PERCEPTION OF BARRIERS TO IMPLEMENTING RISK ASSESSMENT AND MANAGEMENT PRACTICES BY CONSTRUCTION PROFESSIONALS IN TANZANIA

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The performance of construction projects is often affected by the inherent risks existing within the internal and external environments. Risk management and assessment practices (RAMP) can be used to identify these risks and propose appropriate strategies to mitigate them. This could lead to the attainment of the Millennium Development Goal (MDG), thereby, enabling construction organisations to remain competitive. The implementation of RAMP is usually fraught with barriers despite the extensive research on barriers affecting the implementation of RAMP. There is a paucity of empirical studies that examine these barriers for the deployment of RAMP in developing countries, particularly Africa. In an attempt to fill this knowledge gap, a questionnaire survey was used to investigate the perception of construction professionals' on the barriers to RAMP in Tanzania. Data was collected using a sample survey of 67 construction professionals drawn from 27 consultants, 24 contractors and 16 client organizations within the Tanzanian construction industry. Response data was subjected to descriptive statistics and subsequently ranking analysis were used to examine the barriers affecting the implementation of RAMP. The results indicated the following barriers as most significant: (i) awareness of risk management processes; (ii) lack of experience; (iii)" and lack of information. In contrast, "cost implementations" and "time constraints" were ranked lowly. Despite the disparity in the ranking of the 7 barriers, one-way analysis of variance (ANOVA) indicates that, the differences were not statistically significant. The identified barriers could be used as a 'road map' for the development of appropriate solutions for the successful implementation of RAMP, and to improve the decision making processes of construction organisations. In addition, knowledge and understanding of risk management process would contribute in identifying and managing inherent risk effectively. The effect would lead to the achievement of project objectives in terms of time, cost and quality.

Keywords: barrier, Tanzania, construction industry, risk assessment, risk management, questionnaire survey.

INTRODUCTION

The construction industry is vital and plays a critical role to the economic development of most countries. According to Lema (2008), the construction industry in Tanzania accounts for approximately 7 % of Tanzania's gross domestic product (GDP). Studies conducted by Kikwasi (2012) showed that the construction industry is

responsible for 9 % of employment creation, and about 57% of the capital formation. Conversely, recent studies indicate that, the Tanzanian construction industry is fraught with frequent cost overruns and delays on a lot of projects (Kikwasi, 1999). In order to improve the performance of the construction industry, some studies signify casual linkages between implementation of some of the risk management practices and project success (Tabish and Jha, 2011). It could thus be argued that, awareness of, and subsequent implementation of risk management practices could contribute to the enhanced project performance of the construction industry. Additionally, empirical evidence has shown that some construction organisations in Sub Saharan Africa (SSA), that don't implement risk assessment; management practices and the techniques as part of managing their projects, often resulted in project costs exceeding budget and behind schedule (Kululanga and Kuotcha, 2010; Kikwasi, 2012).

The observation above calls for further exploration into barriers to implementation of risk assessment and management practices in Tanzania. For example, what is the level of risk assessment and management practices awareness among the Tanzanian construction stakeholders? Can the barriers to the usage and implementation of RAMP be assessed? Can solutions to these barriers be proposed thereby, leading to the attainment of the Millennium Development Goal (MDG)? The impetus for this paper lies within seeking answers to the questions posed.

There is therefore, a need of exploring the barriers affecting the implementation of risk assessment and management practices in developing countries in an African context such as Tanzania. The present study is aimed at filling the knowledge gap by conducting a survey among construction professionals' in Tanzania. It is aimed at eliciting perception, identifying and ranking the barriers to the deployment of risk assessment and management practices.

The following is an overview of some of the challenges facing the Tanzania Construction Industry (TCI). A brief summary of discussions is provided on the extant literature on the barriers affecting the adoption and implementation of RAMP, and the knowledge gap knowledge. Preceded by the methodological approach adopted and a discussion of the findings and implications of the study. Some advocated solutions to the barriers of RAMP implementation are also suggested. The final section concludes with recommendations and conclusions drawn.

LITERATURE REVIEW

Challenges facing the Tanzanian construction industry

In spite of Tanzania aspiring to have one of the best construction industries in the world, it is still inundated with poor project performance (Ofori, 2012), lack of trained professionals (Debrah and Ofori, 2005). Tanzania is over reliant on foreign institutions to train her indigenous professionals, contractors and consultants to execute big projects (Debrah and Ofori, 2005; van Egmond, 2012). These challenges have impacted the overall execution and application of project management concepts and principles among the stakeholders. Previous Tanzanian studies such as (Kikwasi, 1999; Ministry of Works, (MoW) 2003; Lema, 2008) though focused on addressing project management related issues such as procurement and project performance have never addressed the risk management issues directly. Furthermore, recent studies such as Kikwasi (2012) aimed at assessing the causes, effects and disruptions in Tanzanian construction projects. This study concluded that there are still a number of causes of

delays and disruptions existing. These effects put construction projects at great risk affect performance. One of the main causes identified by the same study was poor project management.

It is recognised that the construction operational environment within Tanzania includes foreign contractors. These foreign contractors often have the competitive advantage over local contractors in relation to skills, training, competencies, and human resources development (HRD) practices. For example, according to the CRB (2010), there are over 4,470 contractors registered in Tanzania of which 134 (3%) are foreign and 4336 (97%) are local. Despite the limited numbers of foreign contractors, they own about 96% of the market share in construction. This appears to be the trend among other neighbouring African countries such as Zambia (Zulu and Chileshe, 2008).

Barriers affecting the adoption and implementation of RAMP

A number of studies have examined the barriers affecting the adoption and implementation of risk assessment practices. However, the majority of these studies have been within the context of developed countries. Table 1 presents a summary of selected studies on barriers to RAMP.

It must be noted that this review is by no means exhaustive. By contrast the context of this study is Tanzania, Africa. Care has been taken to include some studies from within the African context, and some examples have been included from developed (western) economies. The following section briefly discusses some of the barriers as identified both in perception of developed and developing economies or countries. For example, Frimpong *et al*. (2003) a study in Ghana, and the following two studies in the U.K (Wood and Ellis, 2003; Akintoye and MacLeod, 1997).

In regards to Ghana, a study conducted by Frimpong *et al*. (2003) aimed at identifying the causes of delay and cost overruns in construction established one of the reasons being a lack of awareness of risk management processes. This inevitability led to poor resource management.The same study established that, project management tools and techniques played an important role in the effective management of a project. Elsewhere (U.K), Akintoye and MacLeod (1997) also identified lack of familiarity with the techniques as one of the reasons provided by contractors for not using techniques of risk analysis and management. Whereas Wood and Ellis (2003) study which focussed on cost consultants identified the relative lack of training and skills development among the factors underpinning the risk management provision.

Table 1 depicts the lack of usage of risk management practices is not just limited to developing economies, but also affects developed countries such as Australia (Lynos and Skitmore, 2004). There is also the issue of risk management being in its infancy stage as a reason for the lack of implementation indicating a barrier. This problem affects developing countries like Korea (Kim and Bajaj, 2000), and Singapore (Hwang *et al*. 2013). There is a plethora of studies on barriers to RAMP, and the list portrayed in Table 1 is just indicative. However, notwithstanding the previous barriers derived from a cross section of the literature, what is notable from the summary (Table 1) is an obvious omission with the exception of Kikwasi (2011), particularly in the Tanzanian context, of studies focussed on the identification of the barriers to RAMP.

Table 1: Summary of selected studies on barriers to risk assessment and management practices application

Researchers[1]/ Context	Findings
Kim and Bajaj (2000) - Interviews of 13 **Korean** managers of general construction firms.	Three reasons limiting the usage of risk management techniques: a lack of familiarity with techniques; most clients and / or owners wanted to see tangible calculations and unambiguous evidence of risk; and lack of expertise with techniques
Lynos and Skitmore (2004) - General survey of 17 contractors, 11 consultants, 10 clients and 6 developers in Queensland (**Australia**) construction engineering organisations	Identified nine barriers inhibiting the implementation of risk management: lack of time; lack of familiarity with the techniques; lack of dedicated resources; lack of expertise; lack of information; difficulties in seeing the benefits; human / organisation resistance; lack of accepted industry model for analysis; and cost effectiveness.
Liu *et al*. (2007)[2] - General survey of contractors' attitudes in **China**	Investigated the key issues and challenges in risk management and insurance in the Chinese construction industry: contractors' attitudes and perception; knowledge; cultural considerations; lack of experience; and expertise
Tang *et al*. (2007)[2] - General survey of 115 stakeholders comprising 19 clients, 30 contractors, 21 designers, 20 superintendents, 10 management organizations, 8 planning organisations and 7 others in **China**	Eleven barriers to risk management: lack of joint management mechanisms by parties; shortage of knowledge /techniques on risk management; different recognition of risk control strategies; ineffective implementation of risk control strategies; ineffective monitoring; lack of formal risk control strategies; ineffective monitoring; lack of formal risk management systems; no incentive for better risk management; lack of risk consciousness; inappropriate risk allocation; lack of historical data for risk trend analysis; inappropriate risk allocation; and insufficient ongoing project information
Chileshe and Yirenyi-Fianko (2012)*- General survey of 34 contractors, 46 consultants and 23 clients (public and private) in construction projects in **Ghana**.	Identified seven main barriers to risk assessment and management practices: awareness; lack of experience; lack of coordination between parties involved; lack of information; availability of specialist risk management consultants; time constraints; and lack of knowledge and expertise
Kikwasi (2011)[3] - Interviews of 55 consultants, architects and quantity surveyors in **Tanzania**.	Identified three challenges inadequate risk management knowledge; not being a priority in clients requirements; lack of holistic approach to risk management; and reluctance of consultants to spearhead risk management process
Hwang, Zhao and Toh (2013) - A questionnaire survey of 15 consultants and 19 contractors in **Singapore** based on data collected from 668 projects.	Identified ten probable barriers to RM implementation in small project: competition among small and medium contractors (SMC);complexity of analytical tools; lack of potential benefits; lack of budget; lack of government legislation; lack of knowledge; lack of manpower; lack of time; low profit margin; and not economical

Notes: [1]The studies are arranged in chronological order; *this current study is based on the survey instrument as utilised in Chileshe and Yirenyi-Fianko (2012); [2]selected studies within the Chinese context; [3]Specific Tanzanian study on RAMP.

RESEARCH METHOD

To investigate the perception of construction professionals' on the barriers to RAMP in Tanzania, the following research methods were employed in the study.

Measurement instrument

The finalised questionnaire used in this study is based on the Chileshe and Yirenyi-Fianko (2012) instrument and compared with other studies as illustrated in Table 1. The first section of the questionnaire included the overarching aims of the research

projects and covered the demographics. The second section was designed to evaluate the RAMP, and the respondents were asked to rate the likelihood of occurrence and severity of impact of various risk factors. In the third section, the main objective was on establishing the awareness, extent of usage and benefits of RAMP. This was in form of closed questions based on 'yes' and 'no', while the scale for ascertaining the benefits varied from 1 to 4 with 1 representing low agreement and 4 strong agreement. In the fourth section, which forms the basis of this paper, comprised the 7 barriers to the adoption, usage and implementation of RAMP as identified in the Chileshe and Yirenyi-Fianko (2012) studies and compared with previous studies as summarised in Table 1. Respondents were asked to rate their opinions on these barriers using a five point Likert-scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). The resultant values of mean scores were further classified to address the limitations associated with the single point or number changing from 1 to 5 in the verbal scaling expressions (Chileshe and Yirenkyi-Fianko, 2012). The final section was focused on identifying the critical success factors for adopting RAMP. The findings reported here relate to only the first and fourth sections of the questionnaire dealing with the barriers. It was also beyond the scope of this study to report all the results.

Data analysis

This paper seeks to investigate the perception of construction professionals'on the barriers to RAMP in Tanzania. The *Statistical Package for Social Sciences* (SPSS) computer program was also used to analyse the data generated by the research questions. In order to analyse the data as provided by the questionnaire, the following five statistical methods were used: (1) frequency analysis; (2) ranking analysis; and (3) ANOVA. Review of the literature shows that such approaches have been adopted before in survey related studies (Tang *et al*., 2007, Chileshe and Yirenkyi-Fianko, 2012). Rank differentiation was employed for barriers having the same mean score through utilisation of the lowest standard deviation (Chileshe and Yirenkyi-Fianko, 2012). The measurement instrument was also tested for validity and internal consistency. According to Cronbach (1951), one of the most popular reliability statistics is the Cronbach alpha. This was found to be 0.608 (*F*-statistic = 4.335, sig. = 0.000) for the barriers sub instrument. While the value was less than the recommended (0.7), as this was an existing instrument, the value was deemed as acceptable, (Nunnally, 1978).

Population and sampling

600 questionnaires were administered to 2,500 delegates, mainly professionals representing the following three registered bodies: architects and quantity surveyor's registration board (AQRB), contractors' registration board (CRB) and engineers' registration board (ERB) attending a three day construction forum in 2012.

Characteristics of the sample

Out of 600 questionnaires distributed, 300 were collected by delegates at an estimate of one hundred 100 questionnaires to each board. At the end of the forum, only 21 questionnaires were returned despite the call which was made by floor managers. These comprised of 8 from the AQRB, 8 from CRB and 5 from ERB. Following the low response to questionnaires, contacts of forum participants were sought from relevant bodies. This resulted in about 150 respondents being contacted. It should be noted that most of them could not locate the questionnaires supplied during the forum. Henceforth, a further 50 questionnaires were emailed and 100 were hand delivered.

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This was followed by constant telephone reminders out of which 8 and 48 responses were received from emailed and hand delivered questionnaires respectively. It should be noted that the delegates were contacted before the questionnaires were either emailed or hand delivered to them. In addition, those who returned questionnaires had their firms' /employers' details recorded. Consequently 77 returned questionnaires, of which 12 were considered incomplete. 67 were rendered usable for the data analysis representing 22.33 %. Table 2 provides the breakdown of respondents according to the professional background. As indicated in Table 2, majority respondents were quantity surveyors 19 (28.4 per cent) followed by the engineers (25.4 per cent). The minority of the respondents (9.0 per cent) were drawn from the 'others' category comprising 4 construction managers and 2 contracts managers.

Table 2: Demographical information of survey respondents

Professional background	Frequency	Percentage	Cumulative percentage
Quantity Surveyor	19	28.4	28.4
Engineers	17	25.4	53.7
Project Manager	13	19.4	73.1
Architect	12	17.9	91.0
*Others	6	9.0	100.0

Notes:*Other category comprised 4 (6%) Managing directors 1(1.5%) Construction manager and 1 (1.5%) contract manager.

This observation is interesting, given that from the total number of delegates, this was a minority group. The proportions of the respondents in terms of organisation size (number of employees) were: The majority 46.3% (31) of the respondent organisations had less than 25 employees, followed by 20.9% (14) with more than 25 but less than 49 employees. The remainder of the categories had a fair distribution ranging from 6.0% (4) to 9.0% (6) in the '50-99', to more than 300 employees categories. The majority, almost two thirds of the respondents were small and medium sized organisations. The proportions of the respondents in terms of years of experience were: less than 1 year (3.03%); 1-5 years (13.63%); 6-10 years (18.18%); 11-15 years (13.63%); and more than 15 years (51.51%). The breakdown of the final respondents according to the sector of industry was as follows: The majority 40.3% (27) were consultants. This was followed by 35.5 % (24) contractors and 23.9 % (16) clients.

SURVEY RESULTS AND DISCUSSION

Ranking of barriers by contractors, clients and consultants

This sub section examines the individual responses of three groups (contractor's, clients and consultants) perception of barriers to the adoption and implementation of RAMP. Table 3 summarizes the results of the analysis of barriers for the group wise ratings of the respondents based on the sector.

"Awareness of risk management processes" was regarded as the most critical barrier by both contractors and clients. This result is consistent with the findings in Table 1, as well as the results from the literature review of earlier studies within developing and developed countries. For example, a study conducted by Kim and Bajaj (2000) among South Korean contractors cited the lack of familiarity with risk management concepts and methods as one of the reasons for the lack of usage. South Korea, like

Tanzania is relatively new to risk management concepts, therefore drawing such comparisons is useful to provide further understanding of the issues at hand.

Table 3: Descriptive statistics (mean, standard deviation) for items on the barriers according to the sector.

[ ] Barriers	Contractors $n = 24$			Clients $n = 15$			Consultants $n = 27$		
	MS[1]	SD[2]	R[3]	MS[1]	SD	R	MS[1]	SD	R
[1]. Awareness of risk management processes	4.087	0.793	1	4.133	1.187	1	4.074	0.958	4
[2]. Lack of experience	4.042	0.908	2	3.600	1.056	2	4.111	0.698	2
[4]. Lack of coordination between parties involved	3.625	0.924	4	3.400	1.056	4	4.074	0.874	3
[3]. Lack of information	3.583	0.929	3	3.400	1.121	5	4.185	0.786	1
[5]. Availability of specialist risk management consultants	3.435	1.308	7	3.467	1.407	3	3.962	1.113	5
[7]. Time constraints	3.435	0.945	6	3.267	1.163	=7	3.346	1.056	7
[6]. Implementation costs	3.565	0.728	5	3.267	1.163	=7	3.769	0.908	6
Average scores	**3.682**			**3.505**			**3.932**		

Notes: MS[1]= Mean score of the barrier factor where 5 = strongly agree; 4 = agree; 3 = neutral; 2 = disagree; and 1 = strongly agree. The higher the mean, the more impact the barrier has to deployment of risk assessment; [2]SD = standard deviation; [3]R = ranking [ ] overall ranking based on full sample.

Conversely, the consultants ranked this barrier fourth (mean score = 4.074, std dev = 0.958) and the "lack of information" as the first (mean score = 4.185, std dev = 0.874). The plausible explanation for disparity in the ranking of this barrier is that, the consultants are not exposed to any of the risks themselves, and therefore in no position to engage in complete risk control procedure.

Lack of experience, lack of information, and lack of coordination between parties involved which are all related to education, knowledge management and procurement practices were next three highly ranked barriers based on the overall sample. For example, China like, Tanzania is a developing country. The problem of 'lack of experience' in Tanzanian professionals has been highlighted by numerous studies (MoW, 2003; Debrah and Ofori, 2005, 2006). For instance, Debrah and Ofori (2006) observed that many construction firms in developing countries are small-to medium-sized organisations and, hence do not have the facilities to provide for training. This is also compounded by the fact that, for a long time, foreign contractors have dominated construction business in Tanzania (MoW, 2003).

It should be noted that, the identified barriers are also found in the western economies, such as China (Tang *et al*. 2007). These two studies require particular mentioning as Chinese companies dominate the group of foreign contractors that are fully owned and operating in Tanzania (van Egmond, 2012). In anticipation that these organisations might transfer some of their knowledge and expertise to the local Tanzanian contractors, this warranted particular attention in regards to their perception and attitudes towards risk management practices.

Analysis of variance (ANOVA)

In order to test the hypothesis of no significant difference in the perception of the different professionals practising with construction clients (private and public),

consultants and contractors on the ranking of the barriers to RAMP, and ANOVA was conducted. The statistical significance level of the analysis was set at a *p*-value of 0.05. The results revealed that there was no statistical significant difference ($p < 0.05$) in the perception of the construction professionals working for the different types of organisations regarding the barriers considered necessary for the deployment of RAMP. This suggests that construction professionals within the Tanzanian construction industry, irrespective of the sector (clients, consultants or contractors) that they worked for generally have similar opinions regarding the barriers affecting the deployment of RAMP. As such, the null hypothesis of no significant difference in the perception of different types of organisations to the barriers to RAMP is upheld.

LIMITATIONS

While the study makes several contributions to risk management theory and practice, several limitations of the research need to be acknowledged. Firstly, this study did not distinguish between local organisations (i.e. contractors) and those that tended to collaborate with the foreign contractors. Skill levels among the employees tended to differ, with Tanzanian contractors working with foreign contractors being more experienced (Egmond, 2012). In addition, from the contractor's perspective, this study did not distinguish between the different classes of contractors. In Tanzania there are seven classes for building, civil, electrical and mechanical contractors that is, from class one to seven based on the capacity of such contractors to execute works. Therefore, the barriers identified in this study are generic.

Secondly, the sample consisted of organisations in one industry, which is construction operating in Tanzania. Consequently, the findings may not generalize to other industries or organisations operating in other East African or Sub-Saharan countries. Thirdly, the sample size in this study (67) was small. As such caution should be exercised in the interpretation and generalisation of the results. However, despite that limitation, the findings represent a snapshot of the barriers affecting the implementation of RAMP. Future studies should employ a large number of cases representing the population of interest, in order to determine the statistical significance of the results. Finally, this study relied on the usage of self-report data and indicators of the construct are sensitive and difficult for respondents. Nevertheless, there is consistency within the results from the quantitative and qualitative (literature review) parts of the study. Additionally the results do appear to be consistent with previous research (Table 1) that has examined the barriers to RAMP within developed and developing economies.

CONCLUSIONS & RECOMMENDATIONS

The study investigates the barriers to RAMP among constructional related organisations in Tanzania. In the quest to investigate the reasons for low level uptake of RAMP implementation, "awareness of risk management processes", "lack of experience", and "lack of information" were the most significant barriers that the Tanzanian stakeholders needed to overcome. The analysis results showed that the clients, contractors and consultants agreed with the overall ranking of the barriers, despite some differences in the mean scores. However, these differences were not statistically significant.

In the context of Tanzania, the relevant regulatory bodies play a key role in upholding the standards of its members. In order to raise the awareness of RAMP benefits, there is a need for a 'cultural shift' in the mindset of senior management and relevant

stakeholders within the Tanzanian construction industry. In addition, the organisations should also be encouraged to engage or utilise internal auditors through the application of enterprise risk management (ERM) as part of the implementation of RAMP. To assist the clients, consultants and contractors with the training issues associated with RAMP, the government could further focus on the development of vocational training and apprenticeships for its citizenry and relevant professionals or provide capacity building. This would act as a source of skills for the majority of the Tanzanian employees. Another avenue worth pursuing is the entering of joint ventures with foreign contractors.

Findings of this study further reinforce the observation that, despite the quest of the Tanzania Construction Industry to remain competitive, it is faced with a number of challenges. These challenges undoubtedly have an impact of implementation of practices such as risk management. Other performance constraints contributing to the inefficient and deteriorated state of the construction industry cited by the same report included the 'low capacity and capability of the local contractors and consultants due to weak resource base and inadequate experience'. One of the main contributions of this study lies in the identification of an ordered grouped set of barriers for RAMP for construction projects in Tanzania. Another significant contribution of this paper is that it sheds light and provides insights on the understanding of the barriers affecting the implementation of RAMP within the Tanzanian construction sector, an area previously under-researched. It also expands the efforts of studying and evaluating barriers across the developing economies and particularly within the (East) African context. One notable contribution of this study is that, it extends and builds upon the work of Kululunga and Kuotcha (2010) who acknowledged, albeit from the contractors' perspective in Sub-Saharan Africa (SSA), that the extent to which they [contractors] followed the series of steps of risk management processes conceived from project management was severely lacking in the literature. Furthermore, this study makes a contribution to the body of knowledge on the subject within a previously unexplored context. The study provides insights on the barriers to implementation of RAMP across the Tanzanian construction sector, involving more stakeholders such as clients, consultants in additional to the contractors

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