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An evaluation of the quality of management information systems used by SACCOs in Kenya

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Abstract

Purpose – Savings and Credit Cooperatives (SACCOs) in developing countries require core banking Management Information Systems (MISs) to run their business, serve their clients and provide differentiated products and services to gain competitive advantage. Considering that SACCOs in Kenya lack the necessary resources to acquire the best information systems, the purpose of this paper is to evaluate MISs currently in use in the SACCO subsector to determine how well they are serving.
Design/methodology/approach – Using the ISO/IEC 25010 Software Product Quality Model, the quality of MISs operated by 215 Deposit-Taking SACCOs in the Kenya was evaluated to determine their level of performance.
Findings – The results indicated that the MISs currently in use by the SACCOs serve them well in terms of functionality, efficiency, reliability, ease of use and portability. However, vendor support, technical training and implementation process are a big concern to the SACCOs.
Practical implications – The SACCOs in Kenya need not look for other MISs as the ones in use satisfied the condition required by the ISO/IEC 25010 Software Product Quality Model. The areas that require attention are vendor support services by entering into contracts technical training and service level agreement; and good project management in software implementation.
Originality/value – The research addresses itself to one of the biggest setbacks faced by a fast growing subsector in adopting ICT with limited capacity and infrastructure.

Keywords Microfinance, Management information systems, Software tools, Product quality, ISO/IEC 25010, SACCO
Paper type Research paper

1. Introduction

A Savings and Credit Cooperative (SACCO), also known as credit union, is a member-owned financial institution that is controlled by its members and operated for the purpose of promoting savings, providing credit at competitive rates and providing other financial services to its members. SACCOs core business is to mobilize savings and lend to their members. The SACCO industry has impacted lives of many disadvantaged Kenyans over the years. The subsector may be categorized into financial and non-financial cooperatives. Non-financial cooperatives deal with the marketing of members' produce and services such as dairy, livestock coffee, tea, handicrafts and many more similar cooperatives. On the other hand financial cooperatives comprise SACCOs, housing and investment cooperatives (www.sasra.go.ke).

The SACCO subsector can be described as two-tiered given the range of financial services to members and regulatory regime. The traditional SACCOs are described as Non-Deposit Taking and provide a limited range of savings and credit products.

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The Deposit Taking SACCOs (DTS) besides the basic savings and credit products, also provide basic banking services. The general trend is that SACCOs start as non-deposit taking and grow to deposit taking to expand the range of financial services to members. By December 2013 there were over 6,000 registered non-DTS in Kenya and 215 DTS, regulated under the Kenya Cooperative Act (1997) and the SACCO Societies Act (2008).

On average SACCOs have been contributing 48 percent in the Gross National Savings underscoring the role played by SACCOs in savings mobilizations making them perfect vehicles in promoting high levels of savings for investment as envisioned in Vision 2030 of Kenya. As at 2012, the total assets of the licensed DTS in Kenya were approximately US$2.8 billion.

In the 2013, the SACCO Societies Regulatory Authority developed and issued Guidelines on Management Information Systems (MISs) and Information Communication and Technology infrastructure. The guidelines provide the minimum requirements that a DTS should observe in implementing a MIS and related infrastructure to adequately support the deposit taking business operations (www.sasra.go.ke).

SACCOs maintain large amounts of critical business data, from basic client information to detailed analyses of portfolio statistics. These data must be stored, manipulated and presented coherently to system users so that they can make sound management decisions. Inconsistent level of adoption of ICT in relation to the fast growth of the SACCO subsector has posed serious challenges (Bwisa, 2010). Ineffective MIS has been one of the biggest setbacks for SACCOS in Kenya (Nyagah, 2012). In addition, limited capacity by the board of management and underlying infrastructure are the main constraints in SACCO computerization (Owen, 2007).

Most of the MISs being marketed for the SACCO subsector in Kenya are not specifically designed for the business. Microfinance institution in general lack the necessary resources to acquire the best MISs. This research sought to evaluate MISs currently in use in the SACCO subsector to determine how well they are serving the SACCOs in terms of business requirements, reliability, efficiency, among others.

2. Related literature

2.1 Software quality

The definition of software quality by the International Organization for Standardization (ISO, 2011) was adopted. Thus software quality is conformance to explicitly stated functional and performance requirements, explicitly documented development standards and implicit characteristics that are expected of all professionally developed software. The quality of software is assessed by a number of variables. These variables can be divided into external and internal quality criteria. External quality is what a user experiences when running the software in its operational mode. Internal quality refers to aspects that are code-dependent, and that are not visible to the end-user. External quality is critical to the user, while internal quality is meaningful to the developer only. Some quality criteria are objective, and can be measured accordingly. Some quality criteria are subjective, and are therefore captured with more arbitrary measurements.

2.2 Information and communications technology in microfinance and SACCOs

The increased organizational dependence on information systems drives management attention toward improving the quality of information systems. Improve information systems quality is one of the top concerns Information Technology (IT) executives are concerned with. Gorla *et al.* (2010) modelled the relationship between the quality of information systems and organizational impact. They demonstrated greater

organizational impact in situations in which system quality, information quality and service quality are high.

Langat (2012) studied the factors affecting performance of SACCOs in Bomet County, Kenya and observed that there is urgent need for all SACCOs to adapt ICT for services delivery effectiveness and efficiency. They recommend that SACCO management should identify suitable hardware and software based on their need.

Kaburu (2010) observes that SACCOs have attempted to implement computerized information systems with varying degrees of success. They identify the challenges of implementing computerized information systems as including quality of systems, time schedules set, ICT project funding, lack of appropriate ICT policies and lack of ICT project monitoring mechanism. SACCOs need to overcome these challenges in order to realize full benefits of technology adoption.

Sarosa and Zowghi (2003) concluded that adoption of ICT within SMEs is different from larger businesses. SMEs have limited resources for managing ICT adoption process. The authors proposed guidelines for adopting ICT for SMEs based on existing literature and their experience in Indonesian SMEs. These guidelines consist of assessing ICT requirements, assessment of organization ICT maturity, evaluation of available ICT solutions in the market, matching the available solutions with the requirements, implementation of the selected solution and post adoption evaluation.

Ssewanyana (2009) carried out a study on ICT usage in microfinance institutions in Uganda. They established that ICT usage has been on the rise and different applications and technologies have been adopted to control costs, create efficiency and effectiveness in their operations, improve productivity and increase outreach to the poor. The study concluded that there is need for progressive policies that relate to ICT-based services and software to accelerate ICT usage in MFIs.

Bada (2012) investigated the extent to which Microfinance Institutions use ICT to deliver business services. The research focussed on the actual ICT usage by MFI's in Uganda, specifically on ICT literacy, business applications and planning. The research concluded that there was need to experiment e-learning for professional skills development in MFIs.

2.3 Models for evaluating information systems

There are several models for evaluating information systems including those that evaluate specific details within an information system. An exploration of the impact of process improvement on ICT service quality and evaluation of the measurable ICT service quality attributes has been done by (Cater-Steel *et al.*, 2013). They have proposed a framework for a gradual ICT service quality measurement that could support better decision making about proactive service improvement. Information systems evaluation criteria can be categorized into three categories namely; economical benefits, usability measurements for interfaces and measurements of user or customer satisfaction (Palmius, 2007). Lochmann and Goeb (2011) present a general quality model that integrates various concepts found in standards, quality models, guidelines and static code checker rules. Their quality model is able to describe the interrelations of disciplines, like requirements engineering and software test, to software quality, and therefore provide a common foundation for concepts related to software quality, enabling consistency and continuity of quality-related information. Lew (2012) proposed a framework, Enterprise Quality in Use, that includes other parts of an organization's processes and outputs to improve quality in development phase and through each phase of the product lifecycle. Xu *et al.* (2013) have proposed a practical model for rating software security.

The following models and/or standards were considered: The DeLone and McLean Model (DMSM) of IS Success, Oracle Cloud Computing Services Maturity Model, The ISO/IEC 25010:2011 Software Quality Model, Control Objectives for Information and Related Technology (COBIT) and Capability Maturity Model (CMM) for software.

2.3.1 The (DMSM) of IS success. The DMSM is one of the most cited models for measuring information systems success. The model consisting of six categories of IS success (DeLone and Mclean, 2003). The six dimensions include system quality, information quality, use, user satisfaction, individual impact and organizational impact. The six dimensions are examined at three different levels: technical, semantic and effectiveness or influence level. The model has been extended by other researchers and has also been empirically studied. For example, Rai *et al.* (2002) carried out an empirical test in quasi-voluntary information system use context regarding a student information management system and their findings support DeLone and McLean's observations that IS success models must be carefully specified in a given context. A test of information system success model was done through a field study of a mandatory information system by (Livari, 2005). The results showed that perceived system quality and perceived information quality were significant predictors of user satisfaction with the system but they did not matter to system use. User satisfaction was a strong predictor of individual impact. Wu and Wang (2006) proposed an empirical test for a knowledge management system success model using DMSM. Based on an analysis of current practice of knowledge management as well as DMSM, they used five dependent variables (system quality, knowledge or information quality, perceived KMS benefits, user satisfaction and system use) in evaluating KMS success.

2.3.2 Oracle cloud computing services maturity model. The Oracle Cloud Maturity Model is based on collective experience and best practices (Oracle, 2011). The model consists of the following key concepts: capabilities, domains, maturity and adoption. The model includes 60 capabilities that capture the best practices. These capabilities provide the detail necessary to truly measure and guide the progress of a cloud initiative. The 60 capabilities have been classified and organized into domains. There eight domains in the Cloud Maturity Model are:

(1) Business and strategy that provides the high-level constructs that allow the cloud initiative to proceed. The constructs include business motivation, expected benefits, guiding principle, expected costs, funding model, etc.

(2) Architecture – the overall architecture and guidelines for various practitioners to ensure adherence to the architecture.

(3) Infrastructure – the service infrastructure and tools that provide the technical foundation for the cloud initiative.

(4) Information – information aspect of cloud such as metadata management, as well as customer entitlements and data durability.

(5) Project, portfolio and services – concerns the planning and building of cloud services, and management of the portfolio services.

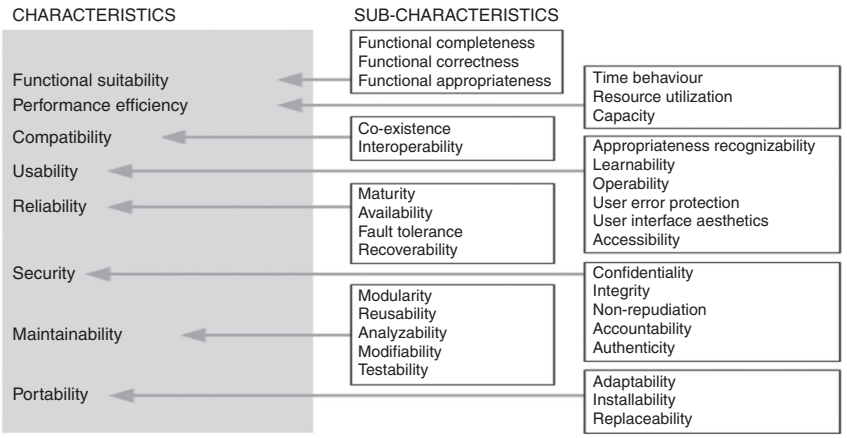
(6) Operations, administration and management – concerns the post implementation aspect of the cloud service.

(7) Organization – concerns the development of organizational competency around cloud computing including the organizational structure and skills development.

(8) Governance – concerns the governance structure and processes that support and guide the cloud efforts.

2.3.3 The ISO/IEC 25010:2011 software quality model. The ISO quality model ISO 25010 (ISO, 2011) can be used to support specification and evaluation of software from different perspectives by those associated with acquisition, requirements, development, use, evaluation, support, maintenance, quality assurance and audit of software. The ISO/IEC 25010:2011 defines two quality models. The product quality model encompasses internal and external qualities of the system, and is composed of eight characteristics and 31 sub-characteristics (Figure 1). The quality in use model allows users to define/assess the impact that the product has on stakeholders and is composed of five characteristics and nine sub-characteristics.

Fundamental in the model approach is the distinction between the internal properties of a product (which contribute to the internal quality), its external properties (which contribute to the external quality) and its quality in use properties, i.e., properties which influence quality and which can be measured when the product is actually in use in specific contexts. All these properties influence each other and the resulting quality in a complex way (Figure 2).



Source: ISO (2011)

Figure 1.
ISO/IEC 25010:2011 product quality model

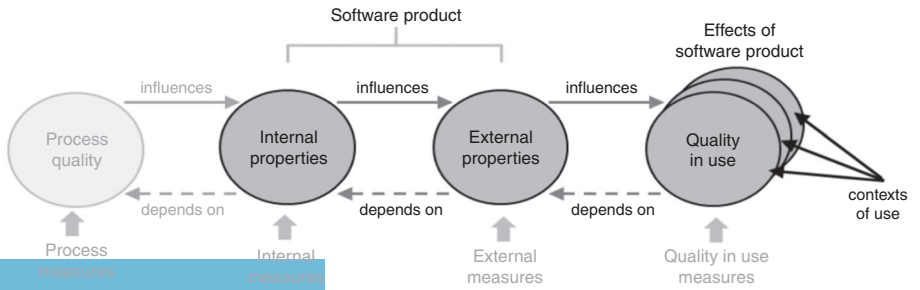


Figure 2.
ISO/IEC 25010:2011 conceptual approach to software quality

2.3.4 Control objectives for information and related technology (COBIT). COBIT provides good practices across a domain and process framework and presents activities in a manageable and logical structure (ITGI, 2005). COBIT's good practices represent the consensus of experts. The business orientation of COBIT consists of linking business goals to IT goals, providing metrics and maturity models to measure their achievement and identifying the associated responsibilities of business and IT process owners. COBIT defines IT activities in a generic process model within four domains. Plan and organize, Acquire and implement, Deliver and support, and Monitor and evaluate. The domains map to its traditional responsibility areas of plan, build, run and monitor.

COBIT is a framework and supporting tool set that allow managers to bridge the gap with respect to control requirements, technical issues and business risks and communicate that level of control to stakeholders. There are many benefits of implementing COBIT as a governance framework.

A study using COBIT Version 4.1 to investigate performance indicators for IT operational management of financial industry in Taiwan came up with six importance key performance indicators for IT operational management within the financial industry (Shaw *et al.*, 2012). They includes: frequency of data verification; changes that follow formal change control processes; problems resolved within the required time period; user satisfaction with data availability; successful data restoration; and monitoring of critical processes. The study confirms that COBIT can be successfully used both as a tool and benchmark for IT operational management in financial industry.

Lovaas and Wagner (2012) concluded that the COBIT framework is too large and cover considerably more than what fits small- and medium-sized financial institutions. They instead recommend a combination of IT industry standards.

2.3.5 CMM for software. The CMM was designed to guide organizations in selecting process improvement strategies by determining current process maturity and identifying the few issues most critical to software quality and process improvement (SEI, 1996). The CMM provides a framework for measuring the maturity of an organization's software process and for evaluating its software process capability. The five maturity levels are:

(1) Initial – the software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort.

(2) Repeatable – basic project management processes are established to track cost, schedule and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.

(3) Defined – the software process for both management and engineering activities is documented, standardized and integrated into a standard software process for the organization.

(4) Managed – detailed measures of the software process and product quality are collected. Both the software process and products are quantitatively understood and controlled.

(5) Optimizing – continuous process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

The CMM can be used by assessments teams to identify strengths and weaknesses in the organization, evaluation teams to identify the risks of selecting among different contractors for awarding business and to monitor contracts, managers

and technical staff to understand the activities necessary to plan and implement a software process improvement program for their organization, and by process improvement groups as a guide to help them define and improve the software process in their organization.

The problem with this model is that it focusses more on the maturity of the organization and the software development processes. It does not consider the features and capabilities of the software itself. It cannot be used to assess commercial off-the-shelf software applications.

2.3.6 Theoretical framework: the ISO/IEC 25010:2011 software quality model. The ISO/IEC 25010:2011 Product Quality Model was adopted for our study. The model can be applied to a software product or a computer system that include software as most of the characteristics are relevant to both software and systems. Rafique *et al.* (2012) proposed an approach to specify information quality requirements for web applications by reusing and extending the ISO 25012:2008(E) data quality model, a complementary model to ISO/IEC 25010. They focus on the learnability aspect of information quality for the web application with the aim of a standardized approach to evaluate web application information quality. Moraga *et al.* tried to align Portal Data Quality Model with ISO 25012 by mapping the intrinsic category to the inherent view of ISO 25012 and contextual, representational and accessibility categories to the system-dependent view. They mapped 42 data quality characteristics for this model and listed many characteristics and relationships.

The following eight elements of the model were considered:

(1) Functional suitability – the capability of the software product to provide functions which meet stated and implied needs when the software is used under specified conditions. This includes: functional completeness (the degree to which the set of functions covers all the specified tasks and user objectives); functional correctness (the degree to which a product or system provides the correct results with the needed degree of precision); and functional appropriateness (degree to which the functions facilitate the accomplishment of specified tasks and objectives).

(2) Performance efficiency – the capability of the software to perform efficiently relative to the amount of resources used under stated conditions. This includes: time behavior (degree to which the response and processing times and through put rates of a product or system, when performing its functions, meet requirements); resource utilization (degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements); and capacity (degree to which the maximum limits of a product or system parameter meets requirements).

(3) Compatibility – the degree to which a product, system or a component can exchange information with other products, systems or components, and/or perform its required functions, while sharing the same hardware or software environment. This includes: co-existence (degree to which a product can perform its required functions while sharing a common environment and resources with other products, without detrimental impact on any other product); and interoperability (degree to which two or more products, systems or components can exchange information and use the information that has been exchanged).

(4) Usability – the degree to which a product or a system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use. This includes: appropriate recognizability (degree to which users can recognize whether a product or a system is appropriate for their needs); learnability (degree to which a product or a system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use); operability (degree to which a product or system has attributes that make it easy to operate and control); user error protection (degree to which a system protects users against making errors); user interface aesthetics (degree to which a user interface enables pleasing and satisfying interaction for the user) and accessibility (degree to which a product or a system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use).

(5) Reliability – the capability to which a system, product or component performs specified functions under specified conditions for a specified period of time and includes: maturity (degree to which a system, product or component meets needs for reliability under normal operation); availability (degree to which a system, product or component is operational and accessible when required for use); fault tolerance (degree to which a system, product or component operates as intended despite the presence of hardware or software faults); and recoverability (degree to which in an event of an interruption or a failure, a product or a system can recover the data directly affected and re-establish the desired state of the system).

(6) Security – the capability to which a system or product protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization. This includes: confidentiality (degree to which a product or system ensures the data are accessible to only those authorized have access); integrity (degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data); non-repudiation (degree to which actions or events can be proven to have taken place, so that the events or actions cannot be repudiated later); accountability (degree to which the actions of an entity can be traced uniquely to the entity) and authenticity (degree to which the identity of a subject or resource can be proved to be the one claimed).

(7) Maintainability – the capability of effectiveness and efficiency with which a product or a system can be modified by the intended maintainers, and include: modularity (degree to which a system or computer program of discrete components such that a change to one component has minimal impact on other components); reusability (degree to which an asset can be used in more than one system or in building other assets); analyzability (degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failure, or to identify parts to be modified); modifiability (degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading the existing product quality); and testability (degree of effectiveness or efficiency with which test criteria can be established for a system, product or component and test can be performed to determine whether those criteria have been met).

(8) Portability – the capability of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another. This includes: adaptability (degree to which a product or a system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments); installability (degree of effectiveness or efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment); and replaceability (degree to which a product can replace another specified software product for the same purpose in the same environment).

Besides the above software quality characteristics, management criteria were also introduced to achieve a complete assessment of the software quality and its management. The following three major criteria were added by (Lian and Lien, 2007): vendor factors, cost factors and time factors. Using literature and interview with two project teams, four sub criteria of vender factors, four sub criteria of cost factors and three sub criteria of time factors were identified. Consequently the following 11 management criteria were identified: vender factors – market share and reputation, industrial credential, service and support, training solution; cost factors – software cost, hardware cost, annual maintenance cost, staff training cost; time factors – time for planning and preparation, time for BPR and system tuning, time for testing and go-live.

3. Research methodology

3.1 Research design

The study employed a descriptive research design whereby an investigation was conducted to evaluate the quality of MISs being operated by SACCOs in Kenya. The enhanced ISO/IEC 25010 software quality model was adopted for the study. The target population for this study was the 215 deposit-taking SACCOs in the country (www.sasra.go.ke). The participants included the SACCO ICT managers and system administrators.

3.2 Data collection

Survey research was used to collect data through questionnaires. The questionnaire had 33 items with close-ended questions that had predefined responses and were assigned numerical values using a five-point Likert scale ranging from "Strongly disagree" to "Strongly agree." The questionnaire items for the study were developed based on the ISO/IEC 25010 software quality model, together with the identified management criteria. The reliability of the questionnaire was determined through Cronbach's α coefficient. A Cronbach's α coefficient of 0.91 attained. The questionnaires were distributed to ICT managers and system administrators and these are persons well placed to knowledgably answer questions on the use of MISs in SACCOs. The research used a sample of 34 respondents comprising of licensed SACCOs in Nairobi City County, Kenya. Out of 34 questionnaires distributed, 29 were received back which translates to 85 percent response rate. The data collected was subjected to descriptive statistical analysis technique of frequency and cross-tabulation analysis. Tables and bar charts were used to present the results.

4. Results and discussion

4.1 Demographics

The characteristics of the sample were captured under demographics with the basic demographics characteristics being gender, age, education level of respondents, MISs in use and number of years the MIS has been used (Table I).

4.2 MIS functionality

Most respondents agreed that their MIS modules satisfy the SACCO business requirements (Figure 3). Output data report was found to be identical with when manual method is used. In addition, most of the MIS can interact with other systems (interoperability) and are also secure.

4.3 MIS reliability

Most MIS have been implemented in other companies and are also capable of restoring themselves after failure (Figure 4).

4.4 MIS usability

Most users could easily identify with the MIS modules since they are similar to the actual business processes (Figure 5). The MIS have graphical user interfaces and the vendor has provided user manuals and system documentation.

4.5 MIS efficiency

Output from the MIS was found to be prompt and response time satisfactory (Figure 6). The MIS utilize resources efficiently.

Demographic item	Category	Age (%)	Important Observation
Gender	Male	83	Most of the respondents were male
	Female	17	
Age	Below 25	3.4	A substantial number of respondents were in the age
	25-34	75.9	range of 25-34 years which indicates most Kenyan
	35-45	17.2	MIS mainly run by the youth
	Above 45	3.4	
Educational level	High school	3.4	Majority of the respondents had Bachelors indicating
	Diploma	10.3	people with good education
	Bachelors	72.4	
	Masters	13.8	
MIS in use	FinExtreme	10.3	Microsoft Dynamics NAV has the dominates the
	Bankers Realm	10.3	market share for SACCOs in Nairobi
	MS Dynamics NAV	41.4	
	E-Coop	3.4	
	ASMAS	27.6	
	T24	3.4	
	FinSacco	3.4	
Years of MIS operation	Less than 1	10.3	Most SACCOs have used the current MIS for a period
	1-2	27.6	of 3-10 years 27.6%
	3-5	34.5	
	6-10	27.6	
	Above 10	0	

Table I.
Demographic characteristics

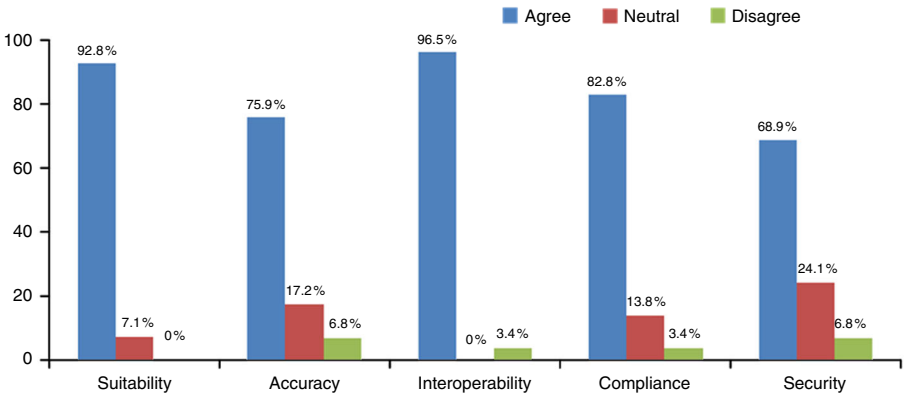


Figure 3.
Software functionality

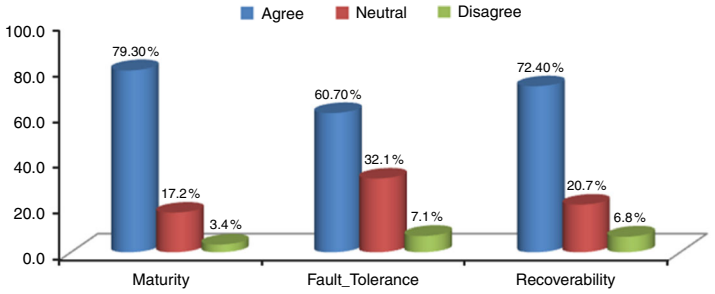


Figure 4.
Software reliability

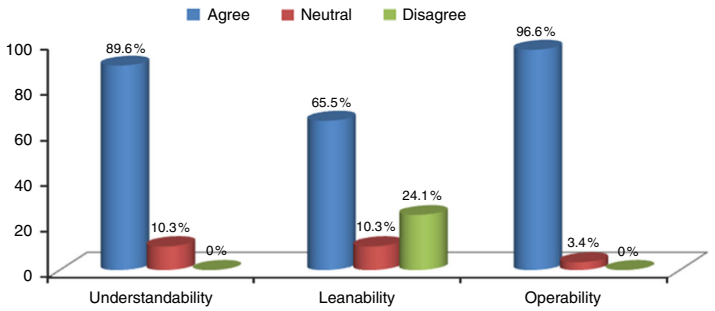


Figure 5.
Software usability

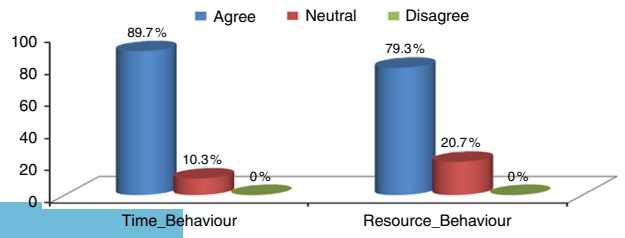


Figure 6.
Software efficiency

4.6 MIS maintainability

The SACCO MIS can be easily modified or customized and will continue working well after the modification (Figure 7). The system administrators can easily perform operational testing. They also have log files for all transactions and activities.

4.7 MIS portability

The process of installing the MIS is a one-step process. The MIS can be installed on various operating systems such as UNIX and Windows, etc. (Figure 8).

4.8 Vendor market share, reputation and service support

Most of the MIS vendors were found to have a good market share, reputable and well-known in the country (Figure 9). Despite the reputation, their support services and technical training were not satisfactory.

4.9 Software and hardware cost

Most of the SACCOs can afford the software and hardware solutions that are in the market (Figure 10). Quite often the hardware and software are provided by different vendors.

4.10 Software implementation plan

Most SACCOs felt that the implementation process was not planned well and not done according to schedule and therefore all errors were not identified and corrected (Figure 11).

4.11 Discussion

Over the past few years, SACCOs are increasingly realizing that information lies in at the very heart of microfinance. Formal and informal financial institutions have also become aware of the vital need to manage large amounts of data. As a result, there is massive need to improve the effective understanding and use of these data. Despite the

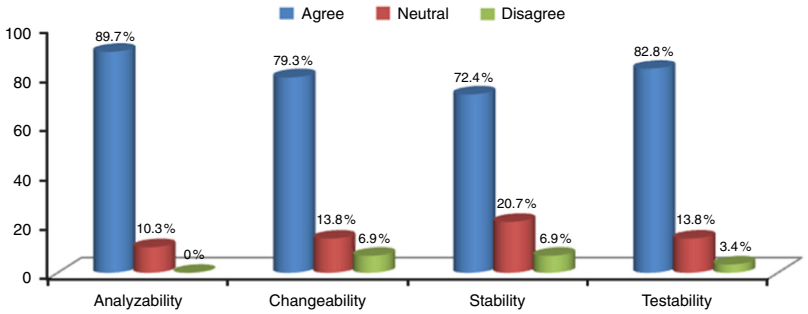


Figure 7.
Software maintainability evaluation

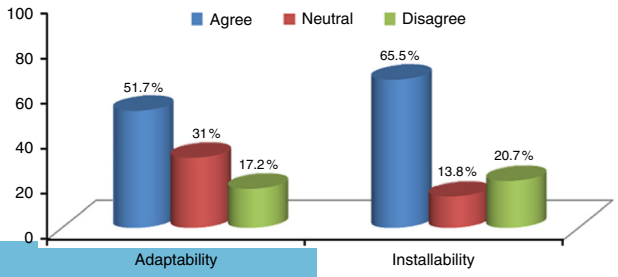


Figure 8.
Software portability

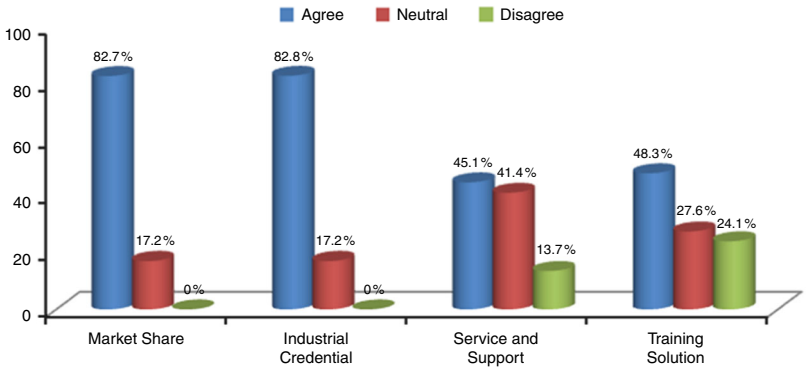


Figure 9.
Vendor reputation

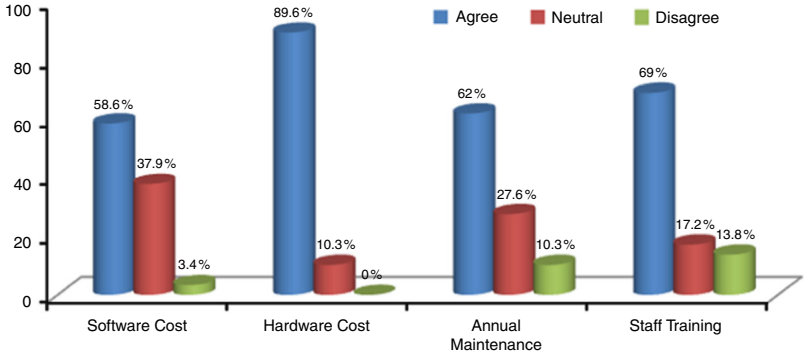


Figure 10.
Software and hardware cost

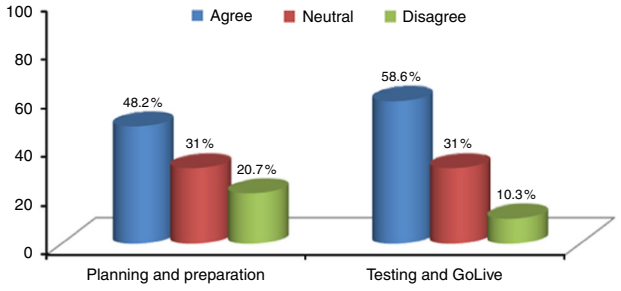


Figure 11.
Software implementation

availability of technology, there is a problem in developing a good and problem free MIS software for the SACCOs. The diverse nature of SACCOs creates an intriguing complexity for software application development.

The research has shown that the existing MISs are good in meeting the business and functional requirements of the SACCOs. The MISs are considered to be providing accurate and timely data and information that SACCOs use to make operational decisions. The MISs were also found to work well with other applications systems including point-of-sale, mobile banking and ATM banking. This was strengthened by the fact that the systems provide for various security functions such as encryption, firewalls and authorized access.

The research shows that most of the SACCO MISs have been in the market for some time and have been implemented in a good number of the SACCOs. This can be attributed to good customer satisfaction. The MISs were found to be fault-tolerant and can easily restore themselves after a failure with the data recovered being complete and correct. The study established that the SACCO software are well modularized and can be easily modified or customized to suit SACCO business. Even though the software works well after customization or modification, the system administrator and the support staff can easily perform operational testing after modification and determine whether the MIS is ready for operation. In addition, the softwares are simple to install and can be installed on various operating systems such as UNIX and Windows.

The study established that most of the vendors had a good market share, are reputable and well-known in the country. However, their support services and training solution are not good and reliable. Most system administrators felt that their software vendor does not provide quality technical training after implementation and any other software upgrade. In spite of this, the users are happy about the cost of the software, annual maintenance fee and cost of the hardware, which are within budget.

Software implementation and its planning was an area that most vendors did not perform well. The implementation is never planned and therefore no schedule or project management practices are employed. In some instances, SACCO software is never fully implemented with errors neither identified nor corrected.

5. Conclusions

The main objective of this research was to evaluate the quality of SACCO MISs in Kenya. The study makes a contribution toward understanding the quality, performance and suitability of the MISs in running SACCOs or microfinance institutions.

The SACCOs do not need to look for other MISs as the ones in use satisfied the condition required by the ISO/IEC 25010 software product quality model. The study established the areas of vendor support services, training and software implementation were poor, and therefore makes the following recommendations.

The SACCO and the vendor must enter into a written contract agreement that includes user and technical training as component of the deliverables. The contract should also contain a clause protecting the SACCO in case the vendor fails to provide full services as per the contract.

SACCOs should enter into service level agreement (SLA) with vendors where their support service standards and performance levels are agreed upon. The SLA should be a legally binding document with penalty clauses that can be invoked by the SACCO when the vendor does not meet the service standards agreed upon. This will ensure that the vendor is committed to the SACCO and that the SACCO has cushion to fall back when services by the vendor are poor.

It was established that software implementation planning and execution was poor. SACCOs need to ensure that a project management team is appointed to spearhead implementation of the software. A project plan should be prepared and agreed upon between the SACCO and the software vendor which should be adhered to during the whole process. After completion of the implementation process, an independent post implementation review should be carried to ensure the process was complete and all errors were handled conclusively. A user acceptance testing should also be carried out and the software should only be put in production if all issues raised by users are resolved.

References

Bada, K. (2012), "ICT for business services: the case of Ugandan microfinance institutions", *International Journal of Research and Reviews in Applied Sciences*, Vol. 11 No. 1, pp. 140-152.

Bwisa, H. (2010), "An entrepreneur approach to use of ICT for the growth of Africa's cooperative movement: the case of mobile phone", *11th SACCA Congress Meeting on Fostering the Culture of Entrepreneurship and Innovation in SACCOs*, October 4-8.

Cater-Steel, A., Lepmets, M., Lluis Mesquida, A., Mas, A. and Ras, E. (2013), "The evaluation of the IT service quality measurement framework in industry", *Global Journal of Flexible Systems Management*, Vol. 15 No. 1, pp. 39-57.

DeLone, W.H. and McLean, E.R. (2003), "The DeLone and McLean model of information systems success: a ten-year update", *Journal of Management Information Systems*, Vol. 19 No. 4, pp. 9-30.

Gorla, N., Somers, T.M. and Wong, B. (2010), "Organizational impact of system quality, information quality, and service quality", *The Journal of Strategic Information Systems*, Vol. 19 No. 3, pp. 207-228.

ISO (2011), *ISO/IEC 25010:2011, Systems and Software Engineering – Systems and Software Quality Requirements and Evaluation (SQuaRE) – System and Software Quality Models*, International Organization for Standardization, Geneva.

ITGI (2005)), "Control objectives for information and related technology", IT Governance Institute, available at: www.isaca.org

Kaburu, A. (2010), "Successful implementation of information systems in the financial sector: a case study of savings and credit cooperative societies in Kenya", MBA thesis, University of Nairobi, Nairobi, available at: http://erepository.uonbi.ac.ke/ (accessed January 6, 2014).

Kenya Cooperatives Act (1997), Kenya Government Printer.

Langat, J. (2012), "Factors influencing performance savings and credit co-operatives societies in Bomet County", MA thesis, University of Nairobi, Nairobi, available at: http://erepository.uonbi.ac.ke/ (accessed March 3, 2014).

Lew, P. (2012), "An enterprise framework for evaluating and improving software quality", *Proceedings of the 2012 Pacific Northwest Software Quality Conference (PNSQC)*.

Lian, S.K. and Lien, C.T. (2007), "Selecting the optimal ERP software by combining the ISO 9126 standard and fuzzy AHP approach", *Contemporary Management Research*, Vol. 3 No. 1, pp. 23-44.

Livari, J. (2005), "An empirical test of the DeLone-McLean model of information systems success", *The Database for Advances in Information Systems*, Vol. 36 No. 2, pp. 8-27.

Lochmann, K. and Goeb, A. (2011), "A unifying model for software quality", *Proceedings of the 8th International Workshop on Software Quality*, ACM, pp. 3-10.

Lovaas, P. and Wagner, S. (2012), "IT audit challenges for small and medium-sized financial institutions", *Annual Symposium on Information Assurance & Secure Knowledge Management, June 5-6*, pp. 16-22.

Nyagah, E. (2012), "Co-Operatives as potential channel for enhancing financial inclusion", Forum on Enhancing Financial Innovation and Access, Abuja, September 18, available at: www.efina.org.ng/media-centre/events/innovation-fora/understanding-co-operatives-in-nigeria-co-operatives-as-a-channel-for-enhancing-financial-inclusion/forcedownload/258 (accessed January 5, 2014).

Oracle (2011), *Cloud Computing Maturity Model*, Oracle, Redwood City, CA.

Owen, G. (2007), *Rural Outreach and Financial Cooperatives: SACCOs in Kenya*, World Bank, Washington, DC.

Palmius, J. (2007), "Criteria for measuring and comparing information systems", *Proceedings of the 30th Information Systems Research Seminar in Scandinavia, Information Systems Research Seminar, Scandinavia, August 11-14*.

Rafique, I., Lew, P., Abbasi, M.Q. and Li, Z. (2012), "Information quality evaluation framework: extending ISO 25012 data quality model, world academy of science", *Engineering and Technology*, Vol. 6 No. 5, pp. 523-528.

Rai, A., Lang, S. and Welker, R. (2002), "Assessing the validity of IS success model: An empirical test and theoretical analysis", *Information Systems Research*, Vol. 13 No. 1, pp. 50-69, available at: http://business.highbeam.com/410108/article-1G1-92864827/ (accessed December 23, 2013).

SACCO Societies Act (2008), Kenya Government Printer.

Sarosa, S. and Zowghi, D. (2003), "Strategy for adopting Information technology for SMEs: experience in adopting email within an Indonesian furniture company", *Electronic Journal of Information Systems Evaluation*, Vol. 6 No. 2, pp. 165-176.

SEI (1996), *Capability Maturity Model for Software. Software Engineering Institute*, Carnegie Mellon University, Pittsburgh, PA.

Shaw, R.S., Chung, W.M., Cheng, C.P. and Fu, T.Y. (2012), "Key performance indicators for information technology (IT) operational management of financial industry in Taiwan", *African Journal of Business Management*, Vol. 6 No. 3, pp. 1041-1053.

Ssewanyana, J. (2009), "ICT usage in microfinance institutions in Uganda", *The African Journal of Information Systems*, Vol. 1 No. 3, pp. 5-28.

Wu, J.-H. and Wang, Y.-M. (2006), "Measuring KMS success: a re-specification of the DeLone and McLean model", *Information and Management Journal*, Vol. 43 No. 6, pp. 728-739.

Xu, H., Heijmans, J. and Visser, J. (2013), "A Practical Model for Rating Software Security", *SERE (Companion)*, pp. 231-232.

Further reading

Moraga, C., Moraga, M.A., Calero, C. and Caro, A. (2009), "SQuaRE-aligned data quality model for web portals", *Proceedings of the 9th International Conference on Quality Software, Jeju*, pp. 117-122.

The SACCO Societies Regulatory Authority (SASRA). available at: www.sasra.go.ke (accessed March 3, 2014).

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