

QUALITY ASSESSMENT OF INFORMATION SYSTEMS IN SMES: A STUDY OF ELDORET, KENYA

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ABSTRACT

The use of Information Systems (IS) of acceptable quality has been viewed to be vital for improving the efficiency and effectiveness of business operations. Many SMEs in developing countries are beginning to embrace the use of IS to help improve their competitiveness. This venture, however, has not yielded the much anticipated benefits for many of these SMEs. For this reason, a number of SMEs in developing countries have ended up dissatisfied with their IS investments. A considerable percentage of IS solutions used within the SMEs in developing countries are inefficient and ineffective in helping meet the unique needs of the SMEs. This paper presents the results of an exploratory study into the quality of IS used within SMEs in Eldoret town, situated in Kenya. The study employs a qualitative research methodology with multiple case studies of seven SMEs. The results of the study indicate that the SMEs that participated in the study use IS solutions that were of unacceptable quality. The study further identifies factors that are responsible for this poor quality of IS and recommends actions that can be taken to improve the quality of IS within the SMEs.

KEYWORDS: Information Systems, Small and Medium-sized Enterprises, developing countries, adoption

1. INTRODUCTION

A number of SMEs in developing countries are faced with a lot of challenges as they try to remain relevant and competitive (Ayyagari et al., 2007). It is widely accepted, however, that SMEs do make a significant contribution to a country's economy (Agbeibor, 2006). Moreover, the sector can do this with minimal effort and resources (Agbeibor, 2006; Beck et al., 2003). This is particularly important because developing countries are more often lacking in resources. The SMEs sector, therefore, remains pivotal for developing countries as they strive to improve their economic status.

The use of IS has been viewed to be vital for improving the efficiency and effectiveness of business operations. Research has shown that many SMEs in developing countries are beginning to embrace the use of IS to help improve their competitiveness (Dhillon et al., 2009; Kapurubandara, 2009; Kyobe, 2004). This effort has, however, been

marred with a lot of challenges and has not yielded the much anticipated benefits for these SMEs. For this reason, many SMEs in developing countries have ended up dissatisfied with their IS investments.

It should be noted that, not many research on IS within SMEs have focused on assessing the quality of the IS used by these SMEs (Duncombe & Molla, 2009; Parker & Castelman, 2007). Moreover, studies on IS within SMEs have largely focused on those in developed countries and only a few studies on developing countries (Parker & Castelman, 2007).

In this research study, we therefore, aim to evaluate the quality of the IS used within SMEs in Eldoret town, Kenya, which is regarded as a developing country. This was done to find pragmatic solutions that can be employed by the SMEs to help improve the quality of their IS so that they can better improve their competitiveness.

The remainder of this paper is structured as follows: the next section provides a brief overview of IS within SMEs in developing countries. This is then followed by a brief presentation on IS quality assessment as well as a presentation of the research approach which was followed. We then present our main findings and conclude with a discussion of the implications of these findings for the SME community.

2. IS WITHIN SMEs IN DEVELOPING COUNTRIES

The use of IS within SMEs has been a subject of a growing research for quite some time now (Burgess, 2002; Parker & Castelman, 2007). This has been buoyed by the growing realization that firms that invest in IS are more productive, and that IS adoption is important for economic growth (Morrell & Ezingard, 2002; Acs, 1992; Boddy et al., 2002; Agbeibor, 2006). From this perspective, IS are, and increasingly will be, an integral component of SMEs. Many big firms have successfully invested in IS and reaped the benefits that accrues from such investment (D'Atri & Sacca, 2009; Sircar & Choi, 2009). SMEs, however, have had a completely different story (Dhillon et al., 2009), particularly those in developing countries as they have to operate under harsh business environments (Puppim de Oliveira, 2008; Kyobe, 2004; Agbeibor, 2006; Duncombe, 2005; Ayyagari et al., 2007). These make them unable to fully realize their potential and compete fairly with their counterparts in developed countries.

The few studies available on IS within SMEs in developing countries indicate that despite the many challenges, these SMEs are slowly but steadily beginning to embrace the use of IS (Kapurubandara, 2009; Duncombe, 2005; Kyobe, 2004). This they do, with the hope that such an investment in IS will translate into better services through enhanced business processes, and eventually increasing productivity. Whether this hope does translate into reality for SMEs in developing countries has been a subject of interest to researchers (Ayyagari et al., 2007; Dhillon et al., 2009; Caldeira & Ward, 2002), with some studies suggesting that there is no significant relationship between investment in IS and improved productivity being realized by SMEs in developing countries (Matambalya & Wolf, 2001).

The process of IS adoption within SMEs in developing countries has been marred with a lot of challenges (Matambalya & Wolf, 2001; Kyobe, 2004; Macharia, 2009), making the process to be characterized by slow pace adoption and use of IS that are outdated, ineffective and inefficient (Kapurubandara, 2009; Macharia, 2009). This is largely attributed to the fact that, most developing countries are not well positioned to provide a conducive environment for their SMEs to thrive even in their effort to embrace IS (Duncombe, 2005; Kew & Stredwick, 2005; Sanford, 2003). SMEs in developing countries have limited resources, because of this, most of their investments is directed towards their core business functions (Agbeibor, 2006; Beck et al., 2003). Investing in IS is often considered secondary, and most of them do not see the immediate impact of such systems to their business (Caldeira

& Ward, 2002; Dhillon et al., 2009) as such, they do not give priority to such investment. Moreover, when such an investment is made, it is normally done with a lot of caution and suspicion (Kapurubandara, 2008). Most of these SMEs lack internal skills necessary to develop IS solutions (Caruso & Marchiori, 2003; Dhillon et al., 2009). Instead, most of them make use of Commercial-Off-The-Shelf (COTS) solutions which are readily available and comparatively affordable to them (Dhillon et al., 2009). Moreover, most COTS solutions are widely used, and have traditionally gained acceptance in many organizations (Boddy et al., 2002; Dhillon et al., 2009). This does offer some assurance to the management of the SMEs on the reliability of such systems. However, many of the COTS solutions used by the SMEs are outsourced and are not designed and developed to meet the unique needs of the SMEs in developing countries.

Previous research has shown that the main obstacles to IS adoption among SMEs in developing countries are the cost involved, skills deficiencies, poor infrastructure, government regulations, short-range management perspectives and poor understanding of the benefits that the adoption of IS can provide, and how these benefits can be measured (Kyobe, 2004; Duncombe & Molla, 2009; Matambalya & Wolf, 2001; Ayyagari et al., 2007; Kapurubandara, 2009).

Research literature on the adoption of IS within Kenyan SMEs is scarce. A few studies have, however, indicated that, while many SMEs in Kenya are slowly beginning to embrace the use of IS solutions (World Bank, 2004; Matambalya & Wolf, 2001; Macharia, 2009; Moyi, 2005), many such systems have not adequately addressed the challenges faced by these SMEs (Matambalya & Wolf, 2001; Macharia, 2009). Nalo (2008) also notes that many SMEs in Kenya use poorly integrated IS, and as a result, do not derive full benefits from such systems. A similar situation has been noted by Duncombe and Molla (2009) on a study of SMEs in sub-Saharan Africa, which revealed that many of these SMEs use IS that do not adequately meet their needs. Ashrafi and Murtaza (2008) study of use and impact of ICT on Oman SMEs revealed that only a small number of SMEs make use of ICT. This situation of IS within SMEs in developing countries is an opposite of the cases reported from developed countries where high usage and benefits have been noted (Caruso & Marchiori, 2003; Harindranath et al., 2008; Lucchetti & Sterlacchini, 2004).

3. IS QUALITY ASSESSMENT

IS quality is increasingly becoming a key subject for many academic and business discussions (Sagheb-Tehrani & Manousaridis, 2007; Lui & Arnett, 2000; Reichgelt, 2006). While older disciplines enjoy agreement on definitions of several constructs, the same cannot be said of IS. IS quality has continued to remain an elusive concept for IS researchers and practitioners (Reichgelt, 2006; Bass et al., 2003; Ravichandran & Rai, 2000). There are several components that make IS, and the quality of IS is constituted by the quality of these components (Ozkan, 2006). According to Ozkan (2006), IS quality is the quality of the software product assessed by the usage of the software within an organization's framework. Palvia, Sharma, and Conrath (2001), expound that IS quality refers to the recognizable features and characteristics of a system that contribute to the delivery of anticipated gains and the satisfaction of perceived needs. A host of other scholars (Hanna, 1995; Markus & Keil, 1994; DeLone & McLean, 2003; Gable et al., 2008) have considered IS quality to include:

- Total system and business gains that exceed IS life-cycle needs;
- Timely delivery and sustained relevance beyond deployment;
- The provision of required functionality and features;
- Ease of access and use of delivered features;
- Acceptable response time;
- Easily identifiable sources of defects that are correctable with normal effort;

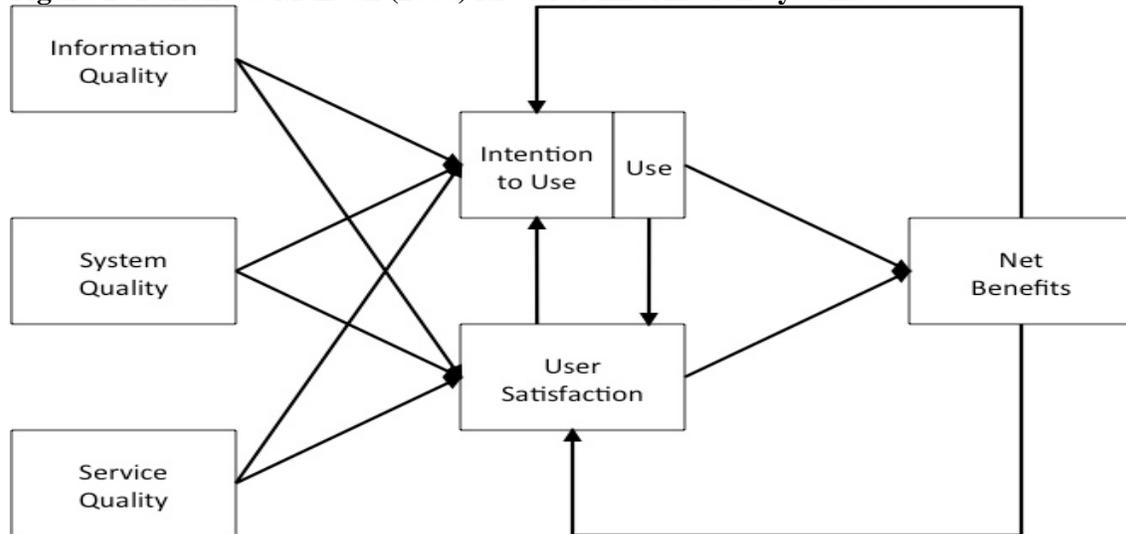
- Expandability to integrate unforeseen functionality and accommodate user base growth; and
- Usage of the system.

The quality attributes enumerated above takes into account several dimensions, as a result, they address the multiple perspectives of IS. The value of these attributes may vary from one individual/organization to the other. Hence acceptable IS quality is that which adequately addresses an individual's/organization's unique needs.

To make any gainful benefit from IS investment, the use of quality IS is paramount (Kontio, 2005; Baschab & Piot, 2007; DeLone & McLean, 2003; Gable et al., 2008). The success of any IS that has been adopted by an organization heavily relies on the quality of the IS (Gable et al., 2008). Studies have suggested that quality IS can increase the effectiveness and quality of the business activities (Sagheb-Tehrani & Manousaridis, 2007). It is with this realization that many organizations are channeling their resources towards improving the quality of their IS (D'Atri & Sacca, 2009). SMEs would justify their investment in IS on the basis of promised value to the business. Reichgelt (2006), asserts that these benefits are predicated on IS users' effective adoptive behavior that translates to acceptance and use. As revealed by DeLone and McLean (2003), however, the quality of IS influences user acceptance. That is, high quality IS would be associated with high user acceptance, and consequently high use rate. Quality, therefore, remains a critical factor in IS success. A number of studies have indicated that many SMEs do use IS that are of unacceptable quality (Burges, 2002; Caldeira & Ward, 2002; Dhillon et al., 2009; Fong, 1999). Reichgelt (2006) aptly puts it that, despite the many advances that have been fueled by Information Technology (IT), the IS community has not adequately exploited these advances to produce high quality IS that can offer value to the organization.

It is evident from the literature that IS assessment is a complex task because of the multi-faceted nature of IS (Smithson & Hirschheim, 1998; Irani, 2001; Peffers & Saarinen, 2002; Stair & Reynolds, 2008). Several constructs have been proposed for use as a surrogate measure for IS quality resulting into several instruments being proposed to measure IS quality. In this study, however, we adopt and use DeLone and McLean Model (D & M Model) for a number of reasons: in IS literature the D & M Model has been considered as the most comprehensive IS assessment instrument (Petter & McLean, 2009; Urbach et al., 2008); the model has remained to receive a wider acceptance over the decade (DeLone & McLean, 1992; Gable et al., 2008; Petter & McLean, 2009; Saarinen, 1996; Almutairi & Subramanian, 2005); the dimensions used in categorizing the different measures of IS quality: system quality, information quality, use/intention to use, user satisfaction, individual impact, and organizational impact adequately captures the multi-faceted nature of IS; and it shows the causal interdependencies between the IS quality dimensions. Figure 1 shows the various constructs that are employed in the D & M Model and their interdependencies.

As indicated in Figure 1, the Information Quality, System Quality, and Service Quality individually or jointly affect either use or intention to use and the level of User Satisfaction. The notion here is that, when the quality of Information, System and Service is poor, it will negatively affect the level of User Satisfaction and the Use/Intention to Use IS. Consequently, the Use/Intention to Use and the level of User Satisfaction while both have a bearing on each other, they both eventually affect the Net Benefit for the organization. This Net Benefit in turn influences both User Satisfaction and the Use/Intention to Use. This implies that, if there is limited Use/Intention to Use and low level of User Satisfaction, as a result of poor Information, System and Service quality, there will be minimal benefits derived from the IS and vice versa (DeLone & McLean, 2003). The definitions of the dimensions of the DeLone & McLean model and their indicators/measures are presented in Table 1.

Figure 1: DeLone & McLean (2003) Model of Information Systems Success**Table 1: Definitions and Measure for DeLone and McLean's Dimensions**

Adapted from DeLone & McLean (2003), Reichgelt (2006), Roldan & Leal (2003), and Petters et al. (2008).

| Dimension | Definition | Indicators or Measures |
|----------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information Quality | The quality of information offered by the IS | Accuracy, precision, timeliness, completeness, relevance, format of reports. |
| System Quality | The quality of the information processing system | Response time, resource utilization, system reliability, system accessibility, ease of use, perceived useful of IS, usefulness of specific functions. |
| Service Quality | Support of users by the IS department | Responsiveness, reliability, and empathy of the support organization |
| Intention to Use | Expected future consumption of an IS or its output | Attitude towards the IS |
| Use | Consumption of an IS or its output | Actual or self-reported usage |
| User Satisfaction | The recipient's response to the use of the output of an IS | User information satisfaction, decision-making satisfaction, user satisfaction with interface. |
| Net Benefit | The effect of IS on organizational performance | Profit performance, overall cost-effectiveness, overall manager productivity, return on assets, market share, effect on work practices. |

4. RESEARCH METHODOLOGY

The research strategy that we have employed in this study is qualitative based on multiple case studies. The research instruments used were questionnaires, interviews and observations. These were designed to measure the various dimensions of IS quality as proposed in the D & M Model (see Figure 1) and various measures/indicators (see Table 1) were used to evaluate the quality dimensions.

The population for this study consisted of SMEs drawn from Eldoret town, which is the fourth largest town in Kenya. Eldoret town is located in the western part of Kenya in Uasin Gishu County. A total of 7 SMEs were successfully recruited to participate in the study. The participants were selected across the major industrial sectors within Eldoret town in order to provide a more comprehensive view on research issues and also to provide practical and theoretical implications for SMEs in Eldoret, Kenya and research literature in this area.

In this study, purposive sampling was used to select those SMEs that would fit the purpose of the study. In this regard, therefore, only those SMEs that were using IS solutions in their operation were selected. We divided the participants into two categories namely: the system users within the SMEs (two users per SME) and the owner/manager of the SMEs. A total of 21 questionnaires were given out to the 7 SMEs that participated in the study. Within each SME, 3 questionnaires were issued, one for the SME owner/manager and two for the IS users. In all the completed questionnaires, none contained substantial uncompleted sections. One SME owner and a total of two IS users from two different SMEs did not return the questionnaires. After the initial analysis of the questionnaires, an interview was conducted with research participants. The data was collected within a period of two months from August to September 2010.

A within-case and cross-case thematic analysis was organized around the research focus (Yin, 2009). The dominant/characteristic themes for each SME were identified from the collected data. The coding categories used were drawn mainly from the D & M model. The emergent categories were organized into tables to enable comparisons across the seven cases. With this, we were able to identify and describe commonalities and differences.

We made use of low inference descriptors to ensure internal reliability. This was done to ensure a careful audit trail, by recording (with permission) the interviews and data. To further improve the reliability of the instruments used, we conducted a pilot study to ensure the reliability of the questionnaire. The use of SMEs owners/managers and IS users within the SMEs helped ensure content validity. Further, based on the results from the pilot study, we adjusted the variables and conceptual structure to improve content validity of the instruments. To minimize the risk of construct validity, we made use of the D & M model which has gained wider acceptance in the measure of IS. The various constructs used were those that have been commonly used in previous studies as indicated in Table 1. Triangulation strategies were used on data sources to ensure internal and external validity. The use of multiple-case studies and cross-case analysis helped improve external validity.

5. FINDINGS

5.1 Participants Educational Background

Only two of the six surveyed SMEs owners/managers had received some formal training in business areas at tertiary level. One had training at certificate level. The rest did not have any kind of training in business. Curiously, none of the SMEs owners/managers had any formal training in IS or related areas. Similarly, a sizeable number of IS users had no formal training in IS or related areas.

Table 2: Educational Background of Participants

| Qualification | No. of IS users | No. of Owners/Managers |
|------------------------------------------------------|-----------------|------------------------|
| Degree/Diploma/Certificate in Business related areas | Not applicable | 3 |
| Diploma in IS or related areas | 2 | None |
| Certificate in IS or related areas | 4 | None |
| No training in IS or related areas | 6 | All |

5.2 Summary of the Findings from the SMEs

Table 3: Demographics of the Sampled SMEs

| SME | No. of Departments | No. of Workers | No. of Owners | Nature of Business | Years in Operation |
|-------|--------------------|----------------|---------------|-------------------------------|--------------------|
| SME A | 4 | 35 | 3 | Financial Services | 12 |
| SME B | 4 | 23 | 2 | Retail Shop | 13 |
| SME C | 3 | 20 | 3 | Retail Shop | 7 |
| SME D | 5 | 42 | 4 | Financial Services | 8 |
| SME E | 7 | 32 | 3 | Accommodation & Food Services | 11 |
| SME F | 3 | 25 | 1 | Retail Shop | 4 |
| SME G | 2 | 18 | 1 | Retail Shop | 6 |

In Table 5 (below) we present some interview extracts from respondents regarding the quality of IS used within the organization. The IS users were asked questions regarding system quality, information quality, service quality, use/intention to use the IS, and their satisfaction with the IS. The decision to ask the IS users these questions was informed by the fact that, since they interact with the IS on a regular basis, they were better placed to provide information regarding these constructs.

Table 4: IS Usage within the SMEs

| SME | Department(s) Using IS Solution | Type of IS Solution Used | Reason for IS Adoption | Origin of Idea for Adoption | No. of Years in Using the IS | Satisfaction with the IS Solution |
|-------|---------------------------------|-----------------------------------------------------------------|----------------------------------|-----------------------------|------------------------------|-----------------------------------|
| SME A | 2 | COTS – Transaction processing system & Office automation system | Efficiency of business processes | Management | 3 years | Low |
| SME B | 1 | COTS – Transaction processing system | Efficiency of business processes | Management | 5 years | Low |
| SME C | 1 | COTS – Transaction processing system | Trend | Management | 5 years | Low |
| SME D | 4 | COTS – Transaction processing system & Office automation system | Efficiency of business processes | Management | 4 years | High |
| SME E | 3 | COTS - Transaction processing system & Office automation system | Efficiency of business processes | Management | 5 years | Low |
| SME F | 2 | COTS - Transaction processing system | Efficiency of business processes | Management | 3 years | Low |
| SME G | 1 | COTS - Transaction processing system | * | Management | 4 years | Low |

*The management of the SME did not participate, as such, the reason for the adoption was not clear.

Table 5: Respondents View on IS Quality [R-User = IS user; R-Mgr = Owner/manager].

| SME | Quality Attribute | Respondents Views |
|-------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SME A | System Quality | R-User02: "I have tried learning new functions but I have not succeeded, it would have been easier if the IS had tutorials or good help feature for learning". |
| | Information Quality | R-User01: "The system provides the information on time, but this information is not sufficient to help run other activities". |
| | Service Quality | R-User02: "...They [service providers] were good for the first six months after the implementation of the system. These days we really have to beg them to come, and when they come we have to pay them". |
| | Usage | R-User01: "Only two of the four departments use the system. I think what is done in other departments are not supported by the system functions". |

| | | |
|--------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Satisfaction | R-Mgr01: "...we have experienced some improvements, but I think we could do better by further exploiting the function of the system". |
| | Net benefit | R-Mgr01: "It is very hard to know if our earnings has increased because of this new system, but the system has helped us do away with certain redundant process that took a lot of our time". |
| SME B | System Quality | R-User04: "It crashes almost every month". |
| | Information Quality | R-User04: "It would have been more useful if we could also get information about the quantity of stock left". |
| | Service Quality | R-User03: "They [service provider] always do a good job". |
| | Usage | R-User03: "The system cannot support these other activities". |
| | Satisfaction | R-Mgr02: "The system is not able to help me do my duties...it was not made for these [his duties]". |
| | Net benefit | R-Mgr02: "how do you tell that the increased income is as a result of the usage of the system....I think it is very hard to tell". |
| SME C | System Quality | R-User05: "The system is very slow in processing a transaction" |
| | Information Quality | R-User05: "We do not depend on the information from this system fully because it does not contain everything we need". |
| | Service Quality | R-User05: "the service providers do their job well" |
| | Usage | R-User05: " We have to process credit transactions manually, the computer does not support this". |
| | Satisfaction | R-Mgr03: "We will be happy to have another system that will simplify most of these duties". |
| | Net benefit | R-Mgr03: "I don't think we have improved financially because of this system, we don't use the system a lot". |
| SME D | System Quality | R-User06: "The system is effective in meeting almost all our activities and it rarely fails". |
| | Information Quality | R-User06: "The reports generated from the system are very accurate and very useful". |
| | Service Quality | R-User07: "They [service providers] always do their job well". |
| | Usage | R-Mgr04: "Nearly all the sections use the system that is why we are very efficient in what we do". |
| | Satisfaction | R-IS06: "The system has helped us a lot in our job". |
| | Net benefit | R-Mgr04: "Our processes have been streamlined since the adoption of the IS and we have experience financial growth as a result of using the system". |
| SME E | System Quality | R-User08: "It was very difficult to learn to use the system...the help features are not easy to understand". |
| | Information Quality | R-User08: "The information is very accurate, but we only use it to run very few activities". |

| | | |
|--------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Service Quality | R-User08: “ They [service providers] don’t understand the system well, and most of the time they don’t do a good job”. |
| | Usage | R-User08: “Only three departments use the system”. |
| | Satisfaction | R-User08: “Some of the tasks we still do manually because they cannot be done with this system”. |
| | Net benefit | R-Mgr05: “No doubts we have been experiencing some growth over the past years, but I cannot say for sure that it is because of the systems we are using”. |
| SME F | System Quality | R-User10: “It took us a lot of time to get to learn how to use the system, even now we still have some problems using it”. |
| | Information Quality | R-User10: “The information is good but it only helps in few processes”. |
| | Service Quality | R-User09: “The service team are very good, they are friendly and have helped us a lot”. |
| | Usage | R-User09: “The inventory control system only informs us when an item is almost over, we don’t use the system much”. |
| | Satisfaction | R-Mgr06: “The system is good but I think it does not help us fully, we are looking for another system”. |
| | Net benefit | R-Mgr06: “The systems have helped us to some extent, but financial gain from the system I can’t tell”. |
| SME G | System Quality | R-User12: “It was very hard for us in the beginning to learn how to operate the system, we used to call the providers every time”. |
| | Information Quality | R-User11: “We don’t use the information from the system in all areas, the information is only useful for transacting a cash sale”. |
| | Service Quality | R-User11: “The service providers have been very understanding in helping us always when we have problems with the system”. |
| | Usage | R-User12: “Only one section [department] use the system, even here where we use the system we still do other activities the same way we used to [manually]”. |
| | Satisfaction | R-User11: “We are only able to do one activity with the system, all other things we still do on paper just like before”. |
| | Net benefit | *The management did not participate to offer an overall assessment into the net benefit. |

These findings revealed that most of the SMEs were not satisfied with their IS investments. The following were the reasons (summarized from the questionnaires and interview extracts) provided by IS users and the SMEs owners/managers as to why they had low satisfaction with their IS:

- The inability of the adopted IS solutions to support a number of business activities within the SMEs. This is mainly because, the IS solutions were adopted without ascertaining if they would address the needs of the SMEs. Most SMEs, therefore, ended up using IS solution that were not in line with their business practices and processes;
- The usage of outsourced COTS solutions that were not tailored for their business practices and processes;
- Poor knowledge of the IS functions used within the SMEs. This can be attributed to the fact that, most of the IS users were not having any formal training in IS or related areas, as a result, they could not fully exploit the potential of the IS solution; and
- The cost of acquiring the IS solution.

The responses of the IS users in regard to IS quality is summarized in Table 6 below.

Table 6: System, Information & Service Quality

| Quality Construct | No. of SMEs satisfied |
|---------------------|-----------------------|
| Service Quality | 6 |
| System Quality | 1 |
| Information Quality | 1 |

From Table 6, we can see that only one of the seven SMEs stated that the quality of the system they have adopted was acceptable, while the majority were not comfortable with the quality of the adopted system. The same applied to the quality of the information. Conversely, six of the SMEs were happy with the quality of the services provided to their IS, and only one noted that the quality of the services provided was unacceptable. This high level of satisfaction with the service quality could largely be attributed to the fact that these services in all the SMEs, apart from one, were provided by external experts.

The table below summarizes responses of the IS users and that of the SMEs owners/managers regarding the level of usage and satisfaction with the IS.

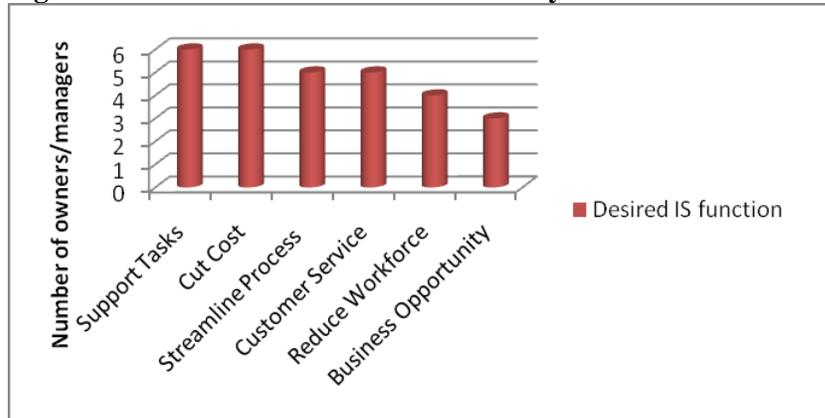
Table 7: Level of usage and user satisfaction with the IS

| Quality Construct | No. of SMEs recording high level | No. of SMEs recording low level |
|-----------------------|----------------------------------|---------------------------------|
| Use/Intention to use | 1 | 6 |
| Level of satisfaction | 1 | 6 |

Six SMEs registered low levels of usage and satisfaction with the IS that had been adopted by the SME. Only one SME noted high level of usage and satisfaction with their adopted IS. It is worth noting here that the owner of the SME that registered high level of usage of the adopted IS had tertiary level training in business (see Table 2). A study conducted by Banji and Lal (2004) on learning new technologies by SMEs in developing countries revealed a similar scenario. Banji and Lal findings revealed that there is a correlation between SMEs effective usage of technology and the education level of owners. Regarding the net benefits that could be associated to the adoption of the IS, many of the SMEs owners/managers could not clearly associate any financial benefit to the adoption of the IS solution. Many, however, noted that the few operations that were supported by IS were more effective.

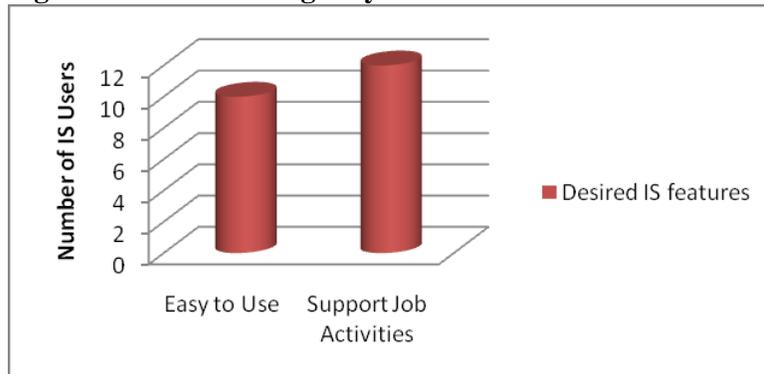
The management teams of the SMEs were asked what they would be looking for in a new IS. The responses were classified into six categories based on analysis of their responses. This is represented in Figure 2.

Figure 2: Desired Areas to be Addressed by IS



IS users were asked what change/replacement they would recommend for the current IS. The users observed the following as the changes/replacement they would prefer on the current IS they were using. Their responses were classified into two categories based on the analysis of their responses. This is represented in Figure 3.

Figure:3 Desired Changes by IS Users on the IS solution



It is clear as presented in Figure 3, that all the IS users were primarily interested in a system that would support their activities and assist them do these tasks with ease. Ten of the twelve IS users who participated in the study wanted a system that was easy to use. This could be tied to the previous findings that the majority of the IS users had no formal training in IS/IT, they would, therefore, likely to have problems operating an IS that appears technical because of their technical inadequacy.

6. LIMITATIONS OF THIS STUDY

Our research involved SMEs in Eldoret, Kenya, and therefore it may not apply to SMEs in other countries. However, a number of SMEs in developing countries share a lot of similarities (Banji & Lal, 2004; Kapurubandara, 2009). Moreover, our findings in regard to IS usage within SMEs expose similarities and confirm previous research (Duncombe, 2005; Duncombe & Molla, 2009; Kapurubandara, 2009; Kyobe, 2004). This study findings and

recommendations are therefore relevant to SMEs in other parts of Kenya in particular, and other developing countries.

Another limitation is the research approach and tools adopted in this study. The study applied a qualitative approach and the assessment of IS quality within the SMEs were based on questionnaires and semi-structured interviews with the SMEs owners/managers and IS users. Further, our study was based on SMEs from a cross-section of industries. The depth of study of particular industries was, therefore, limited by the scope of the research. Having used only 7 SMEs in this study, a larger sample may be needed to further validate our findings.

Notwithstanding these limitations, we consider the results to be valid because the semi-structured interviews included confirmatory questions and confirmation on conflicting information was made and findings refined. Further, our data analysis showed some similarities among the cases.

7. CONCLUSION

The study showed that the usage of IS within the SMEs was primarily for automation as was discernable from the types of IS adopted by the SMEs. More advanced usage like transformation of the business process was still lacking. It was found that while all the SMEs had more than one department, not every department made use of IS. Moreover, even within those departments that used IS, it was clearly evident (from the interviews and observations made) that most of the work was still being done manually. These findings confirm a similar findings by Harindranath et al. (2008) who found low usage of IS within SMEs. This low level of usage of IS within the SMEs could be attributed to a number of factors like:

- Low level of IS skills by both the SMEs management and the IS users;
- Paucity in the number of employees with IS skills to use the IS; and
- Use of IS that do not adequately address the needs of the SMEs.

The second most significant finding from the study was the poor quality of IS used within the SMEs. The D & M model constructs of IS success (*cf.* Figure 1) were used to assess the quality of the IS solutions that was being used within the SMEs. It was evident from the findings that the IS solutions that were being used by the SMEs were of unacceptable quality. This affirms findings from (Burges, 2002; Caldeira & Ward, 2002; Dhillon et al., 2009; Fong, 1999) that have indicated SMEs use of IS that do not adequately address their needs.

Thirdly, it was clear that the following factors did contribute to the poor quality of the IS solutions that were being used:

- Poor knowledge of IS skills by both the SMEs management and the IS users;
- Lack of involvement of IS users in the IS implementation process;
- Use of IS that failed to address unique needs of the SMEs;
- Under utilization of the adopted IS solution;
- Use of IS solutions that were challenging to use by the IS users; and
- Poor decision by the management regarding the choice of IS solution to be adopted.

It was clear from the results of this study that, by just adopting IS, the SMEs are not guaranteed benefits from the systems. It is only through the use of a good quality IS that such benefits can be realized. Without a good quality IS, these benefits will always remain an elusive goal for these SMEs as is the case currently.

7.1 Implications of the Study

7.1.1 Implications for SMEs Owners/Managers and IS users

To help improve the quality of these IS we propose that:

- SMEs owners/managers put down structures that can facilitate the improvement of their IS skills. With this knowledge, the SMEs management will be able to fully understand the potentials of IS solutions, have knowledge of the available IS solutions that can effectively address their business needs, and it will enable them also to be in touch with the IS users. Moreover, most owners/managers did not have any formal training in business, in this regard, it is recommended that the SMEs management take courses to enhance their managerial skills.
- SMEs management exploit either COTS solutions that can further be tailored to the needs of their SMEs or consider having IS developers to design and develop IS solutions for them that are able to address their unique business needs.
- SMEs management should take a more inclusive approach in adopting IS solutions.
- IS users take IS/IT courses to be able to improve their IS skills.
- since many IS users never fully exploited the capabilities of the IS solutions that were being used within the SMEs, the IS users should endeavor to learn and exploit the full potential of the adopted IS.
- the SMEs ensure they have proper IS infrastructure before adopting any IS and periodically evaluate the relevance of the IS to their business in the light of the constantly changing business environment.

Thus, for SMEs in Eldoret in Kenya to really realize the benefits of quality IS, it is important that both the SMEs owners/managers and the IS users take an active role in ensuring that proper structures are in place within the SMEs that will guarantee the quality of their IS solutions.

7.1.2. Theoretical Implications

Our study filled the following theoretical gaps:

- We made an exploratory study on the usage of IS within SMEs in Eldoret, Kenya and the quality of these systems.
- We established factors contributing to poor quality of IS used within SMEs.

This study made a comparatively integrated view over these issues in the Kenyan context and evidence from theoretical findings were presented. The theoretical findings from this study will be of interest to other scholars and may be useful for further research.

7.2 Recommendations for Further Research

In this study, several related areas were revealed that could potentially be exploited to extend the current research. It would be interesting to explore the applicability of this research to a particular industry context. This would provide greater depth to the research and have more pragmatic implications for specific industry. This study showed too that, SMEs management did not possess any formal training in IS, and many IS users lacked formal training in IS. It would be, therefore, useful to look at the development of extra curricula and skills development for SMEs owners/managers and IS users in this area. An ideal research into this would, therefore, be to carry out an analysis of the requirements necessary for the formulation of the underlying framework that can facilitate this development. This will certainly be a vital contribution to IS research.

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APPENDIX A : QUESTIONNAIRES**Questionnaire for SME Owner/Manager***1. Background and History of SME and the SME Owner/Manager*

What is your gender?

How old are you?

A part from you, are there other owners of this SME? If so how many?

For how long has your business been in operation?

What kind of business do you run?

Do you have any formal training that relates to this business? If so, what is the nature of the training and to what level?

Do you have any formal training in Information System usage or related areas?

How many employees work under this firm?

How many departments exist in the organization?

Has this business been registered?

Who are your primary clients/customers?

What are your primary functions/duties in this business?

Is your business located within Eldoret town central business district (CBD) or outside the CBD?

2. Information System Solution Used

What kind of information system do you have?

When did you start using this Information System within your organization?

Have you ever changed the systems before or is this the first Information System for your organization?

If you have changed, what was the reason(s) for this change?

From where did you acquire this Information System?

Was the system developed specifically for your organization? (Did you have a say in specifying the functions of the system)

Was an analysis of your organization practices and processes done to help determine the kind of the Information System that would suit your specific needs?

If this analysis was done, was it conducted by a professional in the field?

How many functions can the system support? Name them.

Which of these functions is frequently used?

Was the cost of acquiring the Information System an issue?

What other function would you have liked this Information System to have that does not currently exist within this Information System?

Do all the departments make use of IS? If NO why?

If yes, are these IS within departments integrated?

Were the IS users involved in the decision to acquire this IS?

3. Perceived benefit from the Information System

What kind of change in the way you run your business has been there from the time you started using this Information System?

Can you say that this change is associated with the implementation of the system?

Are you happy with this change? Why?

What benefits in the organization can you associate with the Information System?

What do you like most about the Information System?

4. *Organizational Problems with the Information System*

What negative effects to the organization can you associate with the usage of this Information System?

What problems does your organization experience with the Information System?

5. *Social-cultural Factors*

Does the Information System fit well with your business beliefs and practices?

Has the Information System affected or caused any issues in the way in which you conduct your business? If so, how?

Did/do you think that using this Information System will impact on your business culture?

6. *Future Plans*

What future plans do you have in regard to continued usage of the Information System?

Will you be considering having another Information System to replace the current one?

If you will be considering replacing this Information System, what will you be looking for in the new Information System?

What do you see as the main barriers to furthering the use of the Information System in your firm?

7. *Other Information*

Is there anything else you would like to add?

Questionnaire for Information System User

1. *User Background and Information Systems Knowledge*

What is your gender?

How old are you?

What are your main duties in this organization?

Did you have training on how to use this Information System?

What formal training/certification do you have in Information Systems or related areas?

How long have you been using this Information System?

What features/functions does the Information System have?

How do you use the Information System to carry out your duties?

Were you involved in the decision regarding the acquisition of this IS solution?

2. *Quality of Information offered by the IS*

Do you get accurate information from the Information System?

How well does this information address your work needs?

In what format do you get this information?

Is the information available at the time when needed?

3. *System Quality*

How long does the Information System take to respond to commands/requests?

How often does the Information System fail?

Do you find the Information System easy to use?

How useful is the Information System towards your job?

What other features/functions are present in the Information System but are not used by you?

What reasons make you not use the features/functions you named above?

What features/functions do you wish were included in the Information System?

4 *Service Quality*

Who is in charge of providing Information System support services?

Do they respond in a timely manner in case their services are needed?

Do you think the support services team/individual provides a good service? Why?

What would you have liked done differently by the services team/individual?

5. *Use and Intention to Use the Information System*

Do you always use the Information System to carry out the tasks that are intended to be carried out by the Information System?

Are there features/functions present in the Information Systems that can help you perform your tasks but you do not make use of them? If so why are you not using them?

Are you happy to continue using this Information System?

What change/replacement would you recommend for this Information System?

6. *User Satisfaction*

Are you satisfied by this Information System?

Does the design of the Information System Interface make you use the Information System with a lot of ease?

7. *Problems with the Information System*

What negative effects to the organization can you associate with the usage of this Information System?

What problems does your organization experience with the Information System?

How has the Information System transformed the way you carry out your duties?

8. *Social-cultural Factors*

Does the Information System fit well with your business beliefs and practices?

Has the Information System affected or caused any issues in the way in which you conduct your business? If so, how?

Did/do you think that using this Information System will impact on your business culture?

9. *Other Information*

Is there anything else you would like to add?

APPENDIX B: INTERVIEW QUESTIONS

Interview Schedule

Part A: For SME Owner/Manager

Section A

Briefly discuss the study background.

Discuss SME and the owner/manager background.

1. How old are you?
2. Are there others who own this business?
3. How long has the business been in operation?
4. What kind of business do you run?
5. Do you have any formal training that relates to this business? If so, what is the nature of the training and to what level?
6. Do you have any formal training in IS usage or related areas?

7. How many employees work under this firm?
8. How many departments exist in this firm?
9. Has this business been registered?
10. Who are your primary clients/customers?
11. What are your primary functions in this business?

Section B

Discuss the type of IS solution used

1. What kind of IS solution do you use?
2. For how long have you been using this system?
3. Have you ever changed the systems before or this is the first IS being used in your firm?
4. If you have changed, what was the reason(s) for this change?
5. Where did you acquire this IS?
6. Was the system developed specifically for your organization? (Did you have a say in specifying the functions that you needed the system to have?)
7. Was an analysis of your organization practices and processes done to help determine the kind of the IS that would suit your specific needs?
8. If this analysis was done, was it conducted by a professional in the field?
9. What functions can the system support?
10. Which of the functions are more often used?
11. How well does the IS help you carry out your duties?
12. What other function would you have liked this IS to have that does not currently exist within this IS?
13. Do all the departments make use of IS? If NO why?
14. If yes, are these IS within departments integrated?
15. Were the IS user involved in the decision to acquire this IS solution?

Section C

Discuss perceived benefit from the Information System

1. What kind of change in the way you run your business has been there from the time you started using this IS?
2. Can you say that this change is associated with the implementation of the system?
3. Are you happy with this change? Why?
4. What benefits in the organization can you associate with the IS?

Section D

Discuss problems with the Information System

1. What negative effects to the organization can you associate with the usage of this IS?
2. What problems does your organization experience with the IS?

Section E

Discuss future plans

1. What future plans do you have in regard to continued usage of the IS?
2. Will you be considering having another IS to replace the current one?
3. If you will be considering replacing this IS, what will you be looking for in the new IS?
4. What do you see as the main barriers to furthering the use of the IS in your firm?

Section F

Discuss social-cultural factors

1. Does the IS fit well with your business beliefs and practices?

2. Has the IS affected or caused any issues in the way in which you conduct your business? If so, how?
3. Did/do you think that using this IS will impact on your business culture?

Section G

Discuss any other relevant issue

1. Is there anything else you would like to add?

Part B: For Information System User

Section A

Briefly discuss the study background.

Discuss user background and IS knowledge

1. How old are you?
2. What is your main duty in this organization?
3. Did you have training on how to use this IS?
4. What formal training/certification do you have in IS or related areas?
5. How long have you been using this IS?
6. What features/functions does the IS have?
7. How do you use the IS to carry out your duties?

Section B

Discuss the quality of information offered by the IS

1. Do you get accurate information from the Information System?
2. How well does this information address your work needs?
3. In what format do you get this information?
4. Is the information available at the time when needed?

Section C

Discuss the quality of the system

1. How long does the IS take to respond to commands/requests?
2. How often does the IS fail?
3. Do you find the IS easy to use?
4. How useful is the IS towards your job?
5. What other features/functions are present in the IS but are not used by you?
6. What reasons make you not use the features/functions you named above?
7. What features/functions do you wish were included in the IS?

Section D

Discuss the quality of the service

1. Who is in charge of providing IS support services?
2. Do they respond in a timely manner in case their services are needed?
3. Do you think the support services team/individual provides a good service? Why?
4. What would you have liked done differently by the services team/individual?

Section E

Discuss the usage and intention to use the IS

1. Do you always use the IS to carry out the tasks that are intended to be carried out by the IS?
2. Are there features/functions present in the IS that can help you perform your tasks but you do not make use of them? If so why are you not using them?

3. Are you happy to continue using this IS?
4. What change/replacement would you recommend for this IS?

Section F

Discuss the user satisfaction with the IS

1. Are you satisfied by this IS?
2. Does the design of the IS Interface make you use the IS with a lot of ease?
3. How has the IS transformed the way you carry out your duties?

Section G

Discuss the social-cultural factors

1. Does the IS fit well with your business beliefs and practices?
2. Has the IS affected or caused any issues in the way in which you conduct your business? If so, how?
3. Did/do you think that using this IS will impact on your business culture?

Section H

Discuss any other relevant issue

1. Is there anything else you would like to add?