FACTORS INFLUENCING ADOPTION OF DIGITAL WEIGHING SCALES AMONG COFFEE CO-OPERATIVE SOCIETIES IN IMENTI NORTH SUB-COUNTY, MERU, KENYA

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ABSTRACT

Cooperative societies are responding to customer's demand by becoming more innovative in many ways in response to rapidly changing business environment. With the rapid technological changes, innovation has become inevitable for the firms to position themselves and gain a competitive edge. Digital weighing scale is one of the key factors for improving the competitiveness and productivity in cooperatives. The purpose of this study was to determine the factors that influence the adoption of digital weighing scales within Imenti North Sub-County. This study objectives were; to determine how user perception influences the adoption of digital weighing scales, to find out how user convenience influence adoption of digital weighing scales, to assess how initial investment cost influence adoption of digital weighing scales and to establish how initial investment cost influence adoption digital weighing scales among coffee cooperative societies in Imenti North Sub-County. The study adopted a descriptive research design. The target population for this study was 2502 management committee members of coffee cooperative societies and affiliated coffee farmers within Imenti North Sub-County, Meru County with a sample size of 232. The open-ended structured questionnaires used generated descriptive statistics, frequencies, percentages, mean score and Standard deviation. Quantitative variables are presented inform of tables while inferential data analysis was done using multiple regression analysis. The findings are in frequency tables. The

findings revealed that improved competitiveness in the speed and reliability of transactions influenced adoption of technology. Findings further show that increased transparency in view of balances and logs of transactions done positively influence adoption of weighing scales. On the service efficiency, the findings indicate minimal errors reading influenced organization decision in adopting new technology. The user perception had a positive and significant influence on the adoption of digital weighing scales among coffee cooperative societies. User convenience positively influenced adoption of digital weighing scales among coffee cooperative societies. The initial investment cost had a positive and significant influence on the adoption of digital weighing scales among coffee cooperative societies. They study therefore recommends training of farmers through organised seminars as well as workshops to instil skills and knowledge to the farmers and also enable smooth transition from the old to the new technology as well as influencing adoption of the digital weighing scales. The study also recommends that digital weighing machine made in such a way that a farmer can easily use them. The modified scales are easily readable and easy to interpret. The study recommends that the weighing scales made should be of high speed since majority of users commented more on the importance of speed in their choice of digital weighing scales.

Key Words: *digital weighing scales, coffee co-operative societies, Imenti North Sub-County, Meru, Kenya*

INTRODUCTION

The emergence of the information and communication technologies has resulted in considerable changes in business, which has led to the so-called Information Society. The Information Society is a social paradigm that offers a great opportunity, as most people connected through an electronic device to telecommunications systems, and more specifically to the Internet (Heeks, 2010). The emergence of the information and communication technologies empowers knowledge sharing (Avgerou, 2012). The environment in which organizations and more specifically cooperative societies, operate is constantly changing with different factors such as technology advancement for their operations.

Since the turn of the millennium, the general business environment has become more volatile, unpredictable and very competitive. Coping with the increasingly competitive environment has called on firms to rethink their customer approach and satisfaction (Pearce & Robinson, 2005). Cooperatives are responding to customer's demand by becoming more innovative in their new ways of approaching the changed business environments (Aosa & Wainaina, 2014). They adopt strategies such as improved customer services, credit facility, post-paid cards and provision of convenience in supply of goods and services. With the rapid technological changes, innovation has become inevitable such as the adoption of digital weigh scales. Measuring weight is a vital and essential part of many industrial manufacturing and processing operations. Njihia (2012) observed that assessment by weighing and measuring is a prime necessity of life in a human society. It is essential to the making and exchange of goods, erection of building and to the devices of transport. There is no trade or industry of human beings, which does not tend to depend on it, no dealing in property, which is not defined by it (Aosa & Wainaina, 2014)

According to Kamau (2016), the law expressly prohibits use of inaccurate weighing and measuring instruments because inaccuracies in weighing and measuring instruments may cause serious economic loss to the consumer. In the development process of weighing scale system, worldwide the focus is on precision and accuracy. Das, Dutta and Guha (2015) observed that it is very difficult to measure weight with proper accuracy because of errors that causes losses. A load cell is a transducer used to convert a force into electrical signal. The sensor used in weighing scale, which gives out digital out-put, is load cell (Das, Dutta & Guha, 2015).

Agricultural cooperatives societies are an important part of economic activity in the Agri-food sector in the whole world. These cooperatives provide employment, mostly in rural areas, making them a real economic, social and cultural engine in rural and less populated areas in the country (Monzón & Chaves, 2012). Marcuello and Sanz (2008) argue that the characteristics of cooperative societies, based on the formula of ownership and democratic control supported in cooperative principles and values, provide a type of management that is in accord with the demands of the Society of Knowledge. Kiiza and Pederson (2012) indicated that the specific features of cooperative companies, derived from cooperative principles, could provide additional

opportunities for the positive effects of digital weigh scale used in obtaining competitive advantages.

In Kenya, cooperative societies create an important component of the economy. Vision 2030 of Kenya recognizes cooperatives as a prime mover in financial resource mobilization to create a vibrant and globally competitive financial sector in Kenya (Olando, Jagongo & Mbewa, 2013). The cooperatives societies are democratic and designed to meet the social and the economic needs of their members. The cooperative societies provide livelihood to 63% of Kenyans both directly and indirectly (Githinji, 2014). The sector continues to grow at 20% per annum while at the same time, cooperative institutions contribute to the direct employment of over 250,000 people and indirectly through establishment of linkages between firms, farms, markets and through provision of collective and individual investments. Meru County has the second highest number of cooperatives in Kenya (56), following Nairobi which has a total of (85) cooperatives (Olando et al., 2013). Imenti North Sub-County has 13 registered cooperatives (Mwangi, 2013).

STATEMENT OF THE PROBLEM

Weighing scale machines have evolved from manual to electronic digital machines. However, farmers having been facing a challenge in accessing weighing scale machines that are transparent and reliable to measure accurately the value of their produce. Montegut-Salla, Cristóbal-Fransi and Gómez-Adillón (2013) carried out a study on understanding the situation and factors of ICT adoption in agricultural cooperatives. Chaddad and Iliopoulos (2013) studied control rights, governance, and the costs of ownership in agricultural cooperatives. Walsh and Charlton (2014) investigated the association between the development of weighing technology, possession and use of weighing scales and self-reported severity of disordered eating while Kumar, et. al. (2015) evaluated the reliability of a digital weighing scale relative to the measuring limb load asymmetry. Therefore, with all these extra ordinary features, this Embedded System based Digital weighing scale will prove to be great miracle for consumer. In addition, the use of digital scales is one of the key factors for improving the competitiveness and productivity in cooperatives. However, the adoption of digital weigh scales by cooperative societies in Imenti North Sub-County of Meru County has not been very impressive with only a few using digital weighing scales. This study seeks to to establish the factors that influence the adoption of digital weighing scales within Imenti North Sub-County. The research findings suggest that whereas the digital gap on material access is closing in the region, the gap on access to skills, usage and utilization is still wide and requires intervention. The proposed framework for adoption indicates that government and infrastructure, human capital development and social perspectives are the main dimensions that weigh heavily on digital inclusion. Wangui (2011) conducted a research on process and challenges of digitization in Kenya in study in the road transport department of Kenya Revenue Authority. Njihia (2012) challenges facing the use of technology on legal metrology in Meru municipality. Mwangi (2013) evaluated factors influencing dairy cooperative society's performance in Mathira and Kieni Constituencies, Nyeri County. In addition, Motanya (2013) studied the strategic responses by weighing scale dealers in Kenya to changes in external

environment. However, none of the reviewed scholars has studied the factors that influence the adoption of digital weighing scales. This study will seek to fill this gap by answering the question: what factors influence the adoption of digital weighing scales within Imenti North Sub-County, Meru County.

OBJECTIVES OF THE STUDY

1. To determine how user perception influences the adoption of digital weighing scales among coffee cooperative societies in Imenti North Sub-County.
2. To examine how user convenience, influence the adoption of digital weighing scales among coffee cooperative societies in Imenti North Sub-County.
3. To assess how initial investment cost influence adoption of digital weighing scales among coffee cooperative societies in Imenti North Sub-County.
4. To establish how service efficiency influence adoption digital weighing scales among coffee cooperative societies in Imenti North Sub-County.
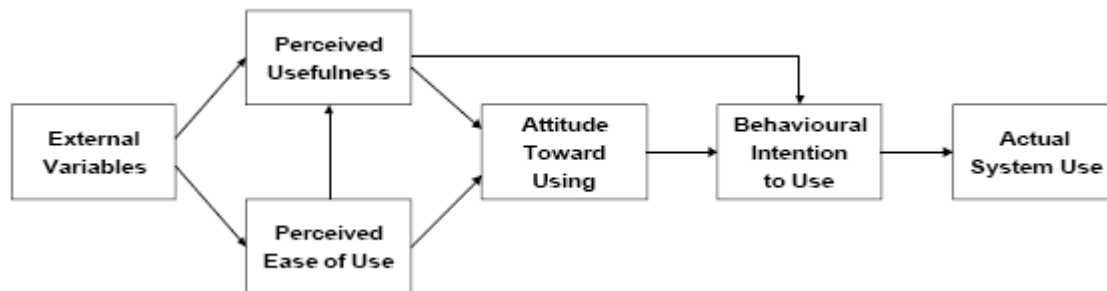
THEORETICAL FRAMEWORK

This study will adopt Technology Acceptance Model and Schumpeter's theory. Technology Acceptance Model introduced by Davis (2009), is an adaptation of the Theory of Reasoned Action specifically tailored for modelling user acceptance of information systems. The goal of TAM is to provide an explanation of the determinants of technology acceptance that is in general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified.

A key purpose of technology acceptance model is therefore to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions. Technology acceptance model formulated in an attempt to achieve these goals by identifying a small number of fundamental variables suggested by previous research dealing with the cognitive and affective determinants of technology acceptance, and using TRA as a theoretical backdrop for modelling the theoretical relationships among these variables (Mohamed & Kathy, 2008). Technology acceptance model posits that two particular beliefs, perceived usefulness (PU) and perceived ease of use are the primary relevance for technology acceptance behaviour. Perceived usefulness is the degree to which a prospective user believes that using a particular system would enhance his or her job performance.
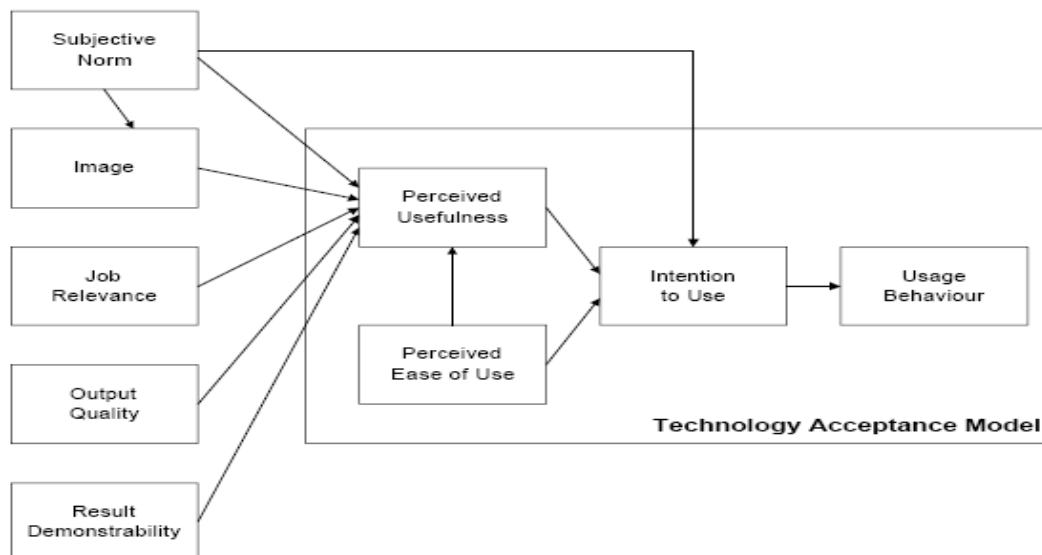
This follows from the definition of the word useful: capable of being advantageously. Within an organizational context, people reinforced for good performance by raises, promotions, bonuses, and other rewards (Wallace & Sheetz, 2014). A system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship. Thus, farmers in cooperative societies would be willing to adopt new digital weigh scales if they are more useful than the traditional weigh scales. Perceived ease of use refers to the degree to which

a prospective user believes that using a particular system would be free of effort. This follows from the definition of ease: freedom from difficulty or great effort. Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible (Cheung & Vogel, 2013). All else being equal, an application perceived to be easier to use than another was. Consequently, co-operatives societies in Imenti north sub-county would adopt digital weighing scales...

Figure 1: Technology Acceptance Model, Source: Davis, 2009

However, one criticism of the current technology acceptance model is that there are very few investigations target at the study of the factors that affect the PU and perceived ease of use. In order to address this issue, Venkatesh and Bala (2013) used three experiments to investigate the determinants of Perceived Ease of Use. The results showed that general Computer Self-Efficacy significantly affects Perceived Ease of Use at all time, while Objective Usability of the system affects users' perception after they have direct experience with the system.

Figure 2: Extension of Technology Acceptance Model (ETAM), Source: Venkatesh and Davis, 2000

Furthermore, Venkatesh (2014) developed and tested a technology acceptance model by including a number of determinants to Perceived Usefulness into the new model. It is a theoretical extension of the Technology Acceptance Model that explains Perceived Usefulness and Usage Intentions in terms of social influence processes (Subjective Norm, Voluntariness, and Image) and cognitive instrumental processes (Job Relevance, Output Quality, Result Demonstrability and Perceived Ease of Use).

The Schumpeter's theory of innovation highlights the role of innovation in the entrepreneurial process. Schumpeter (1965) describes a process of creative destruction where wealth creation occurs through disruption of existing market structures due to introduction of new goods and/or services that cause resources to move away from existing firms to new ones thus allowing growth. Accordingly, Schumpeter calls innovation the specific tool of entrepreneurs, the means by which entrepreneurs exploit change as an opportunity for a different business or a different service. Schumpeter (1965) stressed the role of entrepreneurs as primary agents effecting creative destruction, and emphasized to the entrepreneurs the need to search purposefully for the sources of innovation, the changes and their symptoms that indicate opportunities for successful innovation, as well as their need to know and to apply the principles of successful innovation.

Successive scholars and researchers (Aghion, Akcigit & Howitt, 2013) have carried this Schumpeterian line of thinking forward. On his part, Drucker (2014) held out the entrepreneur always searching for change, responding to it, and exploiting it as an opportunity, and engaging by this means in purposeful innovation. Lumpkin and Dess (2015) saw the process of creative destruction as initiated by an entrepreneur, which makes innovation an important success factor within EO. Furthermore, the link between entrepreneurship and innovativeness is supported by the results of Kisker (2016), who found that innovation is among the key motives to start Entrepreneurial pro-activeness can also be seen as alertness of the organization.

The innovative organization focuses on the past, the present and the future with equal zeal, using history to explain and fully understand the present and to challenge and create its own proactive future. Innovation is vital to cooperative societies since it helps them satisfy customer and member's needs. Societies with the highest turnover can be associated with great commitment to innovation and research (Alvearez & Barney, 2013). EL-Annan (2013) posits that in an external setting that is ever changing, innovation and entrepreneurial conduct are processes that are holistic, vibrant and complementary fundamental to an organization's sustainability and success.

Technology acceptance model is relevant to this study as it helps in understanding particular beliefs, perceived usefulness (PU) and perceived ease of use that are the primary relevance for technology acceptance behaviour. Schumpeter's theory is relevant to this study as it focuses entrepreneurial process that is of interest in adoption of digital weighing scales by coffee co-operatives societies in Imenti North sub- county, Meru County.

EMPIRICAL LITERATURE REVIEW

Antônio, Luciano and Marco (2016) studied on the factors that influence the adoption and implementation of public digital accounting according to the evaluation by managers of Brazilian companies. This study aimed to identify the factors that influence the adoption and implementation of the public digital accounting system according to the evaluation of managers of Brazilian companies, expressed in response to a survey, based on the criteria established by the TOE framework, considering technological, organizational and environmental dimensions. The results show that although other factors influence decisions about the adoption and implementation of the SPED, government requirement, as a component of the environmental dimension, is the main factor driving those decisions. This seems to result from the fact that the government is a major, if not the main, actor in the regulatory environment. We also identified big expectations of companies regarding the possibility of reducing the volume of ancillary tax obligations (record-keeping and reporting obligations). The ranking generated from the survey is a contribution to the improvement of strategies for implementation of e-government projects, both by governments and companies.

Nadim and Noorjahan (2008) established the role of perceived usefulness, perceived ease of use, security and privacy, and customer attitude to engender customer adaptation in the context of technology. This research intended to propose a conceptual framework that will investigate the effects of perceived usefulness, ease of use, and security and privacy on customer adaptation mediated through customer attitude. To test the framework, structural equation modelling techniques applied to data collected from 227 customers of private commercial banks in Bangladesh. Primarily this study aims to test the theoretical models to measure the causality whether perceived usefulness, ease of use, security and privacy, and customer attitude can foster customer adaptation. The initial results of the study indicated that perceived usefulness, ease of use, security, privacy, and customer attitude are significant and positively related to customer adaptation.

Wambugu (2016) established a framework towards digital inclusion in Kiambu County. This study bridged digital divide by developing a framework for adoption to promote digital inclusion. To achieve this objective, the researcher adopted a descriptive survey that purposively targeted rural respondents to understand causes of digital divide. The researcher used questionnaires and document analysis guide as the main research instruments and structured interview. The gathered data was descriptively analysed and presented in the form of frequencies, charts and graphs. This formed the basis for the discussion, findings and recommendations of the study.

The data coding and analysis using qualitative and quantitative methods. The research findings suggest that whereas the digital gap on material access is closing in the region under study, the gap on access to skills, usage and utilization is still wide and requires intervention. The proposed framework for adoption indicates that government and infrastructure, human capital

development and social perspectives are the main dimensions that weigh heavily on digital inclusion.

Njihia (2012) conducted a study on challenges facing the use of technology on legal metrology: the case of Meru municipality, Kenya. The study had the objectives, to establish the influence of cost of digital/electronic weighing and measuring instruments on legal metrology. To assess the influence of operation of electronic weighing and measuring instruments on legal metrology; to establish the extent to which technical knowledge and training on electronic weighing and measuring instruments influence legal metrology; to establish how standardization of electronic weighing and measuring instruments influence legal metrology. The study targeted traders, weights and measures officers, licensed weights and measures repairers in Meru region from Meru Municipality. The researcher used stratified random sampling procedure and then adopt descriptive research design. The data gathered from the traders in Meru, weights and measures Officers in Meru region and of Meru Municipality. The questionnaires structured focused on the objectives of this study. Data required for analysis was collected from the respondents and analyzed using Statistical Packages for Social Service

RESEARCH METHODOLOGY

Research Design

The study adopted a descriptive research design. A descriptive design is concerned with determining the frequency with which something occurs (Bryman & Bell, 2011). Thus, this approach is suitable for this study, since the study intended to collect comprehensive information. Bryman and Bell (2011) assert that a descriptive design seeks to get information that describes existing phenomena by asking questions relating to individual perceptions and attitudes.

Target Population

According to Sekaran and Bougie (2010), a population is the total collection of elements about which we wish to make inferences. The target population for this study composed of 2502 management committee members of cooperative societies and coffee farmers within Imenti North Sub-County, Meru County.

Sample Size and Sampling Procedures

Ngechu (2004) underscores the importance of selecting a representative sample through making a sampling frame. From the population frame the required number of subjects, respondents, elements or firms selected in order to make a sample. Stratified proportionate random sampling technique method selected the sample. Sampling is a deliberate choice of a number of people who were to provide the data from which study draw was to conclusions about some larger group whom these people represent. The section focuses on the sampling size and sampling procedures.

The sample size is a subset of the population that is representative of the entire population (Kumar, 2011). A sample population of 232 was arrived at by calculating the target population of 2502 with a 95% confidence level and an error of 0.05 using the below formula taken from Kothari (2014)

$$n = \frac{z^2 . N . \partial_p^2}{(N-1)e^2 + z^2 \partial_p^2}$$

Where; n = Size of the sample,

$\quad N$ = Size of the population and given as 2502

$\quad$ e = Acceptable error and given as 0.05,

$\quad \partial p$ = the standard deviation of the population and given as 0.5 where not known,

$\quad$ Z = Standard variate at a confidence level given as 1.96 at 95% confidence level.

The study selected the respondents using stratified proportionate random sampling technique. Stratified random sampling is unbiased sampling method of grouping heterogeneous population into homogenous subsets then selecting within the individual subset to ensure representativeness (Kumar, 2011). The goal of stratified random sampling is to achieve the desired representation from various sub-groups in the population. In stratified random sampling subjects are selected in such a way that the existing sub-groups in the population are more or less represented in the sample (Kothari, 2004). The study used simple random sampling to pick the respondents in each stratum.

Research Instruments

The questionnaire had of both open ended and closed ended questions. The open-ended questions encouraged the respondent to give an in-depth and felt response without feeling held back in illuminating of any information and the closed ended questions allowed respondent to respond from limited options. According to Saunders (2011), the open ended or unstructured questions allow profound response from the respondents while the closed or structured questions are generally easier to evaluate. The use of questionnaires was an effort to conserve time and money as well as to facilitate an easier analysis as they were in immediate usable form.

Pilot Testing

Pilot testing refers to putting of the research questions into test to a different study population but with similar characteristics as the study, population to be studied (Kumar, 2011). Pilot testing of the research instruments using staff working in randomly selected cooperative societies not selected into the sample. At least 32 questionnaires administered to the pilot survey respondents chosen at random. After one day, the same participants had to respond to the same questionnaires but without prior notification in order to ascertain any variation in responses of the first and the second test. This is very important in the research process because it assists in identification and correction of vague questions and unclear instructions. It is also a great opportunity to capture the important comments and suggestions from the participants. This helped to improve on the

efficiency of the instrument. This process done until the researcher is satisfied that the instrument does not have variations or vagueness.

Validity of Research Instruments

According to Golafshani (2012), validity is the accuracy and meaningfulness of inferences, based on the research results. One of the main reasons for conducting the pilot study is to ascertain the validity of the questionnaire. The study used content validity, which draws an inference from test scores to a large domain of items similar to those on the test. Content validity is concerned with sample-population representativeness. Gillham (2011) stated that the knowledge and skills covered by the test items should be representative to the larger domain of knowledge and skills. Expert opinion to comment on the representativeness and suitability of questions and give suggestions of corrections to the structure of the research tools. This helped to improve the content validity of the data. Content validity by asking for the opinion of the supervisor, lecturers and other professionals on whether the questionnaire will be adequate.

Data Collection Procedures

The researcher obtained an introduction letter from the university and need a research permit from NACOSTI, which presented to each stakeholder. The drop and pick method was preferred for questionnaire administration to give respondents enough time to give well thought out responses. The researcher booked appointment with respondent organizations at least two days before visiting to administer questionnaires. The researcher personally administered the research instruments to the respondents. This enabled the researcher to establish rapport, explain the purpose of the study and the meaning of items that may not be clear as observed by Best and Khan (2003).

Data Analysis Techniques

Data analysis using Statistical Package for Social Sciences (SPSS Version 22.0) software. All the questionnaires received had a reference and items coded to facilitate data entry. After data cleaning which entailed checking for errors in entry, descriptive statistics such as frequencies, percentages, mean score and standard deviation. The qualitative data from the open ended questions was analyzed using conceptual content analysis and presented in prose. Inferential data analysis using multiple regression analysis. Multiple regression analysis was to establish the relations between the independent and dependent variables and to test research hypotheses. Multiple regression is the procedure that uses two or more independent variables to predict a dependent variable. Since there are four independent variables in this study the multiple regression model generally assumed the following equation.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y= Adoption of digital weighing scale

β_0=constant β_1, β_2, β_3 and β_4 = regression coefficients

X1= User perception, X2= User convenience, X3= Initial investment cost, X4= Service efficiency

ε=Error Term

RESEARCH RESULTS

Reliability Analysis

Reliability is concerned with the question of whether the results of a study are repeatable. The questionnaires to a pilot group of 32 randomly selected respondents from the target population and their responses used to check the reliability of the tool.

Table 1: Reliability Analysis

Coefficients Scale	Cronbach's Alpha	comments
User perception	0.899	Reliable
User convenience	0.735	Reliable
Initial investment cost	0.773	Reliable
Service efficiency	0.843	Reliable
Composite reliability coefficient	0.8125	

The findings of the pilot study shows that all the four variables were reliable as their reliability values exceeded the prescribed threshold of 0.7 with a composite reliability coefficient of 0.8125.

Multiple Regression Analysis

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.820	0.672	0.664	0.112

R-Squared is a commonly used statistic to evaluate model fit. R-square is 1 minus the ratio of residual variability. The adjusted R2, also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. 66.4% of the changes in the dependent variable are attributed to the combined effect of the predictor variables.

Table 3: Summary of One-Way ANOVA results of the regression analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	4.342	4	1.086	85.388	0.000
1	Residual	2.123	167	0.013		
	Total	6.465	171			

F calculated (85.388) being greater than F critical (2.14) as well as a p-value (0.000) less than 0.005 indicated that regression relationship was highly significant in predicting how adoption of digital weighing scale is affected by user perception, user convenience, initial investment cost and service efficiency. The Regression coefficients for the relationship between the four independent variables and dependent variable were as shown In in Table 4.

Table 4: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.036	0.155		6.684	0.0000
User perception	0.766	0.271	0.572	2.827	0.0050
User convenience	0.619	0.146	0.397	4.240	0.0000
Initial investment cost	0.815	0.232	0.602	3.513	0.0005
Service efficiency	0.573	0.221	0.432	2.593	0.0104

The established multiple regression equation for predicting adoption of digital weighing scales from the four independent variables was:

$$Y = 1.036 + 0.766X_1 + 0.619X_2 + 0.815X_3 + 0.573X_4$$

Where: Y= Adoption of digital weighing scale; X_1= User perception, X2= User convenience, X3= Initial investment cost, X4= Service efficiency

The research findings revealed that adoption of digital weighing scale would be 1.036 if user perception, user convenience, initial investment cost and service efficiency held constant. The research findings also implied that there would be a 0.766 increase adoption of digital weighing scale when user perception increased while holding other factors constant. The study findings also revealed that adoption of digital weighing scale would increase at a rate of 0.619 if user convenience increased while other factors held constant.

The research findings further found that while other factors held constant, adoption of digital weighing scale is 0.815 if initial investment cost was increased and that aadoption of digital weighing scale will be 0.573 if service efficiency was increased. All variables were significant since their p-values were less than 0.005.

Discussion of the Key Findings

This section of the report discusses the findings and compares them with literature reviewed in chapter two.

User Perception

The study results revealed that improved competitiveness in the speed and reliability of transactions influence adoption of technology. This conforms to several studies by (Giovanni & Mario, 2013) which found that ICT in general offers an organization a wide range of possibilities for improving their competitiveness. Again, the study findings showed that benefits perceived influence the attitude towards acceptability and use of a technology in a significant way. This corresponds to Reynolds, Savage and Williams (2007) who claims that organization's managers are unlikely to adopt sophisticated technologies if they are not familiar with it. In addition, knowledge and skills influenced organization decision in adopting new technology. This was in line with Long and MacGregor (2016) who asserted that lack of skills amongst workforce affects the use of new products. Finally, it was clear that usefulness of technology motivates of digital weighing scales and that organization's managers however are likely to adopt sophisticated technologies. This was according to Davis (2009) who perceived that ease of use and usefulness influences in a significant way the attitude towards acceptability and use a technology.

User Convenience

The study results revealed that increased transparency in view of balances and logs of transactions done influence adoption of weighing scales. This correlate with Huang et al. (2015) who observed that digital technology is one of the most effective transaction methods because it possesses many advantages which analogue channels cannot offer. Further, the findings indicated that consistency and ease to use the digital weighing machine influence its adoption. This is similar to Laukkanen (2016) who said that a consumer who perceives that new technology saves time compared to previous technology forms the perception of efficiency. In addition, it was clear that accuracy of weighing machine increase the efficiency of transaction. This concurs with Mohamed and Kathy (2008) who claim that when compared to security, cost, efficiency and privacy, convenience influenced more on adoption of digital weighing scales. Objectivity however, highly makes the efficiency of transaction constant. This was in line with Coursaris and Hassanein (2012) who argued that digital weighing scales increase consumer opportuneness in reweighing since users can easily use them even at their homes and increasing the efficiency possibilities

Initial Investment Cost

The findings from this research showed that organizations were less likely to adopt digital weighing scales when its initial set-up cost is high. This was similar to Donaldkiso, 2009) who noted that the investment costs in digital weighing scales include purchase price, transportation and handling, insurance on the equipment during transport, the cost of special bases for them, the

costs of assembly, installation and costs of testing start up. They further showed that the higher the cost of adoption of the innovation, the slower the pace of innovation expansion. This concurred with Mansfied (2008) who claimed that the higher the cost of adoption of the innovation, the slower the pace of innovation expansion is likely to be. In addition, the research findings revealed that pretesting cost influence organization's decision in adopting new technology. Freight cost however were found not to influence organization decision in adopting new technology. These were similar to Lymer (2015) who emphasised that technology adoption in an organization has the potential to reduce costs and increase productivity level thus cost-effectiveness is a motivating factor for adoption.

Service Efficiency

On the service efficiency, the research findings showed minimal errors reading influence organization decision in adopting new technology. This was similar to Fort and Muriel (2016) whose study suggests that convenience means much more to consumers than access and saved time. Again, the findings revealed that weighing speed is an important factor in making the decision to technological advancement. This conformed to Lymer (2015) who argued that majority of users commented more on the importance of speed in their choice of digital weighing scales. In addition, greatly reduced breakdown frequency influenced organization decision in adopting new technology. Personalization increases the efficiency of transaction. Finally, the research findings showed that multi-media input and output maximises slowness of weighing machines. These were similar to Lee (2008) who suggests that navigational efficiency is particularly important in as the restrictive visual interface regarded as a major hindrance for its adoption.

CONCLUSIONS

The study concluded that user perception positively and significantly influenced the adoption of digital weighing scales among coffee cooperative societies. In this case, the improved competitiveness in the speed and reliability of transactions influence adoption of technology, that benefits perceived influence the attitude towards acceptability and use of a technology in a significant way and that organization's managers however are likely to adopt sophisticated technologies.

Concerning the user convenience, the study concluded that it positively influences adoption of digital weighing scales among coffee cooperative societies. The study deduced that increased transparency in view of balances and logs of transactions done influence adoption of weighing scales, that consistency and ease to use the digital weighing machine influence its adoption and that accuracy of weighing machine increase the efficiency of transaction.

About initial investment cost, the study concluded that it positively and significantly influences adoption of digital weighing scales among coffee cooperative societies. Under this the study deduced that organizations were less likely to adopt digital weighing scales when its initial set-up

cost is high, that higher the cost of adoption of the innovation and that Freight cost don't influence organization decision in adopting new technology.

Finally, the study concluded that service efficiency positively and significantly influences adoption digital weighing scales among coffee cooperative societies. The study under this deduced minimal errors reading influence organization decision in adopting new technology, that weighing speed is an important factor in making the decision to technological advancement and that greatly reduced breakdown frequency influenced organization decision in adopting new technology.

RECOMMENDATIONS

Concerning the user perception, the study found that knowledge and skills influence organization decision in adopting new technology. They study therefore recommends measures to ensure all the farmers have the required. This is through organised seminars as well as workshops to instil skills and knowledge to the farmers on how the new technology works. This will hence ensure smooth transition from the old to the new technology as well as influencing adoption of the digital weighing scales.

Concerning user convenience, the study found that consistency and ease of use of digital weighing machine influence its adoption. The study therefore recommends that digital weighing machine made in such a way that a farmer can easily use them. The modified scales are easily readable and easy to interpret.

Further, the study on initial investment cost recommends that the pretesting cost as well as initial set-up cost should be set as low as possible to allow the low-income farmers to be able to adopt the digital weighing scales. This will make it cheap and affordable for the farmers to be able to adopt without any constraints.

Finally, on service efficiency, the study found that weighing speed is an important factor in making the decision to technological advancement. Therefore, the study recommends that the weighing scales made should be of high speed since majority of users commented more on the importance of speed in their choice of digital weighing scales.

REFERENCES

Aghion, P., Akcigit, U. & Howitt, P. (2013). *What do we learn from Schumpeterian growth theory?* (No. w18824). National Bureau of Economic Research.

Alvarez, S. A. & Barney, J. B. (2013). Epistemology, opportunities, and entrepreneurship: Comments on Venkataraman et al. (2012) and Shane (2012). *Academy of Management Review*, 38(1), 154-157.

Aosa, E. & Wainaina, G. (2014). Management Participation and Firm Performance. *American Journal of Industrial and Business Management (AJIBM)*, 4(1)

Avgerou, C. (2012). Information systems in developing countries: a critical research review. *Journal of Information Technology*, 23, 133–146.

Bryman, A. & Bell, E. (2011). *Business Research Methods*. Oxford university press.

Chaddad, F. & Iliopoulos, C. (2013). Control rights, governance, and the costs of ownership in agricultural cooperatives. *Agribusiness*, 29(1), 3-22.

Cheung, R. & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e learning. *Computers & Education*, 63, 160-175.

Coursaris, C. & Hassanein, K. (2012). *Understanding m-commerce - a Consumer Centric Model.* Quarterly Journal of Electronic Commerce, 3(3), 247-271.

Das, S., Dutta, B. & Guha, D. (2015). Weight Computation of Criteria in a Decision-making Problem by Knowledge measure with Intuitionistic fuzzy set and interval-valued intuitionistic fuzzy set. *Soft Computing*, 1-22.

Davis, F. D. (2009). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly,* 13(3), 319-340.

Drucker, P. (2014). *Innovation and entrepreneurship*. Routledge.

EL-Annan, S. H. (2013). Innovation, proactive, and vision are three integrated dimensions between leadership and entrepreneurship. *European Journal of Business and Social Sciences*, 1(12), 148-163.

Garrido, M. M., Fort, R. & Muriel, M. V. (2016). Sensor-based monitoring of heating system effectiveness and efficiency in Spanish churches. *Indoor and Built Environment*, 1420326X16663612.

Gillham, B. (2011). *Developing a questionnaire*. A&C Black.

Giovanni, F. & Mario, A. (2013). Small company attitude ICT based solutions: Some key elements to improve it. *Education Technology and Society, 6*(1), 56-90.

Githinji, C. K. (2014). *Adoption of Computerized Accounting System by Coffee Societies in Nyeri County, Kenya*, Doctoral dissertation, Dedan Kimathi University of Technology.

Golafshani, N. (2012). Understanding reliability and validity in qualitative research. *The qualitative report*, 8(4), 597-606.

Heeks, R. (2010). Do Information and Communication Technologies (ICTs) Contribute to Development? *Journal of International Development*, 22(5), 625-640.

Huang S-M, Hung, Y.C, & Yen, D.C.(2015). A study on decision factors in adopting an online stock trading system by brokers in Taiwan. Decision *Support System,* 40(2), 315-328.

Kamau, E. N. (2016). *An investigation into the causes and characteristics of fraud in Kenyan SACCOs and whether Benford's Law can be used to detect fraud in the accounting data* Doctoral dissertation, Strathmore University.

Kiiza, B., & Pederson, G. (2012). ICT-based market information and adoption of agricultural seed technologies: Insights from Uganda. *Telecommunications Policy*, 36(4), 253-259.

Kisker, C. E. W. (2016). Model for Testing the Impact of Motivational Factors of Nascent Entrepreneurs on Business Surviving Success. *European Scientific Journal*, 12(4).

Kothari, .C. R. (2004). *Research Methodology: Methods and Techniques,* 2nd Edition, Sri Lanka: New Age International Publisher.

Kumar, R. (2011). *Research methodology: A step by step for beginners.* London: Sage Publication.

Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the Internet and mobile banking. *Journal of Business Research*, 69(7), 2432-2439.

Lee, M.C. (2008). *Predicting behavioral intention to use online banking. In: Proceedings of the 19th international conference on information management*. Taiwan.

Long , D., & MacGregor, A. (2016). Integrating Information Technology. *Chartered Accounting Journal of New Zealand,* 75(3), 66-67.

Lumpkin, G. T., & Dess, G. G. (2015). Entrepreneurial orientation. *Wiley Encyclopedia of Management*.

Lymer, A. (2015). The Internet and Small Business: A study of Impacts. *European Conference on Information System.*

Mansfied, E. (2008). Industrial Research and Technological Innovation: An Econometric Analysis.

Mohamed, K. & Kathy, N. S. (2008).*Drivers For Transactional B2C M-Commerce Adoption: Extended Theory of Planned Behavior* Spring 2008 Journal Of Computer Information Systems.

Monzón, J. L. & Chaves, R. (2012). The social economy in the European Union. *Report drawn up for the European Economic and Social Committee by the International Centre*

of Research and Information on the Public, Social and Cooperative Economy (CIRIEC), Brussels.

Motanya, N. M. (2013). *Strategic responses by weighing scale dealers in Kenya to changes in external environment*, Doctoral dissertation, University of Nairobi.

Mwangi, R. W. (2013). *Factors Influencing Dairy Cooperative Societies Performance in Mathira and Kieni Constituencies, Nyeri County, Kenya*, Doctoral dissertation, University of Nairobi.

Njihia, F. W. (2012). *Challenges facing the use of technology on legal metrology: The case of Meru municipality, Kenya*, Doctoral dissertation, University of Nairobi.

Olando. C., Jagongo, A. & Mbewa, M. (2013) The contribution of SACCO financial stewardship to growth of SACCOs in Kenya. *International journal of humanities and social science.* 13(17)112-137.

Reynolds, W., Savage, W. & Williams, A. (2007). Your Own Business. . *International journal of humanities and social science.* 13(17)112-137.

Saunders, M. (2011). Choosing Research Participants. *Qualitative organizational research: Core methods and current challenges*, 35-52.

Sekaran, U. & Bougie, R. (2010). *Research methods for business*: A skill building approach. Wiley.

Venkatesh, V. (2014). Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology. *Wiley Encyclopedia of Management*. 13(17)112-137.

Wallace, L. G. & Sheetz, S. D. (2014). The adoption of software measures: A technology acceptance model (TAM) perspective. *Information & Management*, 51(2), 249-259.

Walsh, D. J. & Charlton, B. G. (2014). The association between the development of weighing technology, possession and use of weighing scales, and self-reported severity of disordered eating. *Irish Journal of Medical Science (1971-)*, 183(3), 471-475.

Wangui, M. (2011). *Process and challenges of digitization: A case study of road transport department, Kenya Revenue Authority*, Doctoral dissertation, University of Nairobi.