ADOPTION OF E-LEARNING TECHNOLOGIES IN EDUCATION INSTITUTIONS/ORGANIZATIONS: A LITERATURE REVIEW

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ADOPTION OF E-LEARNING TECHNOLOGIES IN EDUCATION INSTITUTIONS/ORGANIZATIONS: A LITERATURE REVIEW

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ABSTRACT

Although the advent of E-Learning Technologies presents the best cost effective strategy to teaching and learning, the success of these innovations primarily depends on their adoption. Investment in E-Learning Technologies alone by different institutions/organizations is not enough as its full benefits can only be realized from their full utilization. E-Learning Technologies if well utilized have the capacity to enhance students critical thinking, eliminate geographical barriers, support lifelong learning, reduce costs and increase efficiency at education institutions. E-Learning Technologies are technologies which are based on the backbone of ICT infrastructure. For this reason the Information & Communication Technology adoption models are useful in explaining E-Learning Technologies adoption. A number of models/theories which explain and predict user behaviors and intentions to adopt technologies have been advanced. For this discussion the following models were selected and analyzed, Theory of Reasoned Action (TRA), the origin technology acceptance model (TAM), the TOE framework & the revised TAM model.

Keywords: E-Learning Technologies, Information & Communication Technology, Theory of Reasoned Action, Technology Acceptance Model, Technology-Organization-Environment Framework, and Revised TAM Model in the Area of E-Learning Technologies Adoption.

INTRODUCTION

Globally, Information and Communication Technologies (ICTs) knowledge has been viewed to greatly influence the way people do their work, learn and even develop their economies (Geogia, 2011). Moreover, over the last decade, there has been exponential development in the use of ICTs also known as E-Learning Technologies, which has made impacts both on the society and on people's lives (Shihundu, 2014). It is therefore not surprising to note that increasing attentions are being put into the adoption of ICTs/ E-Learning Technologies in education systems all over the world (Shihundu, 2014). E-Learning Technologies seem to differ from one educational context to other according to literature available. Ideally, E-Learning Technologies include: internet, computers, World Wide Web (WWW), television, radio, Compact Discs (CDs), Digital Versatile Discs (DVDs), video conferencing, mobile technologies, web-based technologies, and electronic learning platforms (Gyambrah, 2007; Njenga, 2011; Kasse & Balunywa, 2013; Kituyi & Tusubira; 2013). Although the advent of E-Learning Technologies presents the best cost effective strategy to teaching and learning, the success of these innovations primarily depend on their adoption (Njenga, 2011). Investment in E-Learning Technologies alone by different institutions/organizations is not enough as its full benefits can only be realized from their full adoption and utilization. E-Learning Technologies if well utilized have the capacity

to enhance students critical thinking, eliminate geographical barriers, support lifelong learning, reduce costs and increase efficiency of institutions.

E-Learning Technologies are technologies which are based on the backbone of ICT infrastructure. For this reason the Information and Communication Technology adoption models are useful in explaining E-Learning Technologies adoption. A number of models which explain and predict user behaviors and intentions to adopt technologies have been advanced (Kituyi, & Tusubira, 2013; Njenga, 2011). For this contest the following models were selected and discussed, Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980), the origin technology acceptance model (TAM) Davis (1989), the TOE framework Tornatzky & Fleischer, (1990) & the revised TAM model by Lee et al., (2011).

Theory of Reasoned Action

Theory of Reasoned Action (TRA) was the first theory by Ajzen & Fishbein, (1975) to predict the relationship between human behavior and attitude towards adoption of an innovation. This theory was developed as a result of frustrations resulting from repeated failure to predict behavior from traditional measures of attitude. This theory postulates that, the direct causes of people's behavioral intentions are influenced by their attitudes towards performing the behavior and the subjective norm linked with the behavior (Feloor et al., 2011). On the other hand, this theory posits that human beings are rational and their behavior is a function of their attitudes and beliefs (Ajzen & Fishbein, 1975). From figure 1, it is seen that an individual's beliefs will lead an individual to develop attitudes which will result into intentions to perform a certain behavior (adoption). Figure 1 further; shows that, (Davis et al., 1989) behaviors of an individual are influenced by behavioral intentions, attitudes and subjective norms of the behavior in question. Form this theory, it is suggested that intention is the major determinant of an individual's behavior, while intention to behave is influenced by subjective norms and an individual's attitude towards the behavior and their perception of it (Feloor et al., 2011). Studies show that the TRA was found to perform well in the forecast of situations of both voluntary and mandatory use (Sheppard et al., 1988), contrary to claims made by (Fishbein & Ajzen, 1975). The outstanding weakness of TRA is that, it focuses on the behavior of an individual rather than considering environmental and social factors that might influence that behavior.
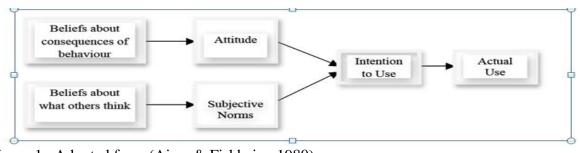

Figure 1. Adopted from (Ajen, & Fishbein., 1980)

The Technology Acceptance Model

The technology acceptance model (TAM) is one of the most famous model of innovation acceptance used to test user acceptance of information technologies for example; the adoption of Microsoft offices like word processing, spreadsheet, PowerPoint, (Maslin, 2007) and other technologies email , e-commerce , e-collaboration, and blackboard (Maslin,2007). This model resulted from the theory of reasoned action by Fishbein & Ajzen (1975) in psychology research. In TAM two factors perceived usefulness and perceived ease of use were found significantly influencing the usage of information technologies in organizations (Davis, 1989). In TAM Perceived usefulness (PU) is conceptualized as the degree to which a user believes that using a particular innovation would enhance his or her job performance while, perceived ease of use (PEOU) is the degree to which a user believes that using a particular innovation would be free of physical and mental effort (Davis, 1989). Figure 2 presents original version of TAM (Davis, 1989).
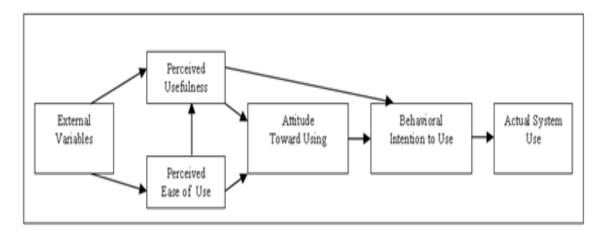

Figure 2. Original Technology Acceptance Model (Davis 1989)

Many studies show that TAM has been modified and extended extensively and has proven to be strong in the areas of management information systems, information systems and information technologies adoption (Mao & Palvia, 2006; Abbad et al., 2009; Munguatosha, 2011). Asianzu (2012) reported that several studies found significant statistical results for the high influence of perceived usefulness on behavioral intention to use a specific system. Koutromanos et al., (2015) provide a strong evidence to support TAM as a model for predicting behaviors of users to adopt an innovation. While TAM has demonstrated success, this model has some weaknesses. One of the outstanding weaknesses reported about TAM is its inability to reveal determinants of its independent variables (perceived usefulness and perceived ease-of-use) Chuttur, (2009). Another weakness of TAM is that it focuses on information systems that have been deployed in voluntary environments, with little consideration for mandatory-use settings Chuttur, (2009). In addition studies using TAM as a theoretical backbone have been mostly carried out from developed nations like Northern America (Mao & Palvia 2006; Bagozzi, 2007) rather than from developing countries like Uganda. It will be very wrong to assume that information technologies adoption models or theories predict equally well in other cultural setting without modifications.

Technology-Organization-Environment (TOE) Framework

Basing on Contingency Theory of Organizations, Tornatzky & Fleischer (1990) developed a framework for called Technology-Organization-Environment (TOE) framework. The Technology-Organization-Environment framework sets a basis that an effective organization should have a structure which is invariable with its environmental needs (Lawrence & Lorsch, 1967). Figure 3 shows the relationships among the variables in the TOE framework that influence adoption of an innovation.
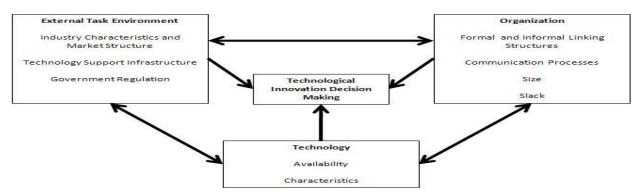

Figure 3 Source: Tornatzky & Fleischer, (1990)

Technological context refers to the nature of the technology adopted and looks into the existing technology that is available in the industry in order to determine the ability of the firm to move on with an innovation initiative. (b) organizational context, which includes: an organization's attributes such as its size, centralization, formalization, the quality of its human resources, the complexity of the organization's managerial structure, and the amount of slack resources available internally' (Tornatzky & Fleischer, 1990: 153). (c) Environmental context, which includes the industry an organization is in, its competitors, its accessibility to the resources supplied by others and dealings with government (Tornatzky & Fleischer, 1990). The TOE framework has been utilized for studying different types of technological innovations. More broadly, it has been tested in the context of information technologies i.e. Thong, (2002), electronic data interchange (EDI), E-business, HRIS, KMS, Mobile-commerce, E-commerce, ERP, e.t.c (i.e Lu, 2010). Besides, many studies suggest that research in technology and innovation adoption should incorporate the organizational circumstances of a potential adopter and its industry or external environment in addition to Rogers'(2003) innovation characteristics (Zhu et al., 2007).In shot, it is widely acknowledged that the existing literature has demonstrated the usefulness of the TOE framework for understanding the diffusion of information systems (IS) innovation (Scupola, 2003 ;) and, more importantly, it provides a much better explanation which addresses firms 'decision-making behaviors (Bouchard, 1993). The main weakness with this model is that it concentrates mainly on general issues which are organizational, environmental and technological ignoring the patronage factor yet has been found to have a major role in the technology adoption (Ngai et al. 2007).

Revised TAM Model in the Area of E-Learning Technologies Adoption

Despite the fact that there are several studies explaining technology adoption in different areas, use of TAM has not been given enough attention to be applied in the area of adoption of e-learning technologies (Zoubib et al., 2014). The generic TAM model by Lee et al., (2011) was applied to study workers intentions to use E-learning systems in Taiwan. Lee et al., (2011) proposed a model which integrated TAM and Innovation Diffusion Theory (IDT).

Lee et al., (2011) put forward that, five innovations attributes (compatibility, complexity, relative advantage, ability to try and observe) exert an important effect on users perceived usefulness, perceived ease of use and intention to adopt an e-learning technology. Nonetheless, Lee et al., (2011), model limitation is that all the constructs explaining E-Learning Technologies adoption have been developed and applied mostly in the advanced nations like the USA, and UK (Maziar & Zuraini, 2010). They are over generalized and require more empirical investigation in the area of E-Learning Technologies adoption in other education context possibly third world nations.. It will be also very wrong to assume that information technologies adoption models or theories predict equally well in other cultural setting without modifications. This therefore requires an understanding of the causes of failure to adopt E-Learning Technologies in HEIs in third nations by modification of revised TAM and address the unique issues to suit the context (Mazen, 2013).

Table 1. Strengths and Loopholes of the Adoption Model

Adoption model	Year and author	Strength	Weakness
TRA	Ajen,I and Fishbein,1980	It has performed extremely well in the prediction of situations of both voluntary and mandatory use	It focuses on individual level behavior and ignores environmental, technological, organizational and social factors that might influence that behavior
TAM	Davis (1989)	Several studies have found out that perceived usefulness has high influence on behavioral intention to use a specific system and these studies provided a strong evidence to support TAM as a model for predicting systems usage behavior.	It does not reveal determinants of the perceived usefulness and perceived ease-of-use variables (Bagozzi, 2007; Chuttur, 2009). This model also ignores patronage factor (training ,technical support and management support) which may be a determinants of perceived usefulness
TOE	Tornatzky & Fleischer, (1990)	Existing literature has it that TOE framework demonstrates usefulness of understanding the diffusion of information systems (IS) innovation (Scupola, 2003; Wu et al. 2003; Thong, 1999) &, more importantly, it provides a much better explanation which addresses firm's decision-making behaviors (Bouchard, 1993).	TOE concentrates more on organizational, environmental and technology factors.
Revised TAM	Lee, Hsieh, & Hsu (2011)	This model accounts for the numerous factors that influence e-learning system acceptance. It integrates two models, IDT and TAM. The findings by application of this model supported existing research that there is strong relationship between PEOU and PU, as originally proposed by Davis et al. (1989). Therefore, becomes suitable to be applied in other studies	This model has a tendency of being redundant in a way that some constructs carry same meaning like relative advantage construct in IDT is similar to the notion of the PU in TAM, and the complexity construct in IDT captures the PEU in the technology acceptance model (Moore & Benbasat, 1991) This model too ignores patronage factor (training technical support and management support) which may be a determinant of perceived usefulness in E-Learning Technologies adoption

Comparison of the Discussed Models

The models discussed are compared on the basis of the following factors for E-Learning Technologies adoption namely: perceived ease of use, perceived usefulness, compatibility, complexity, relative advantage, Observability, Trialability and intention to use, actual usage, and patronage factor. The comparisons are presented in the Table 2.

Table 2.2: The Adoption Models Compared Against Identified factors of E-Learning Technologies adoption.

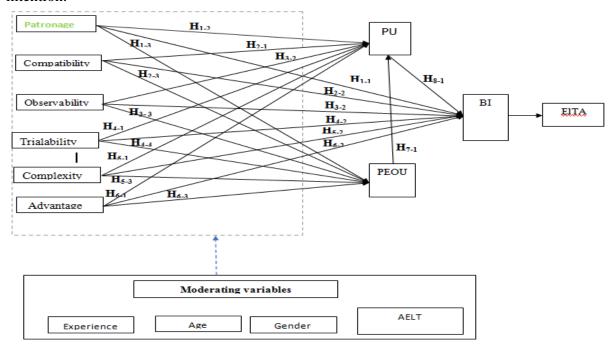| Factors	Models			
	(Ajen,I and Fishbein,1980).	Davis (1989)	Lee, Hsieh, and Hsu, (2011)	Tornatzky and Fleischer, (1990)
perceived ease of use	No	Yes	Yes	No
perceived usefulness	No	Yes	Yes	No
intention to use	Yes	Yes	Yes	No
Actual Usage	Yes	Yes	No	No
Patronage factor	No	No	No	No
Compatibility	No	No	Yes	No
Relative advantage	No	No	Yes	No
Complexity	No	No	Yes	No
Observability	No	No	Yes	No
Trialability	No	No	Yes	No

No - Indicates that the stated variable is not present in a given Technology Adoption Model while, **Yes** -Indicates that the stated variable is present in the given Technology Adoption Model.

It is evident from Table 2 that all the four cited technology adoption models leave out the patronage factor which conceptualized here as (management support , technical support and training) yet has been found to have a major role in the technology adoption (Ngai et al. 2007). Two out of the four adoption models agree with Lee et al,   (2011) revised TAM model on the intention to adopt a technology that is (Davise, 1989) and (Ajen, & Fishbein, 1980) models except (Tornatzky & Fleischer, 1990). This confirms the argument that the above discussed technology adoption models need to be customized to address issues in contexts of less advanced nations. According to literature, (lee et al.,2011) these models have largely been used in more advanced nations and which mean they give general views and moreover they have little about the specific conditions and context in education institutions in third world nations.

CONCLUSION
Proposed Conceptual Model

This discussion proposes a conceptual model based on literature review and technology adoption theoretical models discussed above. Revised TAM model by Lee et al., (2011) was adapted for adjustment. A new construct (patronage factor) is to be added to further the generalizability of Lee et al., (2011) extended technology adoption model to a different context. This model was adapted because it accounts for the numerous factors that influence adoption E-Learning Technologies Lee et al., (2011). Revised technology adoption model by Lee et al., (2011) integrates two models, innovation diffusion theory by Rogers, (2003) and technology acceptance model by Davis (1989) to prove better findings. Empirical results from study of information technology adoption provide strong support for integrative approach of theoretical models (Lee et al., 2011). Furthermore, most studies applying the technology acceptance models have been done in Western countries, particularly in USA, Canada, Germany, UK etc (Amer et al., 2013). Basing on this argument, application of technology acceptance model in the area E-Learning Technologies adoption in third world nations particularly in at Higher Education Institutions is paramount. Thus, technologies adoption models used in the developed nations cannot be generalized for E-Learning Technologies adoption in third world nations without taking into consideration issues that are specific to that nation for example the patronage factor which combines (management

support, technical support and training). To this effect, this discussion proposes a model shown in figure 4 that extended TAM model by Lee et al., (2011) with patronage as a new construct added by the researcher and identified from literature as a factor that influences the adoption of E-Learning Technologies through perceived usefulness and direct to behavioral intention.

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