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ADOPTION OF E-BOOKS IN UNIVERSITY EDUCATION IN SUB-SAHARAN AFRICA: A POSSIBLE CONCEPTUAL FRAMEWORK

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Abstract

The recent past has witnessed a global trend of increased adoption of e-books in scholarly communication. This has been driven chiefly by academic libraries to expand current collections and enhance user experience. However, there is evidence that the rate of adoption globally but also in sub-Saharan Africa is below expectations. This paper explores first, the benefits to be gained through adoption of books. Secondly, it uses a conceptual frame based on the Technology Acceptance Model (TAM) to explore key variables that affects the adoption of e-books by libraries and users. These variables are: perceived usefulness, perceived ease of use and perceived cost, and their impact on behavioral intention to adopt e-books. Based on this model, the paper makes a number of recommendations on strategies by both libraries and publishers of e-books that might increase the uptake of e-books in university education in the region.

UNDERSTANDING E-BOOKS

There exist varied definitions of e-books. According to Rao (2003) an e-book refers to "text in digital form, or digital reading material, or a book in a computer file format, or an electronic file of words and images". According to Armstrong, Edwards and Lonsdale (2002), an e-book is any piece of electronic text regardless of size or composition (a digital object), but excluding journal publications, made available electronically (or optically) for any device (handheld or desk-bound) that includes a screen. Nelson (2008) has argued that an e-book is "an electronic book that can be read digitally on a computer screen, a special e-book reader, a personal digital assistance (PDA), or even a mobile phone."

For purpose of this paper we define e-books as digital versions of printed books, which are distributed through the Internet. These files can be read on readers, tablets, personal computers, smartphones, and also on some mobile phones. Some e-books are digitized versions of printed books and are therefore PDF copy of the original paper copy. These comprise the majority of e-books in the market (Nelson, 2008). The second type is the so-called 'born digital' which are produced, stored and accessed electronically. While is possible for "digitized" books to have static pictures, indices, and tables of content born digital have interactive features such as linking and searching features) and also integrate video, audio, animation, and interactive simulation (Connaway, 2003).

ADVANTAGES OF E-BOOKS

According to Thompson and Sharp (2009), e-books present the following advantages:

- Are available 24/7 from 'local' desktop/laptop i.e. no need to visit the library. This can be particularly useful for distance-learning students, such as those for whom the text is core reading material.

- Make it possible for more than one person to access the same e-book at the same time (although not all e-book suppliers allow this in the licensing agreements).
- Contain searchable and usually special navigation features. The software that accompanies any e-book will provide facilities for searching and navigating the content that are usually much superior to the table of contents and back of the book index available with print books.
- Have the potential to satisfy student demand for more copies

Heron, et al (2006) has summarized key advantages of e-books as convenience, economy, portability and material being up-to-date. Lam, et al (2008), have presented key advantages of using e-books as access to more readings, remote access, searchable readings, potential links to related multimedia resources, portability, and optimizing of reading time. E-books also have the potential to be of use for those with physical disabilities, for whom accessing the library building may be a challenge, or for those with visual disabilities as screen-reading/text enlarging software can be used with the digital text (Connaway, 2003).

The advantages of e-books for Library and Information Science (LIS) professionals who provide e-books to users in their academic institutions include:

- Possible saving of space for housing the physical book volumes.
- Better security since there will not be lost or damaged titles,
- The ability to provide adjustable fonts, speech output and so on for visually impaired users enables library staff to comply with any legal disability discrimination requirements.
- The ease with which ebooks can be integrated into virtual learning environments (VLEs) when developing support material for a specific taught module.
- The instant 'delivery' of an ordered e-book title and there are also possible cost savings in the whole acquisition process.
- The possibility for dynamic collection management if relevant statistics of use are produced.
- Easy transportation (Connaway, 2003).

FRAMEWORK FOR ADOPTION OF E-BOOKS: TECHNOLOGY ACCEPTANCE MODEL (TAM)

E-books have rapidly become a point of convergence of interest among Library and Information Science (LIS) professionals, publishers, distribution agents and educational institutions. The most widely used genres are scholarly publications, reference materials, novels, professional and popular titles. They particularly of high interest in the field of open, distance and e-learning (ODEL) in providing students with reference readings to students in remote collections (Armstrong and Lonsdale, 2005).

Review of literature indicates global trends of increased adoption of books by libraries driven by the perceived opportunity to expand current collections and enhance user experience (Renner, 2007). However, it is widely acknowledged that adoption of e-books is still at infancy. The current situation is characterized by slow adoption of e-books by university libraries and

among both students and researchers not only on the sub-Saharan region but also globally (Connaway, 2003). At the same time globally libraries are facing serious challenges namely, shrinking budgets, reduced or no funding for additional space, need for new buildings and resources, rising costs to repair or replace, lost and stolen books, out-of-print materials, difficulties of interlibrary loans, demand for support for Open, distance, and e-learning (ODEL).

One would wonder what the trend is or what the issues are those are significant in the adoption of e-books in the region. A number of questions have been raised: what will be the status of e-books in the near future across the sub-Saharan region? why has there been slow adoption of e-books in libraries across the sub-Saharan region despite their popularity? What are the perceived advantages of using e-books over print books? Will they gain broad adoption among librarians and scholars in the region? What strategies are required to make e-books a reality in university scholarship?

The notion that print will continue to be critical in scholarly communication as it is from now the future is certain. But there is every indication that e-books will grow to become a key element of scholarly communication. The various stakeholders notably LIS professionals, publishers, and supply agents are best advised to seek knowledge about e-books, require to understand the different social contexts in which e-books and indeed other e-resources are used and work out winning strategies of incorporating them into their offerings. This paper unveils some of the issues that influence the adoption of e-books based on Technology Acceptance Model (TAM) to investigate key in sub-Saharan Africa. TAM is relevant in evaluating critical issues that affect the adoption of e-resources and specifically e-books in university education across the sub-Saharan region.

TAM hypothesizes that actual usage of technologies such as e-books is determined by behavioral intention to use. The theory goes further to suggest that behavioral intention to use is jointly determined by perceived usefulness and attitude and emphasizes two factors: perceived usefulness and perceived ease of use (Wetzels, 2003; Davis et al., 1989). This is presented in Figure 1 below. Perceived usefulness refers to the extent to which an individual believes that using a particular technology would enhance his or her performance in specific activities (Davis et al., 1989). This means that people are more likely to use a technology that they believe will help them perform their job better. In the case of e-books, we can relate this to the extent to which various stakeholders such as librarians, students and researchers think that e-books it helps them be more efficient in their daily actions.

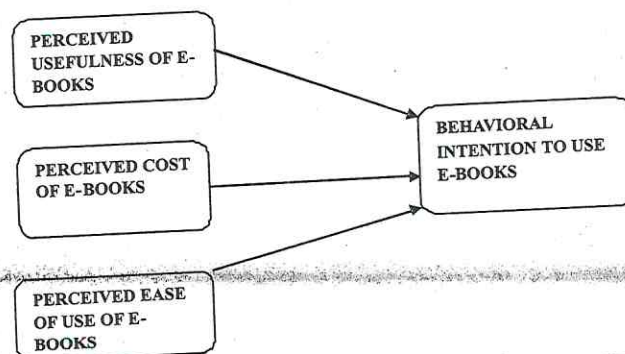


Figure 1. Modified Technology Acceptance Model

Davis et al., (1989) also defines perceived ease of use as the degree to which a person believes that using a particular technology would be free of exorbitant effort. Therefore, even if a technology is believed to be useful by an individual, but is too difficult to use, the potentially enhanced performance benefits to be derived from the technology are outweighed by the effort required of using it.

Besides the two key variables perceived usefulness and perceived ease of use other variables can be added to improve the explanation power of TAM. In the case of e-books, besides perceived usefulness and perceived ease of use, perceived cost is definitely an important variable. This is because libraries universally are facing serious challenge of shrinking budgets, reduced or no funding for additional space, need for new buildings and resources, rising costs to repair or replace, lost and stolen books. Therefore e-books represent an added expense which has to be considered in an effort to incorporate e-books in current collection.

According to Ajzen, and Madden (1986), TAM has a number of advantages in estimating the likelihood and degree certain technologies. According to Venkatesh and Brown (2001), TAM accounts for approximately 40 percent of the variance in usage intentions and behaviour. The theory has also been highly rated its parsimony and applicability across various organizational and software application contexts and review of literature reveal that it is the most widely accepted theoretical model amongst Information Technologies (IS) researchers today (Agarwal & Prasad, 1999).

Numerous studies, for instance Chau and Hu (2001), Segars and Grover, (1993), have been carried out to test the validity of TAM in user adoption of ICT in various contexts by investigating key variables in TAM (perceived usefulness and perceived ease of use) and consumer trust in the study of e-commerce. Chau and Hu (2001) evaluated the psychometric properties of the ease of use and usefulness constructs by examining the usage behaviors of users of voice and electronic mail technologies. This study demonstrated that in a business situation, building of consumer trust is important as perceived usefulness and perceived ease of use of the Web site. It also demonstrated that there is a strong relationship between both perceived ease of use and perceived usefulness (Chau & Hu, 2001) . A study by Segars and Grover (1993) also endorsed this concern but cautioned that absolute measure for these constructs may not be possible across varying technological and organizational contexts.

At the same time, despite its widespread application in the analysis of various systems TAM has also been criticized for lack of falsifiability, questionable heuristic value, limited explanatory and predictive power, triviality, and lack of practical value (Chuttur, 2009). TAM has also been criticized for focusing on the ICT use with concepts such as 'perceived usefulness', in order to explain how a user 'perceives' 'usefulness', which fails to recognize the social processes of Information Technologies (IS) development and implementation, or to question the social consequences of IS use (Bagozzi 2007).

However, regardless of the above criticism, this paper will apply TAM to predict possible scenarios in the adoption of e-books and suggest implications for the various players such as publishers, marketers and users of e-books. Table 1 below highlights the key variables

proposed in the TAM framework that may affect: perceived ease of use, perceived usefulness, perceived cost, and well behavioral intention to use e-books. The table indicates both library and library related indicators of these variables which may affect the adoption of e-books both in libraries and among library users.

A number of factors might affect the perceptions among librarians and library users towards the ease of use of e-books. For example Armstrong and Lonsdale (2005) highlighted the limited availability or ignorance about the availability of bibliographical tools to assist in acquisition of e-books. Lack of bibliographic control in form of identification tools and selection aids for e-books will leads to poor acquisition of e-books. At the same time although there will be software to read and browse the e-book, for some users this may not seem to be designed in a user-friendly manner. Similarly, if an academic library makes e-books available from a variety of suppliers there is likely to be a lack of standardization of interfaces – and this can be confusing for users. Many students, when preparing essays, prefer to have several printed books accessible on their desk at any one time. With e-books it may be difficult to replicate the same effect in the digital environment as it may be difficult to access several e-books at the same time. According to Wilson (2003), other factors that affect ease of us include ineffective navigational controls, accurate and quick search function, and inclusion of hypertext, existence of table of contents, consistent typographical style, and classification of book sections.

One of the factors associated with perceived usefulness is the level of awareness of e-books among academic staff as well as the students. This will to a large extent be determined emphasis put on e-books by academic staff in the way of promoting or publicizing the usefulness of e-books among students in the teaching and learning processes. According to Lam, et al (2008), perception of usefulness issues especially relates to whether e-books or certain collections are effective learning tools. For example, one could ask whether students enjoy the reading process, whether they understand the digital text or are willing to use e-books in learning.

Armstrong and Lonsdale (2005) have also reported one of the factors affecting adoption of e-books is the actual cost of e-books amidst a perception that e-books should be cheaper than the hard copy versions. E-books require different forms of infrastructural investments to facilitate their use. For example there is need for extensive local area network (LAN) backed by reliable internet connectivity. Others include e-readers and desktop PCs. In most cases the high cost of publishing e-books are passed down to libraries and library users. One factor that may affect cost are the licensing arrangements for e-books which may determine whether such arrangements facilitate 24 x 7 access, can be used with distance learners, or can be used off the campus or outside the library (Hernon, 2005).

Table 1: Selected variables in the adoption of E-books

VARIABLE	LIBRARY-RELATED INDICATORS	USER-RELATED INDICATORS
Perceived ease of use of e-books	<ul style="list-style-type: none"> ➤ Ease of management processes for e-books ➤ Ability to manipulate e-book databases to provide services ➤ Ease of navigation of e-book databases and systems ➤ Availability of flexible access features of e-books/databases and systems ➤ Flexibility of digital rights management regimes 	<ul style="list-style-type: none"> ➤ Ease of navigation of e-book databases ➤ Availability of flexible access features of e-book/databases ➤ Friendliness of digital rights management regimes ➤ Adequacy of relevant ICT infrastructure for access to e-resources
Perceived usefulness of e-books	<ul style="list-style-type: none"> ➤ Rapid expansion of library collections ➤ Improved image of library services ➤ Efficiency in achieving library objectives ➤ Improves the performance of individual library personnel ➤ Relevance of collection offering by publishers and agents 	<ul style="list-style-type: none"> ➤ Relevance of e-book content to one's research needs ➤ Adequate numbers of e-books collections ➤ Reliability of literature retrievable from e-book databases ➤ Exposure to the usefulness and advantages of e-resources
Perceived cost of e-books	<ul style="list-style-type: none"> ➤ Return on investment (ROI) in the use of e-books ➤ Cost-effectiveness/sustainability of supply models for e-books ➤ Cost of processing of e-books ➤ Infrastructural costs for access to e-books ➤ Cost of maintenance of e-book collections 	<ul style="list-style-type: none"> ➤ Existence of adequate infrastructure for e-book access ➤ Costs of purchase of technology gadgets for access to e-books e.g. readers, PDAs, ➤ Cost of internet access
Behavioral intention to use e-books	<ul style="list-style-type: none"> ➤ Willingness to support incorporation of e-books in print collections ➤ Willingness to use e-books to fulfill users information requests ➤ Willingness to participate in trainings on e-books ➤ Willingness to subscribe to/purchase e-books collections 	<ul style="list-style-type: none"> ➤ Willingness to use e-book collections to fulfill information needs ➤ Willingness to attend trainings on the use of e-books ➤ Preference for e-books over print versions

IMPLICATIONS FOR STAKEHOLDERS

This paper has borrowed some of constructs used in TAM in analyzing the selected issues in the adoption of e-books in scholarly communication. These include perceived usefulness, ease of use, and perceived cost of using e-books. By investigating these factors it is possible to come

up with a viable explanation and make propositions for better adoption of e-books. First, TAM can help us to understand the factors that affect the adoption of e-books in scholarly communication. Secondly, it can help us to investigate perception-related variables that affect the adoption of e-books by library users. Arising from this discussion we can make the following recommendations that will lead to better adoption of e-books.

LIS professionals and libraries

In order to create an efficient transition to the use of e-books LIS professionals and libraries should:

- Increase knowledge and awareness of usefulness and usage e-books among library fraternity and other stakeholders
- Create library web portals that demonstrate simplicity, ease of access, accuracy of information, ensuring ease of navigation and high loading speeds.
- Increase likelihood usage by raising the awareness of the existence, benefits and advantages of e-books among users both students and researchers
- Implement the necessary policies and strategies, and procedure for e-resources such as acquisitions, access and circulation services, IPR, information literacy
- Invest in the adequate ICT infrastructure for access to e-resources e.g. networks, PCs, DRM, internet bandwidth
- Increase collaboration with each other, faculty, ICT departments, publishers and agents in improving access and usage of e-books
- Push for incorporation of e-books into university academic programme curricula
- There is a need to 'integrate' e-books properly with other items and so metadata, often in the form of MARC records, needs to be available, say for inclusion in a library's catalogue.
- Typically, libraries acquire e-books from a number of suppliers and so LIS professionals have to be aware of the different licensing models and also make sure that the users too are aware of these.
- The variation in user interfaces between the various e-book suppliers means that library and information staff needs to produce relevant digital, or print, support documentation to assist their users in accessing the e-books.
- Create collection development policies that facilitate the acquisition of e-books alongside printed books. (Tedd, Lee, 2009; Turner, 2005; Caldeira & Ward, 2001; Adegbore, 2010; Armstrong and Lonsdale, 2008)

Publishers and agents

To ease the difficulties faced in the adoption of e-books in the region publishers and their agents need to consider:

- Reducing level of complexity of access by increasing adopting a architectural designs that facilitates ease of navigation, high loading speeds, information accuracy
- Creating supply models that is in fit with economic realities of developing countries in terms of pricing, ownership, sustainability, DRM
- Implementing flexible and innovative friendly licensing and costing models that make libraries and their sponsors perceive e-books as a viable alternative to

- print books.
- Create databases that have friendly functionalities such as access and administration, searching, navigation, indexing and abstracting, collection of statistics, archiving, exporting, etc. (Nelson, 2008; Renner, Armstrong and Lonsdale, 2005; Turner 2005; Tedd, Hernon, 2006; Lam, et al, 2008)

CONCLUSION AND RECOMMENDATIONS

The present circumstances suggest that indicates the future spread of e-books is certain although print will continue to be critical in scholarly communication as it is now. But there is every indication that e-books will grow to become a key element of scholarly communication. The various stakeholders need to develop models and putting them into test. The model that incorporates as many as possible variables that are part of the realities in the sub-Saharan region is likely to carry the day. In the case of sub-Saharan Africa, although this conceptual paper has suggested the factors that affect the adoption of e-books, the actual situation on the ground remain uninvestigated. Therefore a number of issues need to be investigated. These include: habits of users in the use of electronic vis-à-vis print sources: when, where and what purpose; library user perception of e-books in terms of usefulness, ease of use and cost; adoption of e-readers among users; efficacy of different supply models of e-books; standards digital rights management (DRM); barriers (cultural & technical) to adoption of e-books; e-book readiness in campuses; intellectual and property rights in the use of e-books, policy and management issues in the use of e-books and e-book publishing industry in the region. Better understanding of these issues will form the basis for proper planning and incorporation of e-books in the scholarly communication in the region.

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