated by the company's rules, policy, and IT guidelines. In the use of open access technology, perceived usefulness and ease of use is not often a problem as most tutorial videos are provided to guide the user through visualization processes. The playfulness of the gaming technology is more critical to users and fun of application rather than ease of use. This paper argued that TAM is not envisioned to address the use of technology in business, university, and organizational context, but, mainly conceptualized for an individual perception and purpose. The implication of using TAM based on the simplicity of the model will be misleading young researcher and denied them the opportunity of applying the theoretical model in a real organization context. Thus, their studies may be presenting falsifiable arguments when TAM is used in a study as theoretical underpinnings. The implication of (TAUM) model for emerging researcher is the ability to conceptually link the model to the practical institution real-life situation as a model should provide a bridge between practicality and theoretical debate rather than modeling a concept as theoretical artifacts.

Base on the preceding arguments and limitations of TAM, the paper recommends the use of this modified TAM as it links the guidelines and company's rules with nature of tasks to be carried out as what promote the intention to use technology. Consequently, emerging researching in the field of LIS, management, and social sciences may understand and be able to apply the model as theoretical underpinning. The conceptual model introduced in the (figure 3) is recommended for it provides clarity and simple model that is easy to understand for studies on technology-related subjects especially on the use and acceptance of the technology. The paper suggests that the (TAUM) model be a further probe for its suitability and enhanced argument as a conceptual model suitable to technology-related study. It is recommended to probe further if the model justifiably addresses the perceived criticism and limitations of TAM.

Acknowledgement

References

Ajibade, P. (2018). Levels of Utilization and Alignment of Business Information Technology in the Small and Medium-sized Enterprises (SMEs) in Nigeria and South Africa: (Doctoral Thesis, University of Fort Hare).

Ajibade, P. (2017). Efficient Information Management as Organizational Performance Drivers in South Africa. Journal of Social Sciences, 53(2), 95-106.

Ajibade, P. (2016). Validating information sensing in a South African University as an impetus to improved information management practice and performances. Journal of Social Sciences, 48(3), 225-238.

Anderson, T., Curtis, A., & Wittig, C. (2014). Definition and theory in social innovation. Krems, Austria: Danube University.

Ang, M. C., Ramayah, T., & Amin, H. (2015). A theory of planned behavior perspective on hiring Malaysians with disabilities. Equality, Diversity and Inclusion: *An International Journal,* 34(3), 186-200.

Chandio, F., Burfat, F., Abro, A., & Naqvi, H. (2017). Citizens' acceptance and usage of Electronic-Government services: A conceptual model of trust and technological factors. *Sindh University Research Journal-SURJ (Science Series)*, 49(3), 665-668.

Chintalapati, N., & Daruri, V. S. K. (2017). Examining the use of YouTube as a learning resource in higher education: scale development and validation of TAM model. *Telematics and Informatics*, 34(6), 853-860.

D'Amour, D., Beaulieu, M. D., Rodriguez, L. S. M., & Ferrada-Videla, M. (2004). Chapter Three key elements of collaborative practice & frameworks: Conceptual basis for interdisciplinary practice. *Interdisciplinary Education for Collaborative*, *Patient-Centred Practice*, 63-97.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.

Ding, L., & Er, E. (2018). Determinants of college students' use of online collaborative help-seeking tools. *Journal of Computer Assisted Learning*, 34(2), 129-139.

Elkaseh, A. M., Wong, K. W., & Fung, C. C. (2016). Perceived ease of use and perceived usefulness of social media for e-learning in Libyan higher education: a structural equation modeling analysis. *International Journal of Information and Education Technology*, 6(3), 192.

Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information Management,* 28(1), 107-130.

Hai, L. C., & Alam Kazmi, S. H. (2015). Dynamic support of government in online shopping. *Asian Social Science*; 11(22), 1-9

Hess, T. J., McNab, A. L., & Basoglu, K. A. (2014). Reliability generalization of perceived ease of use, perceived usefulness, and behavioral intentions. *MIS Quarterly*, 38(1).

Hojjati, S. N., & Khodakarami, M. (2016). Evaluation of factors affecting the adoption of smart buildings using the technology acceptance model. *International Journal of Advanced Networking and Applications*, 7(6), 2936.

Hsu, C. L., & Lu, H. P. (2004). Why do people play online games? An extended TAM with social influences and flow experience. *Information & Management*, 41(7), 853-868.

Hsu, Chin-Lung, and Hsi-Peng Lu (2004). "Why do people play online games? An extended TAM with social influences and flow experience." *Information & Management* 41(7) 853-868.

Joo, Y. J., So, H. J., & Kim, N. H. (2018). Examination of relationships among students' self-determination, technology acceptance, satisfaction, and continuance intention to use K-MOOCs. *Computers & Education* 122 (), 260-272.

Laugasson, E., Quaicoe, J. S., Jeladze, E., & Jesmin, T. (2016, July). Bridging digital divide in schools in developing countries: perceptions of teachers of free software opportunities. In International Conference on Learning and Collaboration Technologies (pp. 695-706). Springer, Cham.

le Roux, A., & Breshears, D. (2016). Introducing open source reference management software to a rural South African campus: Evaluating the effectiveness of workshops at the

University of the Free State's Qwaqwa Campus. *Journal of Higher Education in Africa/Revue de l'enseignement Supérieur en Afrique,* 14(2), 49-60.

Lee, J., & Lee, M. (2011). Factors influencing the intention to watch online video advertising. Cyberpsychology, *Behavior, and Social Networking*, 14(10), 619-624.

Lee, J., Ham, C. D., & Kim, M. (2013). Why people pass along online video advertising: From the perspectives of the interpersonal communication motives scale and the theory of reasoned action. *Journal of Interactive Advertising*, 13(1), 1-13.

Lim, Y. J., Osman, A., Salahuddin, S. N., Romle, A. R., & Abdullah, S. (2016). Factors influencing online shopping behavior: the mediating role of purchase intention. *Procedia economics and finance*, 35, 401-410.

Lin, H. F. (2007). Predicting consumer intentions to shop online: An empirical test of competing theories. *Electronic Commerce Research and Applications*, 6(4), 433-442.

Marangunić, N., & Granić, A. (2015). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, 14(1), 81-95.

Myerson, R. B. (2013). Game theory: Harvard University Press. Page 1-585 SA

Napitupulu, D. (2017). A Conceptual Model of E-Government Adoption in Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, 7(4), 1471-1478.

Ngulube, P., Mathipa, E. R., & Gumbo, M. T. (2015). Theoretical and conceptual frameworks in the social and management sciences. Addressing research challenges: Making headway for developing researchers, Mosala-MASEDI Publishers & Booksellers cc: Noordywk, pp. 43-66.

Omar, K. M., Mat, N. K. N., Imhemed, G. A., & Ali, F. M. A. (2012). The direct effects of halal product actual purchase antecedents among the international Muslim consumers. *American Journal of Economics*, 2, 87-92.

Persico, D., Manca, S., & Pozzi, F. (2014). Adapting the Technology Acceptance Model to evaluate the innovative potential of e-learning systems. *Computers in Human Behavior*, 30, 614-622.

Prieto, J. C. S., Migueláñez, S. O., & García-Peñalvo, F. J. (2014, October). Mobile learning adoption from informal into formal: an extended TAM model to measure mobile acceptance among teachers. In Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (pp. 595-602). ACM.

Shan, Y., & King, K. W. (2015). The effects of interpersonal tie strength and subjective norms on consumers' brand-related eWOM referral intentions. *Journal of Interactive Advertising*, 15(1), 16-27.

Taillefer, M. C., Dupuis, G., Roberge, M. A., & LeMay, S. (2003). Health-related quality of life models: Systematic review of the literature. *Social Indicators Research*, 64(2), 293-323.

Thomas, E., & Magilvy, J. K. (2011). Qualitative rigor or research validity in qualitative research. *Journal for Specialists in Paediatric Nursing*, 16(2), 151-155.

Torres, R., & Gerhart, N. (2017). Mobile proximity usage behaviors based on user characteristics. *Journal of Computer Information Systems*, 57 (1), 1-10.

Wu, J., & Du, H. (2012). Toward a better understanding of behavioral intention and system usage constructs. *European Journal of Information Systems*, 21(6), 680-698.

Bashange, L. (2015). Assessment of the risk awareness for mobile banking users in Tanzania, a case of CRDB Mbagala branch Temeke Municipality Dar Es Salaam, The Open University Of Tanzania.

King, W. R. and J. He (2006). "A meta-analysis of the technology acceptance model." Information & management **43**(6): 740-755.

Myerson, R. B. (2013). Game theory, Harvard university press.

Schafersman, S. (1994). "An introduction to science: Scientific thinking and the scientific method." online whitepaper, January.

Zahid, M. J. A., et al. (2013). Information communication technology (ICT) for disabled persons in Bangladesh: Preliminary study of impact/outcome. International Working Conference on Transfer and Diffusion of IT, Springer.