Factors Influencing Adoption-Use of Open Source ERP by Deposit-Taking Saccos in Kenya

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Abstract: *The deposit taking saving and credit cooperative societies (Deposit-Taking SACCOs) are increasingly utilizing open source enterprise resource planning (open source ERP) to improve the efficiency with the least possible cost. Understanding the factors that influence the organisation and individuals to utilize this technology can assist managers and policy makers to implement strategies to increase and improve the update of the technology and improve the innovation adoption process. The main aim of the study was to establish the factors that influence open source ERP adoption- use by deposit taking SACCOs in Kenya. The study specific objective was to identify the effect of open source ERP adoption factors on the adoption-usage of open source ERP by Deposit-Taking SACCOS in Kenya.*

Target population was 168 Deposit-taking SACCOs with sample size of 378 respondents. Questionnaire was used to collect quantitative data. SPSS and PLS-SEM using smart PLS was used to analyse the data. The study concludes that environment, attitude and normative structure adoption factors have significant influence on the adoption-use of the open source ERP. The findings indicate that, competition within the sector, internal facilitation through training and top management support can increase adoption and use. The findings reinforce the need to support new technologies from both managerial, technical and policy perspectives.

Keywords: *Open Source ERP, Technology, Organisation, Environment, Attitude, Normative Structure and Perceived Behaviour Control, Adoption, Use, Deposit-Taking Saccos.*

1. INTRODUCTION

Kenya's vision 2030 under the economic pillar requires a vibrant and stable financial system to mobilize savings and to allocate resources more efficiently in the economy. The vision on financial services sector (FSS) seeks to create a vibrant and globally competitive financial that seeks to transform the country Deposit-Taking SACCOs operation through adoption of innovative information communication technologies. The vibrant and dynamic cooperative movement in Kenya is a key player in the economy, controlling about 43 per cent of Kenya's gross domestic product (GDP). Kenya is ranked number one in Africa and seventh in the world on the strength of savings in excess of Kshs400 billion which is 35 per cent of total savings. Deposit taking savings and credit cooperative societies (Deposit-Taking SACCOs) have Kshs378 billion in deposits (Supervision Annual Report, 2014). Deposit-Taking SACCOs are one of the leading sources of rural finance and in many rural areas businesses and households the local Deposit-Taking SACCOs are the only provider of financial services (Supervision Annual Report, 2014).The cooperative movement in Kenya has improved mainly in the areas of disbursement of loans. However, it continues to miss opportunities from the use of modern Information Communication Technology (ICT) platforms. There is a need to refocus and re-assess its capacity not just only to mobilizing financial resources further, but cheap and effective technology adoption and prudent resource management for faster economic growth (Gunga, 2008).

Enterprise Resource Planning (ERP) is an integrated software package composed of a set of standard functional models that help financial institutions to become more customer-centric and efficient (Koh et al. 2009). Through ERP systems, critical business tasks including business analyses, financial and accounting processes, human capital management, support and logistics are improved for employee access, while customers, vendors and partners can gain more flexible, yet secured access to key service areas (Osoro, 2013). The cost of acquisition of a proprietary enterprise resource planning software is costly, it ranges between 2% to 6% of the firm's revenue and annual maintenance cost of

18% to 20% of the software's purchase price, monies which would otherwise been utilized to increase loan liquidity to members and portfolio.

In 2003 United Nations Conference on Trade and Development identified the use of free and open source software (FOSS) as an opportunity for Africa to leverage on the potential of FOSS to boost Africa's ICT infrastructure (Rishab, 2004). Open Source (OS) ERP brings an alternative which addresses many of the key problems found on both custom and commercial enterprise software. It begins by offering the user a freely available code base as a starting point. The user can try it for free to see if it meets his needs. There is no risk of upfront licensing fees for software that may not work. If no modifications are required, Open source ERP can be implemented with the same rapid time-to-market as commercial packages. If customizations are required, the user has a head start with an existing code base. Furthermore, the user can leverage the expertise of both in-house and Open Source Software community developers. An Open Source Software project brings with it the domain knowledge and business requirements of many contributing organizations, significantly reducing the specification risk typical of custom software. Open Source Software communities also offer user-developers collaborative help in developing and debugging of the software. The net result is better software in less time. In-long term, Open source ERP offers the user the control of the software and the external resources previously available only with commercial software, with the source code in hand, the user can decide on future support and upgrades. There is no one to "discontinue" the software for him. At the same time the software shares the common roots with Open Source Software, user can obtain support and upgrades from the Open Source Software community or purchase at subsidized price from professional-quality support from a range of vendors in the community. Thus, the risks of becoming "stranded" due to the loss of vendor support or key employees are significantly reduced with open source ERP. Proprietary ERP systems such as SAP and Oracle have long led the industry ERP and controls about 40% of the ERP software market, but new players have emerged and seemed to offer capabilities similar to their more established competitors, and most of them open source, such as : Adempiere, Compiere, ERP5, GNU Enterprise, OpenERP, Openbravo, opentaps, WebERP and BlueERP (Dionisya et al., 2015).

1.1. Statement of the Problem

The most successful adoption of technology results from understanding the target population and the factors influencing their rate of adoption. Based on the large number of Deposit-Taking SACCOs, their increasingly adoption and interest in open source ERP systems and their impact on the Kenyan economy, little academic attention has gone to the assessment of the drivers of open source ERP adoption and its impact in the industry. Given the projected increase in adoption of ERP systems it is imperative to understand extend of adoption and the determinants that can facilitate the successful implementation and assimilation of this technology into firms' daily operations. Therefore there is a need to better understand the drivers for adoption and use of open source ERPs. This is particularly true for Deposit-Taking SACCOs as the format for these ERP systems has drastically changed and the cost of implementing them is a nonissue. The low extant study on open source ERP adoption and use this certainly inhibits the understanding of the field among practitioners in a manner that can precipitate information for more absorption of the software.

1.2. The Study therefore Sought to Address the Following Objectives

To identify the effect of open source ERP adoption factors on the adoption-usage of open source ERP by Deposit-Taking SACCOs in Kenya.

1.3. Research Hypothesis

Following null hypothesis was tested;

Ho_1: Open source ERP adoption factors have no significant effect on the adoption-usage of open source ERP by Deposit-Taking SACCOs in Kenya.

The null hypotheses **Ho_1** was further subdivided into six null hypotheses for ease of analysis, the six are:

$Ho_{1.1}$: There is no influence of technology factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

$Ho_{1.2}$: There is no influence of organisation factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

Ho$_{1.3}$: There is no influence of environment factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

Ho$_{1.4}$: There is no influence of attitude factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

Ho$_{1.5}$: There is no influence of normative structure Factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

Ho$_{1.6}$: There is no influence of perceived behavior factors on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

1.4. Conceptual Framework

To implement the study various independent variables were defined and a relationship between then and the dependent variable were shown on the conceptual framework (see figure 1).Usage is the ante in the IT transition game while adoption is all about behaviors' which are inherent and subjective. Usage and adoption are a duality and both are essential in that neither alone can lead to success. Therefore it's imperative to determine the adoption factors (reasons) which influence the adoption (behaviour) and usage of open source ERP by Deposit-taking SACCOs in Kenya.
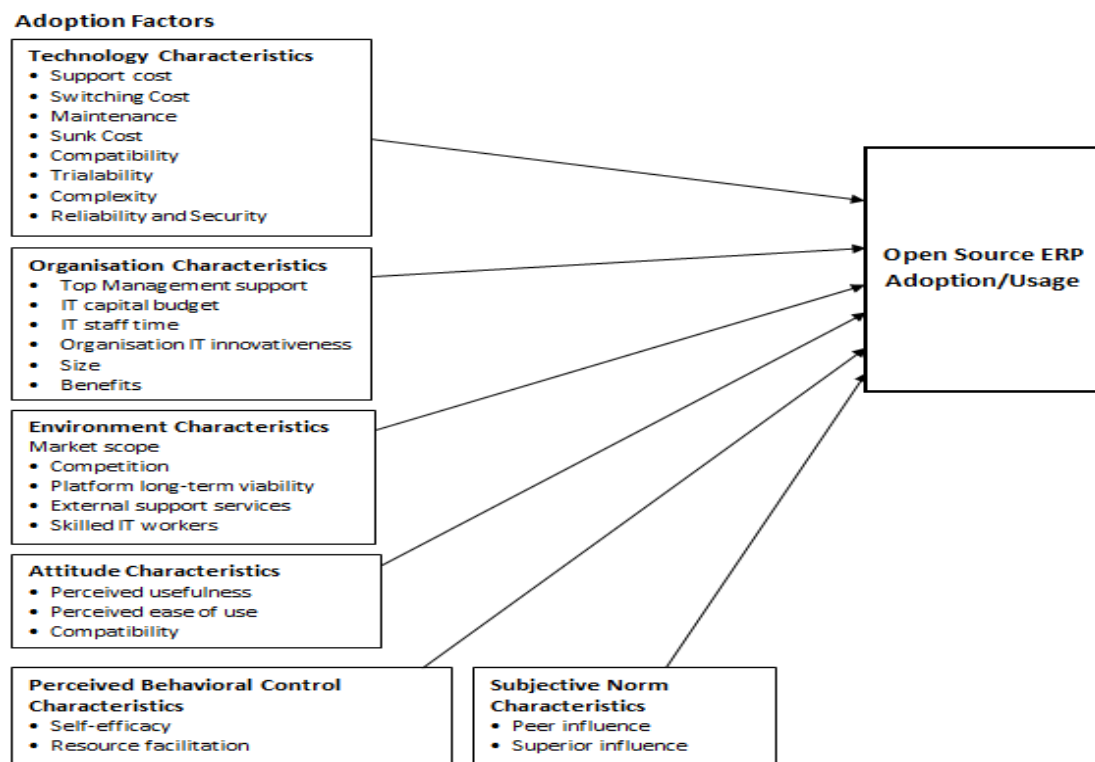

Figure1. *Factors influencing adoption and usage of open source ERP by deposit-taking SACCOs in Kenya*

2. LITERATURE REVIEW

2.1. Theoretical Review

2.1.1. Technology-Organisation-Environment (TOE) Framework

It is a fundamental approach to investigating a firm context that influences the process by which it adopts, implements, and diffuses technological innovations. A firm functions along three dimensions of technology, organisation, and environment (TOE), which influence the firm's ability to adopt or reject new technology. The Technology-Organisational-Environment (TOE) framework has been used to understand how firms adopt technology for many years (Morgan and Finnegan, 2007). Technological context includes both the internal and external technologies used by the firm this includes the factors of cost, reliability, compatibility, complexity, and performance expectancy. Meanwhile, organisational context refers to descriptive characteristics of the firm, including firm size and scope, complexity of firm managerial structure, and quality and degree of its human resources, innovativeness, and competitiveness while environmental context refers to the firm industry and its

dealings with trading partners, competitors, government, suppliers, and customers (Dedrick and West, 2003; Ellis and Van Belle, 2009; Miscione and Johnston, 2010). These factors may negatively or positively influence the decision to adoption-usageICT innovation more so open source ERP.

2.1.2. Decomposed Theory of Planned Behaviour (DTPB)

Originated from IS research field and first published in the 1990s (Taylor and Todd, 1995). As an extension of TPB (Ajzen, 1991), decomposed TPB more completely explores the dimensions of normative structure (that is; social influence) and perceived behavioral control by decomposing them into specific belief dimensions. In DTPBmodel attitudinal, normative and control beliefs are decomposed into multi-dimensional belief constructs. Reasons for adopting DTPB in IS research in general, and OSS research in particular, are described as; Firstly, the DTPB has three principle components (attitude, Normative structure s, and perceived behavioral control), which are applicable to a wide variety of complex and subjective factors associated with ICT adoption and therefore relevant for exploring and developing valid explanations of diverse factors influencing the adoption of open source ERP. Secondly, the belief components within the DTPB are decomposed into their belief structures, which provide greater scope for identifying complex factors than that offered by other theories and models. this research will seek to establish the essential components of DTPB that influence the adoption-usage of open source ERP adoption and their effect on use of open source ERP by Deposit-Taking SACCOs' in Kenya.

2.2. Empirical Review

2.2.1. Technology Characteristics for Adoption-Usage

As this complexity factor is found to be negatively influencing the firm's adoption decision on ERP, it is considered to be an important factor of open source software adoption by them (Thong 1999; Ramdani et al. 2003). Triability is "the degree to which an idea can be experimented with on a limited basis" (Rogers, 1995). This factor is considered to be important in organization adoption of ERP since it was found to be influencing firms in the adoption of electronic commerce in previous studies (Kendall et al. 2001). Observability "the degree to which the results on an innovation are visible" (Rogers 1995). Ramdani et al. (2003) found this variable to be a significant variable in firms' adoption of ERP. Petter et al., (2008) established that technology quality is the desirable characteristics of any information system. The technology quality characteristics which include; ease of use, system flexibility, system reliability, ease of learning, system success features of intuitiveness, sophistication, flexibility, and response times, are all referred to as technology complexity (Gichira*et al.* 2012).Odulaja*et al.* (2010) on the study Factors Affecting the Use and Adoption of Open-Source Software Development Process Among Nigerian Undergraduates" in selected Institutions of Higher learning in Nigeria showed that technological challenges facing developing countries in Africa such as Nigeria affected the adoption and use of open source software.

2.2.2. Organisation Characteristics for Adoption-Usage

Aurelija and Vida (2013) carried out a study to establish organisational setup factors for the success of implementation and analyse differences in evaluations opinions of experts and users of ERP systems in Lithuania. Top management support was identified as the most significant factor in determining a successful implementation of ERP systems in an organisation. Top management support relevance is also proved by the fact that it is mentioned in almost all sources of literature analysing the factors determining the success of ERP implementation. The top management support involves; management is aware of the benefits that can be achieved with the use of ERP, management always supports and encourages the use of ERP for job related work, management provides most of the necessary help and resources to enable people to use ERP, management is really keen to see that people are happy with the use of ERP, management provides good access to hardware resources when people need them (Bradford and Florin, 2003; Willcocks and Sykes 2000). If a given company has adequate resource such as plentiful budget, sufficient human resource support, ample time, and good involvement from top management, then the adopting of ERPs will be met in a positive manner. To this end, the adequate resources factor is critical to the successful adoption (Chang et al.2006) of open source ERPs by the firm. Any serious company will always want to be the leader not the follower and thus being more innovative in adopting "cutting edge" innovations.

2.2.3. *Environment Characteristics for Adoption-Usage*

Competition in the industry positively affects the firm's adoption of ERP. When the competition in the industry is directly affected by the adoption of innovation, the firm is more likely to go for such technology since, to compete in the market; this adoption would become a strategic requirement (Premkumar and Ramamurthy 1995,Kuan and Chau 2001).Scope of the Market means the market area in which an organisation operates which can be local or international; larger the scope, higher the complication of dealing with legal, ethical as well as cultural issues and diversities. Companies are on the move to expand their existing limited ICT infrastructure to get them connected with other organisations internationally, since these organisations are becoming globally operational resulting in the adoption of inter-organisational information systems (Ramdani et al. 2003). According to Rafa et al. (2009), on determining factors of ERP assimilation in Tunisian and Canadian companies, institutional pressures for a company to improve internal efficiency and performance and to preserve a leading position in the market, was identified as the key environmental aspect for ERP assimilation. Vendor support which includes; technical assistance, software updates, emergency maintenance, was classified as other important aspect of environmental dimension for successful and efficient deployment of ERP (Wang et al., 2007; Chang, 2006; Somers and Nelson, 2004).Dibo (2009) Using Diffusion of Innovation theory investigated Open Source Software adoption by Kenyan counties based on selected local authorities. The research found that OSS adoption is influenced the firm's technology adoption factor. Stewart et al. (2006) conducted global research into 138 OSS projects, making use of a positivist paradigm, empirical and quantitative data which were analysed for driving factors via the commonly-used TAM-based model. The research found that 'license restrictiveness' and organisational sponsorship were important factors to OSS usage success.

3. METHODOLOGY

The study adopted correlational research design as it is designed to investigate factors influencing open source enterprise resource planning software adoption and use by of deposit taking savings and credit cooperatives in Kenya. Hyndman (2008) describes a population as the entire collection of 'things' in which we are interested. The target population is the 164 deposit taking SACCOs licensed by SASRA as at 31st December 2016. Consistent with the prior research into ICT innovations and given the focus of this study, the target respondent group is senior managers for example: General Manager, Chief Accounting Officer, Procurement Officer, Human Resource Manager, Customer Service Manager, and ICT Manager with dedicated involvement in the adoption and implementation of ERP in their respective organisations. The total target respondent is 984.To obtain a representative sample size of the population, multi-stage sampling consisting of stratified, proportionate and convenience sampling was applied.

To arrive at the appropriate sample size, Creative Research Systems (2003) formula will be used.

$$SS = \frac{Z^2 *(p)*(1-p)}{C^2} = SS = \frac{1.96^2 *(.5)*(1-.5)}{.04^2} = 600.25$$

where:

SS=Sample size

Z=Z-value (e.g., 1.96 for a 95% confidence level)

P= Percentage of population picking a choice, expressed as decimal 0.5 (50%) used for sample size needed.

C= Confidence interval, expressed as decimal (e.g., .04=+/- 4 percentage points)

From the total target population of 984, the required sample size for an infinite population is 601, the sample size was reduced using correction formula:

$$New\ SS = \frac{SS}{1+\frac{SS-1}{POP}} = = \frac{601}{1+\frac{601-1}{984}} = 373.35\ respondents$$

A total of 378 questionnaires were self-administered to the respondents accompanied. The semi structured questionnaires were constructed using the 1-5 Likert scale type of statements, where the respondents were required to either to indicate strongly agree (5), agree (4), not sure (3), disagree (2) and strongly disagree (1).Using 8% of the sample size, a pilot test was conducted to determine the questionnaire's validity and reliability. Reliability was tested using questionnaire duly completed by thirty (30) randomly selected respondents.

4. FINDINGS

The inferential analysis was done through the Partial Least Squares (PLS) method based on Structural Equation Modeling (SEM). Structural equation modeling is a technique widely used for evaluating causal relationships between constructs. For the purpose of this study, we used PLS (partial least squares) based structural equation modeling, which helps minimize endogenous variable errors and provides a greater level of explanatory power (Hair, Hult, Ringle and Sarstedt 2013).

4.1. Demographic Information

Of the 378 total respondents, a total of 298 questionnaires were filled and returned, 9 of the returned questionnaires had invalid responses and were discarded and 289 questionnaires were found to be correct and were used for study analysis. The demographics of the sample were as follows (see table 1).Majority of 54% of the respondents were men and in terms of education level, bachelor degree graduates accounted for the largest share of 50.5%. Staff in the position of customer service manager accounted for the largest number of respondents in the target group. In terms of length of service between 5 and 10 years represented 45.7% of the total respondents. Meanwhile in terms of ICT knowledge of the respondents 146 representing 50.5% had good knowledge in ICT.

Table1. *Demographic Information*

Demographics Profile		Frequency	%
Gender	Male	156	54
	Female	133	46
Education Level	certificate	4	1.4
	Diploma	60	20.8
	Bachelor	146	50.5
	Postgraduate	79	27.3
Current Job Position	General Manager	9	3.1
	Chief Accountant	38	13.1
	Human Resource Manager	64	22.1
	Senior Procurement Officer	61	21.1
	Customer Service Manager	68	23.5
	ICT Manager	49	17
Length of service	1-4 years	61	21.1
	5-10 years	132	45.7
	Above 10 years	96	33.2
ICT Knowledge	Moderate	50	17.3
	Good	146	50.5
	Excellent	93	32.2

4.2. PLS- SEM Measurement Model

Before evaluating causal relationship between constructs in PLS-SEM, measurement model was conducted using smart PLS 3.2.8.

4.2.1. Internal Consistency and Convergent Validity

Table 2.0 shows that the measures are strong in terms of their internal consistency reliability as indexed by the composite reliability (CR[c]). All CR[c] values are above the recommended value of 0.70. Table 2.0 also shows that all the outer loadings were above 0.70. According to Bagozzi and Yi (1988), the average variance extracted (AVE) for each measure should exceed 0.5.

Table2. *Measurement model*

	Items	Loadings[a]	AVE[b]	CR[c]	Rho_A[d]	α[e]
Technology Factor	TS4	0.8563	0.7016	0.9215	0.8959	0.8936
(TF)	TS5	0.7799				
	TS6	0.8335				
	TS7	0.8616				
	TS8	0.8542				
Organisation Factor	OS16	0.9168	0.8103	0.9553	0.9446	0.9415
(OF)	OS17	0.8897				
	OS18	0.8985				
	OS19	0.9181				

	OS20	0.8772				
Environment Factor	ES22	0.8775	0.794	0.9506	0.9373	0.935
(EF)	ES23	0.8498				
	ES24	0.9043				
	ES25	0.915				
	ES26	0.9071				
Attitude Factor	DPBACo32	0.7726	0.679	0.9267	0.9935	0.9126
(AF)	DPBACo33	0.7355				
	DPBAPE30	0.8274				
	DPBAPE31	0.8801				
	DPBAPU28	0.8703				
	DPBAPU29	0.8484				
Normative structure Factor	DPBNSPI34	0.909	0.8852	0.9686	0.9585	0.9566
(NSF)	DPBNSPI35	0.9538				
	DPBNSSI36	0.9619				
	DPBNSSI37	0.9379				
Perceived Behavior Factor	DPBPBSRFC40	0.9152	0.818	0.9473	0.9266	0.9258
(PBF)	DPBPBSSE38	0.9123				
	DPBPBSSE39	0.9046				
	DPBPBSTFC41	0.8852				
Usage Factor	ExtUSG1	0.9378	0.8925	0.9803	0.9759	0.9759
(UF)	ExtUSG2	0.9358				
	ExtUSG3	0.936				
	ExtUSG4	0.9559				
	ExtUSG5	0.9592				
	ExtUSG6	0.9434				

- All Item Loading >0.5 indicates indicator Reliability (Hulland,1999,p.198)
- All Average Variance Extracted(AVE)>0.5 as indicates convergent Reliability (Bagozzi and Yi (1988); Fornell and Larcker (1981))
- All Composite reliability (CR) >0.7 indicates internal Consistency (Gefen, et al, 2000)
- rho_A - coefficient Dijkstra-Hensele
- All Cronbach's alpha >0.7 indicates indicator reliability (Nunnally, 1978)

4.2.2. Discriminant Validity

The study employed the Fornell and Larcker (see table 3.0) to test discriminant validity. The results indicate that the values are not above 1.0 as recommended by Fornell and Larcker and therefore no discriminant validity.

Table3. *Forenell and Larcker Criterion*

	AF	EF	NSF	OF	PBF	TF	AUF
AF	**0.824**						
EF	0.573	**0.891**					
NSF	0.587	0.577	**0.941**				
OF	0.687	0.499	0.537	**0.900**			
PBF	0.492	0.456	0.548	0.429	**0.904**		
TF	0.494	0.633	0.447	0.416	0.525	**0.838**	
AUF	0.737	0.614	0.648	0.572	0.520	0.502	**0.945**

Note: TF-Technology factor, OF-Organisation factor, EF- Environment factor, AF-Attitude Factor, NSF-Normative structure factor, PBF-Perceived Behavior Factor, AUF- Adoption-Usage Factor

4.3. Structural Model Assessment

4.3.1. Structural Model Path Coefficients and Coefficient of Determination (R2)

Table 4.0shows that the R^2 value for the endogenous construct was above the 25% accepted level set as the threshold, while table 5.0 shows the bootstrapping results for hypotheses testing1.

Table4. *(R2)*

Constructs	R Square	R Square Adjusted	Cut Off	Description
Usage Factor (UF)	0.641	0.634	≥0.50	Substantial

Table5. *Direct hypothesis testing by bootstrapping*

	HyR	β	SD	|t-value|ʌ	P Values	Sig. Level	Decision	95%CI LL	95%CI UL	f²
Ho₄	TF -> UF	0.026	0.053	0.502	0.615	NS	Accepted	-0.060	0.111	0.003
Ho₅	OF -> UF	0.013	0.068	0.252	0.801	NS	Accepted	-0.100	0.124	0.004
Ho₆	EF -> UF	0.167	0.063	2.690	0.007	***	Rejected	0.059	0.303	0.036
Ho₇	AF -> UF	0.454	0.056	7.835	0	****	Rejected	0.363	0.545	0.230
Ho₈	NSF -> UF	0.222	0.06	3.744	0.0002	****	Rejected	0.123	0.318	0.071
Ho₉	PBF -> UF	0.076	0.047	1.681	0.092	NS	Accepted	-0.001	0.156	0.010

Note: HyR- hypothesis relationship**,** f^2- effect size**,** β- beta coefficient, SD- Standard deviation, ** $p \leq 0.05$, *** $p \leq 0.01$, **** $p \leq 0.001$, NS- Not significant, CILL-confidence interval Lower Limit, CIUL-confidence interval Upper Limit. TF-Technology factor, OF-Organisation factor, EF- Environment factor, AF-Attitude Factor, NSF- Normative structure factor, PBF-Perceived Behavior Factor, UF- Usage Factor

4.4. The Effects of Open Source ERP Adoption Factors on the Adoption-Usage of Open Source ERP by Deposit-Taking Saccos in Kenya

The study set to determine the influence of technology, organisation, environment, attitude, normative structure and perceived behavior factors on usage of open source ERP by DTS- SACCOs in Kenya.

The null hypothesis to be tested in this case was:

Ho₁: Open source ERP adoption factors have no significant effect on the usage of open source ERP by Deposit-Taking SACCOs in Kenya.

Given the finding of the study the null hypothesis Ho₇, Ho₈, and Ho₉ changes to alternate hypotheses:

H₁.₃: There is influence of environment factor on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

H₁.₄: There is influence of attitude factor on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

H₁.₅: There is influence of normative structure factor on the adoption-usage of Deposit-Taking SACCOs in Kenya**.**

The results (see table 11) indicate that only three predictors had significant influence on the adoption-usage of open source ERP by the Deposit-Taking SACCOs , technology factor (TF) has no significant influence on the adoption-usage of open source ERP by Deposit-Taking SACCOs in Kenya (β = 0.026, t= 0.502, p =0.615), confidence interval = [-0.060, 0.111]), as well as organisation factor (OF) has no significant influence on the adoption-usage of Deposit-Taking SACCOs in Kenya (β = 0.013, t= 0.252, p =0.007) and confidence interval = [-0.100, 0.124]). There was significant influence of environment factor on the adoption-usage of Deposit-Taking SACCOs in Kenya (β = 0.167, t= 2.69, p =0.007, confidence interval = [0.059, 0.303]), the attitude factor had significant influence on the adoption-usage of Deposit-Taking SACCOs in Kenya (β = 0.454, t= 7.835, p =0.00, confidence interval = [0.363, 0.545]). The Normative structure Factor (NSF) had significant influence on the adoption of Deposit-Taking SACCOs in Kenya (β = 0.22, t= 3.744, p =0.0002, confidence interval = [0.123, 0.318]) and finally there was no significant influence of perceived behavior factor on the adoption-usage of Deposit-Taking SACCOs in Kenya (β = 0.076, t= 1.681, p =0.092, confidence interval = [-0.001, 0.156]). Table 4.10 further shows that the exogenous constructs environment factor (EF), attitude factor (AF) and Normative structure Factor (NSF), have small effect size (f^2 = 0.036), moderate effect size (f^2 = 0.23) and small effect size (f^2 = 0.071) respectively. This means that of the 64.1% variance in Usage Factor (Adoption) (see table 4.10), attitude factor (AF) explain for the largest variance in comparison to environment factor (TF) and Normative structure Factor (NSF).

The significance of environment to influence the adoption-usageof open source ERP in this study compliments to the study of (Abdullah *et al.,* 2016; Li, 2013; Vitharana and Chapman 2010) who found that environmental factor had significant effect on the use of cloud computing and open source software by organisations. This is because the businesses outweigh each other through adoption the most cost effect but efficient technology in the market, this leads to other businesses copying from each other. The environment factor is not made only of competition component but also by market scope of the organisation and long-term viability of the technology which plays significant role to use

of open source ERP by the Deposit-Taking SACCOs. The study findings that attitude factors (perceived usefulness and ease of use) and normative structure factors (peer influences and superior influences) personal and interpersonal interactions greatly influence the use of open source ERP within the Deposit-Taking SACCOs, the findings of this study extents those of Anidza*et al.* (2015), Abdullah et al. (2016), Zaouia*et al.*, (2016), Li (2013),Bueno and Gallego (2010). The insignificance of perceived behavior on the adoption and use of open source ERP is inconsistent withZaouia*et al* (2016), Odulaja*et al.* (2010) and Stewart *et al.*(2006 on their studies found that behavioral intention significantly influenced the use of open source software.

5. CONCLUSIONS AND RECOMMENDATIONS

The study found out that environment factor, attitude and normative structure factors had significant effect on the adoption-usage of the open source ERP among the deposit-taking SACCOs. This means the use of the system was mostly driven by environment, attitude and normative structures factors. This meant that the three factors will have more impact on the performance of the organisation and therefore more effort should be put on the characteristics that form the three factors.

Based on the study findings, several policies aimed at enhancing the performance of the Deposit-Taking SACCO subsector using open source enterprise resource planning can be formulated. Secondly Forums for awareness of open source ERP by SACCOs' management should conducted to encourage buy-in by SACCO staff. In addition, management of Deposit-Taking SACCOs should offer specialized training for the ICT staff to learn more about open source ERP development and implementation. Increased adoption and use of open source ERPs within SACCOs should be encouraged by the SACCO's management to enhance their performance. Thirdly; academicians should collaborate with players in software design, development and support of open source to further develop capabilities of open source ERP in order to support the emerging technological, organisational, environmental and people needs which will encourage their utilisation within organisations.

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