Major Factors Affecting the Level of Adoption of Document Management Systems in Zambia's Higher Institutions of Learning

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Abstract — the aim of the study was to identify the challenges facing, Zambia's higher institutions of learning in managing manual documents and to determine whether an electronic Document management Systems (EDMS) could be useful. The study in addition had to determine the levels of adoption prevalent in the institutions among the stakeholders to warrant implementing an Electronic Document Management System or otherwise. A quantitative survey was undertaken at three higher learning institutions covering members of staff and learners in the institutions. A questionnaire was designed to help collect the sample data from the three institutions, which was then analyzed using the SPSS application package. The purpose was to use the Technology Acceptance Model (TAM) [3], to model how users come to accept and use technology, the actual system use is the end point where people use the technology. The TAM Model relies on two primary factors influencing an individual's intention to use new technology ie perceived usefulness, perceived ease of use , to gauge whether they provide positive indicators to show that there are high levels of perception and expectations to influence positively the dependent variables in the TAM model ie. Attitude, behavioral intention and system use. The study revealed high levels of system adoption perceptions overall, in the institutions, to warrant introducing an EDMS technology. The results revealed a very high perceived usefulness and ease of use across the three institutions of higher learning. The study recommended that an Electronic Document Management System be implemented in these higher institutions of learning.

Keywords— Electronic Document Management Systems, Technology Acceptance Model , Higher institutions of learning,System,

I. INTRODUCTION

Document generation has increased tremendously at institutions of higher learning to unmanageable levels requiring urgent and effective response. New technological interventions to manage the situation are required. During preliminary investigations it was physically evident, to see mountains of documents on officer's desks as you move from office to office. It seemed like the continued use of manual Document Management Systems (DMS) had been entrenched in these organizations with no solution in sight. In addition to these observations there were many complaints from various quarters from both staff and learners on issues dealing with document management. Quiet often it took a lot of time to search for and retrieve individual records for both staff and students. So many records went missing and could not be retrieved on time, or permanently got lost. Although it seemed that people were working normally however there were a lot of negativities associated with maintaining the same old way of document management and the same old way of doing business. While operatives may go about with their businesses as usual, however the status quo in terms of the current document management system was contributing to a downward spiral to the institutions business performance by:

Incresing the cost of utilization of paper in the institutes to very costs as huge piles of paper can be seen all over staff offices

Indiscriminate use of paper for example being used as scratch pads, rough work and many more

Information retrieval is both stressful, tedious and lengthy as one needs to move mountains of documents to locate the needed documents.

Paper itself is very costly and takes up a lot of space to store and a lot of care to ensure its safety from water, dampness, fire, and degradation etc.

As long as nothing is done about it the document management problem will keep growing bigger and bigger and eventually become unsustainable? Some of the problems that would be an off shoot of the prolonged neglect of a proper document management systems, within the corridors of these institutions and many others, not subject to this study, may include:

Huge losses of man hours in looking for these documents, which, when converted into monetary terms, add up to huge colossal amounts of money.

Stakeholders would have lost confidence in administrative and technological management of these institutions to keep their data and information safely.

It is also not far-fetched to note that, while a lot of office space has been utilized for manual storage of documents, this office space could be advantageously, used for classrooms and as staff offices. This would reduce on storage costs and at the same time improve on operations. Looking at the results coming from the study of these three institutions despite being different and independently managed, the problems besetting these institutions are of similar nature,

and therefore a solution in one of them would be extrapolated to other institutions..

The total accumulation of all these problems affecting the institutions led to the initiation of the study to gauge the major factors affecting the level of adoption of a documents management system technology and the major challenges faced by higher institutions of learning in handling of paper based documents on day to day operations. The process of creation, storage, searching, filing, retrieval of documents in a manual environment comes with a lot of challenges especially when it comes to accessibility of individual stored documents. The idea is to eliminate manual handling of documents and migrate to digital storage. Manual documents have proved to be quiet unreliable, which has had a detrimental effect to workflow.

Management has faced numerous challenges in storing various documents and tracking their status in terms of location, access and follow up for verification purposes. A lot of useful time is spent on searching for documents, at the risk of alienating clients who are students and staff to the institutes. This in the long run would reduce enrollments in these institutions and hamper smooth work flow. While there are so many disadvantages associated with manual document management systems, the sheer cost of paper work is overwhelming. Take for instance, 8 gigabytes of data would be stored on a flash disk which costs about K100 while it would take 1515 rims of A4 paper to store the same amount of data at a cost of approximately K75,000.00. Clearly paper as a storage medium, is prohibitively expensive as compared to digital storage. The argument at the end of the day here was, how could we prove that the populations in these institutions are ready for the adoption of an Electronic Document Management Systems.

II. LITERATURE REVIEW

A. Technology Adoption Model

The study employed The Technology Acceptance Model (TAM; Davis, 1989) [2][3][5]. TAM model has been one of the most influential models of technology acceptance. With two prime factors influencing an individual intention to use new technologies Perceived ease of use and perceived usefulness.

These factors try to explain how a new technology and the various aspects of it are received and used by the user. Though many models have been proposed previously in the field of information systems to describe the relationship, it is this model which has been widely acclaimed and used. This Technology Acceptance Model is an Information systems theory that models how users come to accept and use a technology. The actual system use is the end point where people use the technology. Behavioral intention is a factor that leads people to use the technology. The behavioral intention is influenced by attitude A which is the general impression of the technology
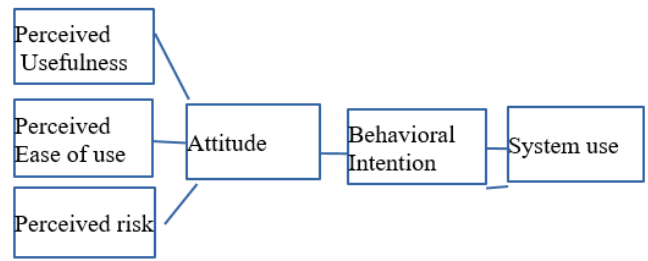

Fig. 1. TAM Model

Key factors of TAM include:

Perceived usefulness (PU) - defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease-of-use (PEOU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" [2]. Perceived risk (PR) - defined by What is as " a set of uncertainties that consumers have in their minds while purchasing a product regarding technology the outcome of the product usage". TAM has undergone some modifications to increase the factors that increase Perceived usefulness and ease of use with modifications such as TAM 2. TAM has been highly regarded both because of its parsimony and because of its high predictive power in explaining IT

Acceptance behavior across various contexts (Mathieson, 1991; Venkatesh, 2000). However, TAM is a model which has been developed a decade ago and has not been tested in the field of Education (Lee et al., 2003).
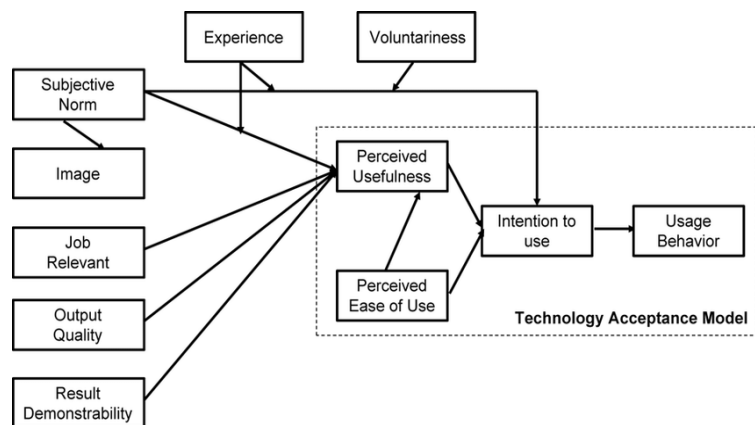
B. TAM 2

Fig. 2. (TAM 2) (Venkatesh and Davis, 2000)

1) Criticism of TAM:

TAM: Originally developed for the adoption of IT at the workplace, TAM neglects the diverse needs relevant in the voluntary consumer context. Especially the lack of subjectively norms or social impact is a major point of critique on the original TAM. The central constructs PU and PEU provide no information about how to make technology more useful and easier to use. TAM 2&3: Very complex due to the multitude of factors incorporated

2) Advantages of TAM:

TAM 1: Due to its few factors, TAM is easy to comprehend and yet has demonstrated a high level of predictiveness in many contexts.

TAM 2: Takes external and social influences into consideration as well. There is only a limited body of research, demonstrating the applicability of all factors to different fields of technology.

The TAM model refers to IT adoption in workplace situations, which is why this model is mostly used in the context of IT-related and work-related technologies. TAM 2 and 3 have been successfully applied to a wide variety of innovations, while most studies have only confirmed some of the many proposed constructs.

C. Unified Theory of Acceptance and Use of Theory (UTAUT) (Venkatesh and Davis, 2000).

The unified theory of acceptance and use of technology (UTAUT) is a technology acceptance model formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view".[1] The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. The theory holds that there are four key constructs:

1) performance expectancy,

2) effort expectancy,

3) social influence,

4) enabling conditions.

The first three are direct determinants of usage intention and behavior, and the fourth is a direct determinant of user behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior.

An Electronic Document Management System (EDMS) is a software that centrally stores and organises documentation in one digital repository. Types of EDMS include 'self-built', proprietary 'on-premise', and cloud-based solutions. The objective of an EDMS is to bring structured and secure digital filing capabilities, discoverability, and control to all the documentation your business generates so it can function effectively[1][4].

Implementing an EDMS is critical for organisations today. They must have the ability to create, process, manage, transfer and share electronic documentation. They cannot remain competitive or react to dynamic market place changes. Efficient document search and retrieval is integral to an EDMS. Every time your staff members want to access a particular document, they must find it immediately and retrieve it without delay. For this when a new file enters the system it should be indexed categorized, tagged with specific search terms and stored in an organized manner, Indexing and classification are critical EDMS features and fluidity in file organisations saves countless hours and improves productivity.

The results from the first objective have shown an overwhelming perception of usefulness which makes it easy for adoption of EDMS. Similarly most respondents believe that it will be easy to use. In terms of security risk respondents are aware of the risks but believe they can adequately be delt with. The results show high correlation between the respondents and results based on the TAM (Model). Results from the second objective show an inclination to developing custom made system rather than purchasing one of the proprietary EDMS as they are beyond most of these institutions financial capability. The study has been encouraging as it forms the basis for future development and enhancement of EDMS system which can easily be adapted by other institutions of higher learning..

III. METHODOLOGY

The study was based on a deductive quantitative research embracing positivism philosophy. The rresearch targeted three higher instutions of learning within a radius of Five kilometers within the central districts of Lusaka, Zambia. The targeted respondents were staff within the institutions with a combined population of 560 staff members was undertaken on three colleges Evelyn Hone, NIPA, and LBTC. A sample size was computed at 90% confidence levels using a simple formula $n = N/1+Ne^2$ [9] which produced 84 as the sample size. Hence 100 was taken as the default minimum sample size as recommended. A total of 100 questionnaires were sent out and 85 responses were received. Responses were distributed as follows Evelyn Hone 34, NIPA 26 and Lusaka Business and Technical College 22 respectively. The questionnaire for survey contained 21 questions both quantitative and qualitative with three Likert scale questions based on Technology Adoption Model (TAM)[2][3][5]. To assess the levels of adoption of EDMS technology in these Institutions a Technology Assessment Model (TAM) was used. The main purpose was to learn about the extent of technological awareness and readiness of operatives in these institutions in accepting new technology.

The aim of the study therefore was to identify the bottlenecks holding back the computerisation of document management systems and then coming up with a model solution that can easily be adopted by institution of higher learning Institutions in the country. The first objective was to identify levels of adoption and challenges in using document management systems in Zambia's institutions of higher learning, based on TAM model by assessing the perceived usefulness, ease of use and understanding of security risks associated with the technology. The choice of use of TAM model rather than TAM 2 is due to its simplicity but high levels of productiveness. Also TAM was designed for adoption of IT at work places than outside[2][3][5].

For developing countries, the license for proprietary software such as SharePoint are unaffordable hence the alternative is to go for Free software under the GNU Project a mass collaboration project that Richard Stallman announced on September 27,1983. Alternatively, a prototype can either be created or modified to be used by an institution. On this project the recommendation was to come up with creating a customized prototype.

IV. RESULTS

From the computed sample size, a total of 85 responses were received.

90 % of all respondents were male

90% of all respondents were professional with a hands on experience of either laptop or digital mobile device with an over 60 % usage of the device

Disagree	17	18	17	52	17
Str/Disagree	3	10	5	18	6

In terms of perceived usefulness and ease of use of EDMS 85 % responded positively

On Perceived Risk to introduction of an EDMS

The response was almost 50/50

Table iii   Institution name survey carried out

		Freq	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**EHC**	32	37.6	37.6	37.6
	LBTC	29	34.1	34.1	71.8
	NIPA	24	28.2	28.2	100.0
	Total	85	100.0	100.0	

Descriptive statistics on TAM independent variables: Perceived usefulness, ease of use and risk

Table iv   Descriptive Statistics

	Mean	**Std. Deviation**	**N**
Perceived Usefulness	4.2788	.54206	85
Perceived Ease Of Use	4.4127	.53203	85
Perceived Risk	3.6559	.71960	85

The table above shows the response of the three variables in the TAM in terms means: The highest score in the variables is 5 from the lowest 1. All the means are much closer to the highest score this depicts higher adoption levels for the technology.

Perceived usefulness   = 4.2
Perceived ease of use

Perceived risk   = 3.6

This shows the average score on the variables where the lowest score was 1 and highest 5. This shows high levels of positive attitude to EDMS technology

Table v   Correlations

Perceived Usefulness	Pearson correlation	1	.655	.137
	Sig. (2-tailed)		.000	.213
	N	84	83	84
Perceived Ease of use	Pearson correlation	.655	1	
	Sig. (2-tailed)	.000		
	N	83	84	84
Percceived risk	Pearson correlation	.137	.157	1
	Sig. (2-tailed)	.213	.157	
	N	84	84	85

Correlation is significant at the 0.01 level (2-tailed)

Table i shows   Descriptive Statistics

Evelyne

Variable	Desc	Nipa Freq	Home Freq	**LBTC Freq**	Total Freq	Percentage %
Gender	Male	18	25	16	59	76
	Female	6	7	6	19	24
Satisfied with Doc Mgt	Yes	6	12	11	29	37
	No	18	20	11	50	64
Heard of EDMS	Yes	23	22	16	61	78
	No	1	10	7	18	23
ICT infra Dev For EDMS	Yes	12	11	11	34	44
	No	12	20	12	44	56
Usage of infra Mobile Device	>50%	23	31	19	73	78
	<50%	1	1	2	5	65

From the baseline study a total of 100 questionnaires were sent and had 85 responses.

90 % of all respondents were male

90% of all respondents were professional with a hands on experience of either laptop or digital mobile device with an over 60 % usage of the device .This signified that the populations in this institutes would easily use an EDMS as the know how is high

Key factors

Table ii

Variable	Desc	Nipa Freq	Home Freq	**LBTC Freq**	Total Freq	Percentage %
Perceived Usefulness	Strongly /A	59	60	61	180	46
	Agree	49	77	35	161	41
	Neautral	9	17	35	35	9
	Disagree	3	5	5	13	3
	Str/Disagree	0	1	2	3	1
Perceived Usefulness	Strongly /A	62	68	44	174	55
	Agree	27	49	35	111	35
	Neautral	6	7	9	22	7
	Disagree	1	4	2	7	2
	Str/Disagree	0	0	0	0	0
Perceived Usefulness	Strongly /A	35	33	20	88	28
	Agree	28	56	38	122	39
	Neautral	13	11	10	34	17

On the table above we were trying to find out if there is any significant difference between the three variables correlation.

Between Perceived usefulness and perceived ease of use there a strong positive correlation which means there is difference between the means of the two variables, but with perceived risk there is a weak but positive relationship with the other two variables.

V. CONCLUSIONS

The TAM variables PU and PEOU are key to determining the attitude of staff in embracing the technology. Higher adoption levels point to higher chances of successful acceptance of the technology **Proposed method is based on the TAM** template developed by F. Davis 1989 [2], with intention of assessing how users come to accept and use the technology in question. From the preliminary results analysed, we can see that there is good response from the respondents as it shows that they believe the EDMS [1][4][6], would greatly improve document management in their institutions. Secondly almost everyone is using some form of an electronic device at the moment which can be used in accessing the EDMS. This suggests that most respondents either own or are exposed to electronic gadgets with capability of accessing the internet.

We can see from the results that the majority of staff are computer literate and have very good hands on experience with mobile devices. From the study undertaken the members of staff are ready for the introduction of an EDMS [1][4]. All indicators point to the fact that the system will be supported by the majority staff

VI. ACKNOWLEDGMENT

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