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Examining Health Information Systems Success Factors in Uganda's Healthcare System

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Abstract

Healthcare Health Information Systems offer several benefits towards healthcare service delivery in Uganda including easy record keeping, enhancing communication, performing simple calculations, supporting decision making, gaining competitive advantage, better management of chronic diseases, faster retrieval of records, improving process flow and increasing productivity. However, the benefits mentioned have been hindered by failure of HIS in Uganda. The success factors for Information Systems in Ugandan healthcare system are largely unknown. The effect of these failures is most felt in Small and Medium Healthcare Enterprises who have limited resources and semi-skilled employees.

This study determines success factors for Information Systems in Small and Medium Healthcare Enterprises in a developing country context like Uganda. The findings of the study therefore aid in understanding the key issues that lead to the success of Information Systems in developing countries, Uganda in particular.

The study targeted staff of Small and Medium Healthcare Enterprises including doctors, nurses, administrators and laboratory attendants. A sample of 274 was taken from 954 health units but only 202 questionnaires were considered for analysis after data cleaning. Data were analyzed using Convergent and Discriminant Validity, Rotated Component Matrix tables, Communality and Regression analysis.

The findings indicate that management support, user involvement, resource supply, and education and training are the most important success factors for HIS success. Principal component analysis results obtained show that all items on the listed variables had communalities above the significant level of 0.4, implying that all items exhibited sufficient loadings. This therefore implies that each of the items correlates highly with all other items and can at least easily load onto one of the factors. Further, multiple correlation coefficient R=0.717 obtained implies that there is a strong relationship between the multiple independent factors and the dependent variable.

Key words: Health Information Systems, Health units, Success factors, Small and Medium Healthcare Enterprises, Small and Medium Enterprises, Uganda

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INTRODUCTION

A huge number of healthcare service providers in Uganda are Small and Medium Healthcare Enterprises (SMHEs) with employees ranging from 5 to 100. Information Systems (HIS) used in healthcare units in Uganda include patient records management systems, decision support systems, drug monitoring and control systems, mobile technologies, electronic mail, enterprise resource planning systems and several other office automation systems. Healthcare HIS offer several benefits towards service delivery in Uganda including easy record keeping, enhancing communication, performing simple calculations, supporting decision making, gaining competitive advantage, better management of chronic diseases, faster retrieval of records, improving process flow and increasing productivity. Irrespective of the benefits mentioned, HIS failure continues to be high in Uganda. Amanyire *et al*. (2010) studied HIS failures in three Small and Medium Enterprises (SMEs) clinics in Uganda and established that the major causes of failure include skills deficiency in usage of computers, resistance to change, inadequacy of necessary information system infrastructure, high cost of information system infrastructure, poorly designed HIS, concerns raised by patients and general community about privacy of their information.

HIS assessment is vital to their success. Several conceptual and empirical studies have been conducted to explore this important issue (Garg *et al*., 2010; Al-Adaileh, 2009). Various generic models for assessing information system success exist. However, such models developed are generic in nature and are expected to be used in any kind of enterprise with little regard to the differences that exist between large enterprises and SMHEs. SMHEs are differentiated from larger enterprises by a number of key characteristics including being smaller size firms; majority are family run; lack HIS management knowledge; have limited resources; degree of bureaucracy is typically lower; internal lines of communication are shorter and often do not consider long-term strategies or treat them in a vague manner as compared to large companies (Iskanius, 2009; Taticchi *et al.,* 2008). As a result an information system success model that works well for large enterprises does not necessarily work for a Small and Medium Enterprise, as SMHE are not miniatures or smaller versions of large enterprises. Thus, the transfer of models from developed countries to developing countries is not appropriate as the two settings differ in a number of contexts (Cocca & Alberti, 2010; Garengo, 2009). Hence, developing an Information System (IS) model for SMHEs should therefore always start from a detailed analysis of SMHEs needs and characteristics.

Given the above, IS failure has remained an issue of concern to SMHEs, especially in developing countries. SMHEs that encounter IS failure face problems including loss of funds, service delay and overcrowding, loss of reputation, threatening the companies' future survival among others

(Laitinen, 2008; Noudoostbeni *et al.,* 2009). The need therefore remains to assess factors that influence the success of HIS to be used by SMHEs in developing countries like Uganda.

This study determines success factors for HIS in SMHEs in a developing country context like Uganda. The findings of the study therefore aid in understanding the key issues that lead to the success of HIS in developing countries, Uganda in particular.

Causes of HIS failure in SMHEs

Related to the concepts of HIS success is the inverse proposition of IS failure. IS failure is often influenced by the perception of people who are involved in it (Peterson *et al.,* 2002). Beynon-Davies (1999) defines IS failure as termination of an IS due to unbearable accumulation of flaw or inability of an IS to meet its stakeholder expectations. Heeks (2002) identified two major categories of IS failure as; (1) total failure where an IS never gets implemented or where it is implemented but immediately abandoned and (2) partial failure where major goals are unattained or where there are significant undesirable outcomes implying only a subset of initially stated objectives are achieved.

An overview of literature shows successful examples of HIS in SMHEs in developing countries as well as several cases of HIS that have failed to fulfil their initial promise. HIS failure results into money wastage which is particularly serious for SMHEs in developing countries where development capital is generally in very short supply (Sander *et al*., 2005). One major cause of IS failure cited in literature is the transfer of HIS and IS models from one environment to a different environment. SMHEs differ from large enterprises in terms of managerial, cultural and economic environment (St-Pierre and Delisle, 2006). Similarly developed countries differ from developing countries in terms of technology, processes, objectives, values, motivations, staffing, skills, management, structures and financial resources (Malling, 2000). The transfer and use of HIS and IS models in differing settings may therefore not be appropriate and could result into failure.

Several other factors have been proposed as being barriers to IS success in the developing countries and contributing directly to its failure. These include lack of management support, limited expertise, poor planning, limited resources, changing requirements, poor information quality, resistance to change, system quality, IS adoption process and unstable power supply. Lack of Management support for example has been identified in Bhatti (2005) who highlight management support as a critical success factor in any project. Any project is prone to failure in case it encounters problems any time during the project life cycle for as long as it lacks commitment from management (Dorsey, 2005).

Further, the IS adoption process within SMHEs is different from larger businesses. SMHEs have limited resources to be allocated for managing the IS adoption process (Saira, 2010). The process however requires owners / managers to allocate resources and devote significant time as well as effort (Sarosa & Zowghi, 2003). Shortages in resources impede conducting proper information system adoption which at times results into IS failure.

Unstable power supply is also another contributor towards IS failure in Uganda and usually puts businesses to a standstill (MoFED, 2008). SMHEs at times end up abandoning HIS in preference to paper work. Another factor is poor system quality, which often, is caused by limited finances and poor planning. This leads most SMHEs into deploying systems from unprofessional IS

designers who usually provide cheaper services but poorly designed HIS. A wide range of poorly designed HIS have been put into place but fail shortly after implementation.

RESEARCH DESIGN

SMHE units in Uganda were involved in the study. Both public and private healthcare units were included in the study. A case of Kampala district was taken since it is one of the regions in the country with a high number of healthcare units using HIS. Healthcare units including hospitals, clinics, outpatient care centers and specialized care centers, such as birth centers and psychiatric care centers were visited.

The study targeted staff (doctors, nurses, administrators, laboratory attendants) in SMHEs settings. Staff who used HIS and clearly understand reasons for IS success in healthcare were considered.

Sampling technique

Purposive sampling was used in this study. Purposive sampling technique enables a researcher with a purpose to have access to a particular subset of people (only candidates of interest) and excludes those that do not fulfill the conditions in mind. According to Lewis & Sheppard (2006), in purposive sampling the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. For this study, healthcare units using HIS were selected to determine IS success factors.

Sample size

There are 954 registered healthcare units in Kampala district (MOH, 2011). According to Krejcie & Morgan (1970), this population gives a sample size of 274. In this study, 274 questionnaires were issued out. However, 202 respondents returned correctly filled questionnaires giving a 73.4% response rate. The non-response rate of 17.1% comprised of 32 questionnaires that were not returned, 15 questionnaires that were not fully filled and 26 questionnaires that were wrongly filled.

Data analysis

The large volumes of data gathered were analysed using the Statistical Package for Social Scientists (SPSS) software tool. The data analysis process involved summarizing the information collected so as to extract the factors for HIS success.

FINDINGS

This section presents the findings from the study.

Computer applications used in healthcare units

Data were collected to determine the computer applications commonly used in healthcare units. Computer applications including word processing software, spreadsheet software, database software, internet software and accounting software were used in the sampled healthcare units. The results are presented in Figure 1.

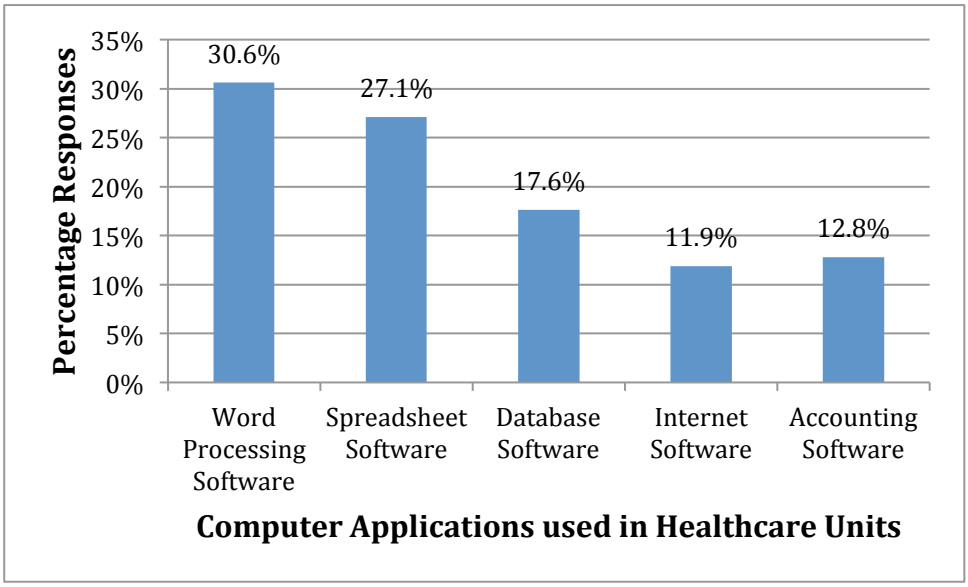

Figure 1: Computer applications

As per results in Figure 1, the computer applications that were used to support healthcare operations, management and decision functions included word processing software (30.6%), spreadsheet software (27.1%), database software (17.6%), internet software (11.9%) and accounting software (12.8%). According to the findings, staff in healthcare units mostly used word processing software, followed by spreadsheet software and database software. The software was used to execute functions including but not limited to entering data, producing reports, performing calculations and quick retrieving of data.

Success factors for HIS

Table 1 summarizes key findings from the field study that contribute towards HIS success in SMHEs. It presents the variables investigated and respective factors that had scores above 50% in agreement. This implies over 50% of respondents agreed on the respective factors contributing factors to HIS success in SMHEs.

Table 1: Summary of HIS success factors for SMHEs

Management Support	User Involvement	Resource Supply	Education and Training	Intention to Use
— Coordinating and directing, — User happiness, — Overall management support	— Planning, — Gathering requirements, — Design, — Testing, — Overall user	— Infrastructure availability, — Reliable infrastructure, — Finances, — Technical	— Level of knowledge, — Training, — Awareness, — Past similar experience,	— Enhancing effectiveness, — Increasing productivity, — Improving quality of service,

	involvement	personnel, — Timeliness, — Overall Resource supply	— Overall education and training	— Belief it helps do work better, — Knowledge of use, — Overall intention to use

The factors under the management support variable that is coordinating and directing HIS activities, user happiness and overall management support scored above 50% implying that respondents agreed that they mattered for the success of HIS in healthcare.

All the factors under the user involvement variable which included involving staff in the stages of planning, gathering requirements, design, testing and overall user involvement scored above 50% implying that majority respondents agreed that user involvement in HIS development activities contributed to success.

All factors under the resource supply variable which included availability of reliable infrastructure, availability of finances, availability of technical personnel, timely provision of resources and overall resource supply scored above 50%, implying that most respondents agreed to the fact that resource supply contributed to HIS success.

All factors under the education and training variable which included staff level of knowledge, staff training, and staff awareness, past similar experience and overall education and training scored above 50%, implying that majority of the respondents agreed that education and training contributed to HIS success.

All factors under the intention to use variable which included enhancing effectiveness, increasing productivity, improving quality of service, belief it helps do work better, knowledge of use and overall intention to use scored above 50% implying that majority of the respondents agreed that intention to use contributed to HIS success.

Convergent and discriminant validity

The component factor loading matrix in Table 2 shows the loadings of the factors on the four components. The matrix consists of items on management support coded as (MS), user involvement (UI), resource supply (RS), education and training (ET). Management support had 6 items coded from MS1 to MS6, user involvement had 6 items coded from UI1 to UI6, resource supply had 6 items coded from RS1 to RS6 while education and training had 5 items coded as ET1 to ET5. The total number of items was 23. All factor loadings below 0.40 were suppressed.

Table 2: Component factor loading

Number	Code	Items	Components			
			1	2	3	4
1	MS1	Management setting and clearly explaining IS goals and objectives to staff code	.555			
2	MS2	Management ensuring IS aligns well with organisational activities	.620			

3	MS3	Management coordinating and directing information system activities	.648			
4	MS4	Management involvement in implementation of the HIS	.629			
5	MS5	Management keen to see that people are happy with using the system	.716			
6	MS6	Overall, management support	.745			
7	UI1	User involvement in IS planning	.690			
8	UI2	User involvement in gathering requirements	.737			
9	UI3	User involvement in approving the design	.682			
10	UI4	User involvement in implementing IS	.543			
11	UI5	User involvement in testing for proper functionality of the IS	.560			
12	UI6	Overall, user involvement in IS development	.544			
13	RS1	Availability of proper IS infrastructure	.666			
14	RS2	Reliable information system infrastructure	.561			
15	RS3	Availability of finances to run IS activities	.662			
16	RS4	Availability of technical personnel	.698			
17	RS5	Timely provision of resources	.513			
18	RS6	Overall, supply of IS facilities (resources)	.566			
19	ET1	Staff level of knowledge about HIS	.577			
20	ET2	Training staff how to use HIS	.697			
21	ET3	Staff awareness about relevancies and benefits	.662			
22	ET4	Past similar experience of using HIS	.537			
23	ET5	Overall, education and training	.575			

It is important to note that sufficient / significant loadings depend on the sample size of the dataset. According to Hair *et al*. (2006), the significant factor loading for a sample size of about 200 is 0.40. The sample size for this study was 202 thus factor loadings of 0.40 and above would be considered significant / sufficient.

Convergent validity is said to occur when items load high on their respective variable or factor. Results in Table 2 above show that all items exhibited loadings higher than 0.40 on the first factor (all items converged on the first factor). The results therefore signify that desirable convergent validity was attained.

Discriminant validity refers to the distinctiveness of different variables (Campbell & Fiske, 1959). A successful evaluation of discriminant validity shows that a test of a concept is not

highly correlated with other tests designed to measure theoretically different concepts (in other words it occurs when an item loads high on the variable it measures than on any other variable. Results in Table 2 above show reasonable discriminant validity since all items had higher loadings on their own factors than on other factors. Results therefore indicate that desirable discriminant validity was achieved.

Rotation

Rotation was also performed to interpret analysis easier. The Rotated Component Matrix table 3 shows the loadings of the factors on the four components. Factor loadings less than 0.40 were excluded from the table for clarity. The results of the rotation are shown in Table 3.

Table 3: Rotated component matrix

Number	Code	Items	Components			
			1	2	3	4
1	MS1	Management setting and clearly explaining HIS goals and objectives to staff	.576			
2	MS2	Management ensuring HIS aligns well with organizational activities	.556			
3	MS3	Management coordinating and directing information system activities	.457			
4	MS4	Management involvement in implementation of the HIS	.774			
5	MS5	Management keen to see that people are happy with using the system	.749			
6	MS6	Overall, management support	.644			
7	UI1	Staff involvement in HIS planning	.777			
8	UI2	Staff/ IS user involvement in gathering requirements	.552			
9	UI3	Involving staff/ information system users in approving the design of the HIS				.467
10	UI4	Involving staff/ information users in implementing (putting in place) of the HIS				.655
11	UI5	Involving staff / HIS users in testing for proper functionality of the HIS				.688
12	UI6	Overall, user involvement in HIS development				.533
13	RS1	Availability of proper HIS infrastructure			.579	
14	RS2	Reliable information system infrastructure			.783	
15	RS3	Availability of finances to run HIS activities			.627	

16	RS4	Availability of technical personnel			.501	
17	RS5	Timely provision of resources			.609	
18	RS6	Overall, supply of HIS facilities (resources)		.520		
19	ET1	Staff level of knowledge about HIS		.645		
20	ET2	Training staff how to use HIS		.703		
21	ET3	Staff awareness about relevancies & benefits of HIS		.767		
22	ET4	Past similar experience of using HIS		.738		
23	ET5	Overall, education and training		.657		

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization.

Table 3 shows that all items on management support loaded highly (factor loadings higher than 0.40) on component 1. Items on user involvement loaded highly on component 4. Despite the fact that item number 7 failed to load on component 4, it had a cross loading higher than 0.2 as per the cross loading rule. Items on Resource supply loaded highly on component 3 apart from item number 18 which still had a cross loading higher than 0.2, thereby meeting the cross loading rule. All factors on education and training loaded highly together on component 2. Results in the rotated component matrix further signify that convergent as well as discriminant validity was achieved since all items converged on their respective components that they measured than on other components measuring differing concepts.

The Exploratory Factor Analysis (EFA) performed helped to identify which items had the strongest association with a given factor. Items on management support were highly associated with component 1, items on education and training were highly associated with component 2, items on resource supply were highly associated with component 3 and items on user involvement were highly associated with component 4.

Items on management support that were most highly associated with component 1 were: management involvement in implementation of the HIS (MS4) with factor loading 0.774 , management being keen to see that people are happy with using the system (MS5) with 0.749 and overall management support (MS6) with factor loadings 0.644.

Items that best measured the education and training variable while correlating highly with component 2 were; staff awareness about relevancies and benefits of HIS (ET3) with factor loading 0.767, followed by past similar experience of using HIS with (ET4) 0.738 and training staff how to use HIS (ET2) with 0.703.

Items on resource supply that were most highly correlated with component 3 were; availability of reliable information system infrastructure (RS2) with factor loading 0.783, availability of finances to run HIS activities (RS3) with 0.627 and timely provision of resources (RS5) with 0.609.

Items on user involvement that were highly associated with component 4 included; involving staff/ HIS users in testing for proper functionality of the HIS (UI5) with a factor loading of 0.688

followed by involving staff/ information users in implementing (putting in place) of the HIS (UI4) with 0.655 and overall user involvement in HIS development (UI6) with 0.533.

Communalities

Communality illustrates the degree to which an item correlates with all other items. It is said to be good if communalities for a particular variable are high; however if communalities are low (between 0.0-0.4), then that variable struggles to load significantly on any factor. Principal component analysis was performed; results in Table 4 show that all items had communalities above the significant level of 0.4 implying that all items exhibited sufficient loadings. This therefore implies that each of the items correlates highly with all other items and can at least easily load onto one of the factors.

Table 4: Communalities

Number	Code	Items	Initial	Extraction
1	MS1	Management setting and clearly explaining HIS goals and objectives to staff	1.00	.425
2	MS2	Management ensuring HIS aligns well with organisational activities	1.000	.493
3	MS3	Management coordinating and directing information system activities	1.000	.595
4	MS4	Management involvement in implementation of the HIS	1.000	.678
5	MS5	Management keen to see that people are happy with using the system	1.000	.699
6	MS6	Overall, management support	1.000	.655
7	UI1	Staff involvement in HIS planning	1.000	.702
8	UI2	Staff/ HIS user involvement in gathering requirements	1.000	.607
9	UI3	Involving staff/ information system users in approving the design of the HIS	1.000	.523
10	UI4	Involving staff/ information users in implementing (putting in place) of the HIS	1.000	.560
11	UI5	Involving staff/ HIS users in testing for proper functionality of the HIS	1.000	.589
12	UI6	Overall, user involvement in HIS development process	1.000	.590
13	RS1	Availability of proper HIS infrastructure	1.000	.623
14	RS2	Reliable information system infrastructure	1.000	.715
15	RS3	Availability of finances to run HIS activities	1.000	.594
16	RS4	Availability of technical personnel	1.000	.553

17	RS5	Timely provision of resources	1.000	.508
18	RS6	Overall, supply of HIS facilities (resources)	1.000	.482
19	ET1	Staff level of knowledge about HIS	1.000	.722
20	ET2	Training staff how to use HIS	1.000	.679
21	ET3	Staff awareness about relevancies and benefits of HIS	1.000	.687
22	ET4	Past similar experience of using HIS	1.000	.606
23	ET5	Overall, education and training	1.000	.563

Regression analysis

Regression analysis was performed to estimate the relationships among factors. Multiple regression analysis method was used since there was one dependent variable and more than one independent variable to be analyzed. Regression analysis statistical technique was used because it is a predictive technique which allows estimating relationships between the independent/ predictor factors and the dependent/ criterion. In other words knowing the independent factors (management support, user involvement, resource supply, education and training) enables predicting the dependent variable (intention to use).

Generally, the multiple regression equation takes on the form:

$Y = a + b1*X1 + b2*X2 + ... + bn*Xn+ u$

Where

Y= Dependent variable

X1,….., Xn= Independent factors

a= constant

b= B coefficient

n= Number of independent factors

u= Error

Therefore for this study,

Y= Intention to use/ system use.

X1,…..,X4= Independent factors (education and training, user involvement, management support, resource supply)

a= constant/ intercept *(It gives the value of Y at* a point where the regression line crosses the Y axis; at point X=0)

b= B coefficient/ Regression coefficient/ slope of the regression line represents the independent contributions of each independent variable to the prediction of the dependent variable.

Taking on the general equation: $Y = a + b1*X1 + b2*X2 + ... + b4*X4 + u$

Intention to use/ system use = 1.014 + 0.341 (X1) + 0.056 (X2) + 0.005 (X3) + 0.368 (X4) + u

The values of the independent factors X1, X2, X3, X4 corresponding to education and training, user involvement, management support, resource supply respectively can be assumed in order to predict the expected value of Y (intention to use/ system use) which is the dependent variable.

Strength of the relationship

Regression analysis carried out helped to determine the strength of the relationships between the independent factors and the dependent variable. Results showing strength of relationships are presented in the model summary in Table 5.

Table 5: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717[a]	.514	.504	.46290

a. Predictors: (Constant), Education and Training, User Involvement, Management Support, Resource Supply

Table 5 above, presents the model summary and at the footnote to the model summary, predictors that are relevant for the R and R2 are shown. The predictors of HIS success proposed in the model include management Support, user involvement, resource supply, education and training.

The multiple correlation coefficient R, which is the square root of R Square shows how strongly the multiple independent factors relate to the one dependent variable. R varies from 0 to1, in Table 5 above, R=0.717 which implies that there is a strong relationship between the multiple independent factors and the dependent variable.

R2 is the amount of variance in the dependent variable (intention to use/ system use) which is explained by the independent factors (management support, user involvement, resource supply, education and training). R square values vary from 0 to 1; 0 indicating no relationship, 1 indicating a perfect relationship. The closer the R square value is to 1.0, the better the model (it means that one can better predict one term from another) and the closer the R square value is to 0, the worse the model (it means knowing one term does not help one know the other term at all). R square (R2) for this study is 0.514 which implies that the proposed variables (management support, user involvement, resource supply, education and training) explain 51.4% of the variance in intention to use HIS. The proportion of unexplained variance in the dependent variable is therefore (1-R) 0.486; part of which could be catered for by the other HIS success factors not catered for in this model.

The adjusted R square is an adjustment of the R square that penalizes the addition of extraneous predictors to the model. The adjusted R square tries to yield a more honest value to estimate R Square. The adjusted R square for this study is 50.4%. The standard error of estimate/ standard deviation is 0.463.

DISCUSSION OF FINDINGS

HIS failure is a factual challenge that continues to face SMHEs especially in developing countries (Devos *et al.,* 2008; Laitinen, 2008). The existing HIS success models are generic in nature, not tailored to specific SMHE needs in developing country settings. This research study aimed at examining the HIS success factors in SMHEs in a developing country, Uganda. A discussion of findings is given in this section as follows.

Results from the study indicate the factors for HIS success in SMHE healthcare units in Uganda as being: management support, user involvement, resource supply, education and training.

The level to which management support contributed to HIS success was not significant. This may be the case since majority SMHEs were small enterprises and few were medium enterprises. For small enterprises, it is common to find that the users of the HIS are at the same time the managers; in that way SMHEs may consider management support to be one of the factors contributing to HIS success but not to a level that is significant. This finding is consistent with studies by Sabherwal (2008) who states that management support positively affects HIS success; Young and Jordan (2008) also highlight management support as being one of the critical success factors for HIS. Umble (2003) also points out that HIS success requires leadership, commitment, and participation by management.

User involvement in the process of developing an HIS is also a factor contributing to success. This research study findings indicated that the level to which user involvement contributed to HIS success was not significant. This may be the case since majority SMHEs were found using commercial off-the-shelf software that is standardized and was easy to learn. This therefore implies that users of HIS in these SMHEs agreed that user involvement contributes to HIS success but may not be one of the major factors contributing to success. Majority of the respondents were using word processing software, followed by those that used spreadsheet software, database software, accounting software and the Internet. Users used these software packages to input data and generate reports on patients received in a day, cash received in a day, drugs procured, and employees' salaries among others. The results are consistent with studies by McGill (2008), who found that user participation influences success by increasing system use. Harris (2009); Mattia (2008) in their studies also point out that user involvement in IS development activities leads to IS success.

CONCLUSION AND RECOMMENDATIONS

Multiple regression analysis was performed to determining the strength, direction and level of significance of the relationships among factors. The multiple correlation coefficient R was equal to 0.717. R shows how strongly the multiple independent factors relate to the one dependent variable. Results thus imply that there is a strong relationship between the multiple independent factors and the dependent variable.

The HIS success factors obtained in this study were specifically for SMHEs healthcare units. It is important to note that factors affecting HIS failure in SMHEs in the health sector may differ from those affecting SMHEs in other sectors. This therefore creates need for further research to investigate HIS success factors for SMHEs in other sectors.

This study was conducted in only SME healthcare units in Uganda. There is need for more studies looking at large health facilities and hospitals. Also similar studies in different countries may yield varying results. Heeks (2006) noted that the failures are mainly due to a North-South transfer of information that does not take into account the context, or the local attitudes towards modernization and rationalism. In addition, future research should study the effect of proposed factors on user satisfaction.

Finally, future research could focus on visiting only those healthcare units that have experienced HIS failure to establish the causes on ground for this particular sector. After, the results obtained could then be matched with our findings to obtain a better understanding of the factors.

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