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Information and Communication Technology (ICT) Risk: Impact on Small and Medium Enterprises

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ABSTRACT The focus of this study was to investigate the relationship between: (1) Information and Communication Technology (ICT) risk constraints and performances of SMEs. The study was based upon survey design to collect the primary data from 107 respondents using the simple random sampling technique. In order to understand the degree of association between the performances of SMEs and the independent variables, multiple regression, Repeated-Measures Analysis of Variance RM-ANOVA were performed. Where a significant value was observed, either Betas of multiple regression or significant levels of RM-ANOVA or RM-MANOVA ascertained these differences. It was found that information system failure or improper user participation in the systems development process actively impacts on SMEs. By implication there was enough evidence to suggest that SMEs would become more effective if efforts are targeted towards ICT risk control. As a recommendation the significant feature that may be drawn from the current study is the change in the adoption and application of ICTs from large organisations to SMEs.

INTRODUCTION

These information and communication technology (ICT) risk governance focus areas describe the topics that executive management needs to address to govern ICT within their enterprises whether large or small organisation. Operational management uses processes to organise and manage ongoing IT activities (ITGI 2007: 7). In consequence, building an information system is a process of planned organisational change that must be carefully managed. Therefore, one can better understand system success and failure by examining different patterns of implementation. Yet, other authors maintain that:

A temporary construction of an information security management system needs a constant investment whenever new vulnerabilities are discovered. Therefore to achieve objectives of information security investment efficiently and effectively, it is critical to build ISMS which retains consistency in terms of managerial level. In accordance with SMEs and characteristics of SMEs' informatization, a development of ISMS which is differentiated from security system for large enterprises possessing enough resources is essential. (Lee and Jang n.d: 85).

Notwithstanding, especially important is the relationship between participants in the implementation process, notably the interactions between system designers and users (Posthumus and Von Solms 2004; King III Report 2009). Additionally, it is important to note that conflicts between the technical orientation of system designers and the business orientation of end users must be solved (King III Report 2009). This implies that the success of organisational change can be determined by how well information systems specialist, end users, and decision makers deal with key issues at various stages in implementation.

A survey suggested that professionals in the ICT field do not attribute success and failure the same way (Standing et al. 2007; King III Report 2009). This is particularly true for ICT SMEs (Standing et al. 2007; King III Report 2009). The survey established that the manufacturing sector was the least advanced on average, with only 34 per cent of businesses surveyed having developed a website.

These results, based on a stratified random sample demonstrate the relatively slow uptake of e-business in the smaller organisation. The other significant feature that may be drawn from the study is the change in the adoption and application of ICTs.

Some reasons for SMEs not establishing facilities were the non-IT literacy of customers or the prohibitive costs quoted by consultants for setting up a site (Lam 2006; King III Report 2009). More so, it was evident from qualitative responses that ICT and internet development was a significant feature in the thinking of most business-

es in terms of future innovations (Standing et al. 2007); a result that perhaps indicates that such developments for SMEs are still viewed as an innovative product that is yet to be fully exploited. It is also evident that wider marketing applications involving database management and relationship marketing strategies were not being fully exploited by the SMEs (Standing et al. 2007). Certainly, further exploration of the usage of the ICT by SMEs is necessary.

Yet, *post hoc* analysis of the interaction effect showed that while there were trends towards IT support and line managers, there was however, a significant reverse effect of executive managers who attributed success to global and stable factors (mean =0.18) more than project failure (mean= 0.17), $F(1, 39)=3.99$, $p<0.05$ (Standing et al. 2007).

The results and insights from studies indicate there is a need for improvement of SMEs performance (Standing et al. 2007; King III Report 2009). IT professionals need to be aware of the pattern of how they attribute success and failure within IT projects and reflect on their contribution to projects. The above contestations form the basis of the current study.

Objectives

The focus of this study was to investigate the relationship between: (1) ICT operational risk management (ORM) and (2) performances of SMEs.

RESEARCH METHODOLOGY

Instrumentation

The items were adapted and administered online electronically after the hypotheses, objectives and contestations from literature.

Statistical Techniques

Simple descriptive and inferential statistical methods were incorporated into the SPSS programme for analysing the data. The variables were precoded in preparation for entry into the programme (Tabachnick 2008; Tabachnick and Fidell 2009).

Despite the fact that the variables were descriptive in nature, they were assigned numeric codes to facilitate different statistical analysis (Curley 2004). Some of the measurement level (scale of measurement) was nominal and others ordinal. After the data was checked, the codes were entered into the programme and the process of data cleaning ensured.

Appropriate statistical procedures were then performed. Frequency counts and percentages were applied to the data relating to the demographic details of the respondents in order to determine the distribution of gender, age group, position, department and level of education. A bivariate analysis between the respondents' demographic characteristics and the relationship between; (1) ICT risk constraints and (2) performances of SMEs was performed.

Factor Analysis was used as data reduction technique (Tsoukas 1998; Tabachnick and Fidell 2009). For this reason, it was used to reduce a large number of related to a more manageable number, prior to using them in other analyses such as multiple regression or multivariate analysis of variance (MANOVA) (Tabachnick and Fidell 2009).

In order to understand the degree of association between the performances of SMEs and the independent variables, multiple regression, Repeated-Measures Analysis of Variance[1] RM-ANOVA and Repeated-Measures Multivariate Analysis of Variance - RM-MANOVA were performed (Cody and Smith 2005). Where a significant value was observed, either Betas of multiple regression or significant levels of RM-ANOVA or RM-MANOVA ascertained these differences (Tabachnick and Fidell 2007). The outcomes of these analyses are described in subsequent sections.

One of the objectives of this study was to find the factors predicting ICT operational risk within SMEs. Multi- item constructs were used to capture the information about various types of variables to adopt ICT operational risk. Multi-items construct of the instrument were used. To assess as seen in the questionnaire a construct was used to measure five main support items. The items were adapted after literature and research questions.

The study was based upon survey design to collect the primary data from 107 respondents using the simple random sampling technique.

Data Analysis and Interpretation

The questionnaires received were analysed using SPSS for correlation and multiple regression analysis to predict ORM adoption based

on the parts mentioned. In line with the principles of multivariate data analysis, the researcher conducted a zero-order correlation of the independent and dependent variables. The correlation provided directional support for predicted relationship and showed that collinearity among the independent variables is sufficiently low so as not to affect the stability of regression analysis. This also included the test of various assumptions[2] such as, normality, multicollinearity.

During the analysis, operational risk decomposed into a number of sub risks using business lines and risk categories defined by the institution. In each subsection ORM, data was collected and robust estimation techniques as indicated were used.

Ensuring Reliability and Validity

In order to ascertain face validity, an initial questionnaire (research instrument) was passed through routine editing; it was given to experts (academics, practitioners and business managers). They were asked to respond to the questionnaire and based upon their comments, the questionnaire was reworded to enhance clarity. Convergent validity was measured by the average variance extracted for each construct during the reliability analysis, 0.5 or 50 percent or better. To further analyse for convergent and discriminating validity of any constructs of ORM used, the principal component method with varimax rotation was used to assess the variance explained. This was to ensure that in general, results demonstrated that both validities were satisfied.

RESULTS

This subsection sought to interrogate the issue of ICT risk constraints surrounding information system in SMEs. Thus, the motive was to answer the question, (1) how well do the measures of ICT risk constraints predict ICT adoption within SMEs? (2) Which is the best predictor of ICT risk constraints requirements?

Generally, amongst the participants who responded to levels of agreement with regards to factors influencing ICT risk constraints requirements and ICT ORM adoption within SMEs, it was noted that while 15.9% (n= 17) strongly agree, 33.6% (n= 36) agree, 46.7% (n= 50) disagree while 2.7% (n= 3) strongly disagree.

About a quarter (25.2%, n= 27) strongly agree that enterprise applications are difficult to implement successfully, because they usually require far-reaching changes to business processes. A little under two-thirds (70%, n= 65) agree. While, 11.2% (n= 12) disagree and 1.9% (n= 2) strongly disagree.

Nearly three-quarter (72.0%, n= 77) agree that the success of organizational change can be determined by how well information system end users deal with various stages in the implementation of ICT projects. But 15.0% (n= 16) strongly agree and 13.1% (n= 14) disagree.

About one-fifth (20.6%, n= 22) strongly agree that the success of organisational change can be determined by how well information systems decision makers deal with various stages in the implementation of ICT projects. 36.4% (n= 39) agree, 38.3% (n= 41) disagree and 3.7% (n= 4) strongly disagree. In summary, it can be said that the majority agree that change management requirements and ICT ORM adoption are impacted by the above measures.

Meanwhile as evidenced in Table 1, nearly equal portions of respondents from IT personnel had varying views. Thus, while 20 out of 65 agree, 33 out of 65 disagree.

Table 1: Analysis of hypothesis

Count		*There is a high failure rate among enterprise application projects because they require extensive organizational change that is often resisted by members of the organization*				
		Strongly disagree	*Disagree*	*Agree*	*Strongly agree*	*Total*
Depart	IT	3	33	20	9	65
	HR	0	2	3	1	6
	Finance	0	13	8	3	24
	Operations	0	2	5	4	11
Total		3	50	36	17	106

Analysis of Hypothesis

In answering the question, (1) how well do the measures of ICT risk constraints predict ORM adoption within SMEs? and (2) which is the best predictor of ICT risk constraints requirements? Multiple regression analysis was utilised to determine the percentage contribution of some of the identified significant predictors of change management requirements and ICT risk adoption in SMEs. The distribution revealed that only one variable made significant percentage contributions to the level of ICT risk constraints requirements and ICT Risk. This was; A (information system failure) [3] (β= 0.291, $p < 0.05$).

It may thus be inferred that A is the only variable, prominent in explaining the variation in change management requirements and ICT Risk. The variable has a correlation of 0.85. The R^2 value also suggests that the variable contributed approximately 55.2 percent of the variations in level of change management requirements and ICT operation. The analysis of variance also revealed that the regression coefficients are real and did not occur by chance.

In conclusion, the results of the analysis presented above allow the researcher to answer the two questions posed at the beginning of this sub-section. The model, which includes five [4]sub variables, explains 55.2 percent of the variance of ORM adoption within SMEs. Of the five sub variables, A makes the largest unique contribution ($\beta = 0.291$, $p < 0.05$); although, the rest made some contribution, these do not reach statistical significance in terms of contributions ($p > .05$).

It may therefore be inferred that relatively, A actively impacts on change management requirements and ICT operation. By implication, there seems to be enough evidence to suggest that change management requirements and ICT risk in SME would become more effective if efforts were targeted towards A.

DISCUSSION

Previous researchers have studied the relative importance of challenges posed by ICT ORM solutions in SMEs. ICT risk constraints were found to be significant.

It was obvious from the results that SMEs consider "A" as an important and fundamental factor for its operation and there was statistical significance in this case. The current findings support the prior studies by Pflug (2006) and King III Report (2009). Findings further resonate with McBride (2005) who argues that an understanding of 'A' improves the performance of small business.

A survey of ICT operation enterprises (SMEs), by the Standing et al. (2007), found that A is currently at 54 per cent for ICT operation and 33 per cent for large companies. Similar studies by Lam (2006) indicate that smaller organisations are rapidly becoming aware of the potential for competitive advantage to be gained via ICT operation; though they are perhaps less aware of potential risks benefits, particularly in South Africa.

For instance, Lam's (2006) study reported that results into usages indicate that the nature of developments within the SME sector is increasing exponentially.

The current study's findings is that the present linear relationship model that dominates most large organisations will rapidly be replaced by a more defined relationship model in SMEs. King III Report (2009) emphasised this development, suggesting that it is not simply about new channels or even about new customers. In consequence, the aim is to integrate strategic management to achieve the optimal outcomes of the SMEs.

Once the integrated strategic management is achieved, the evolution of new solutions which offer services to SMEs will grow rapidly and transform practices governing relationships and partnerships. This resonates with King III Report (2009) comment that a more systematic model is required to reveal the true nature of commerce in SMEs. These current results demonstrate the relative importance ICT operation within SMEs.

CONCLUSION

It was also inferred that relatively, information system failure impacts on challenges posed by ORM solutions in SMEs. By implication there was enough evidence to suggest that challenges posed by SMEs would become more effective if efforts are targeted towards information system failure . That is entirely new business models are appearing, where the ability to build flexible alliances at speed is a critical management skill for SMEs. These changes will have an

impact on all organisations, irrespective of size, the focus of the current and particularly SME sector. It is thus anticipated that the outcomes from this current study and the associated empirical data will enhance awareness and understanding of the nature of SMEs management and provide guidelines for developments in strategic management, relationship marketing and most importantly ICT operation.

RECOMMENDATIONS

The significant feature that may be drawn from the current study is the change in the adoption and application of ICTs from large organisations to SMEs. In support of the current study's findings, literature maintains that almost every sector is experiencing a doubling of usage of the ICT development.

NOTES

1. A four point Likert scale also cf. questionnaire.
2. For details see Tabachnick and Fidel (2009).
3. A= One of the principal causes of information system failure is insufficient or improper user participation in the systems development process.
4. cf. sub variables on "principal causes of IT failure.

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