Engineering, Construction and Architectural Management

Critical success factors for implementation of risk assessment and management practices within the Tanzanian construction industry

Nicholas Chileshe Geraldine John Kikwasi

Critical success factors for implementation of risk assessment and management practices within the Tanzanian construction industry

Nicholas Chileshe
School of Natural and Built Environment, University of South Australia, Adelaide, Australia, and
Geraldine John Kikwasi
Department of Construction Management, School of Construction Economics and Management, Ardhi University, Dar es Salaam, Tanzania

Abstract

Purpose – Despite the extensive research on critical success factors (CSFs), there is a paucity of studies that examine CSFs for the deployment of risk assessment and management processes in developing countries, particularly, Africa. The purpose of this paper is to investigate the perception of construction professionals on CSFs appertaining to the deployment of risk assessment and management practices (RAMP) in Tanzania with the aim of filling the knowledge gap.

Design/methodology/approach – The primary data were collected from 67 construction professionals working with clients (private and public), consultants, and contractor organisations (foreign and local) within the Tanzanian construction. Response data was subjected to descriptive and inferential statistics with one-way analysis of variance to examine the differences in the perception of the identified CSFs.

Findings – The descriptive and empirical analysis demonstrated a disparity of the ranking of the ten CSFs among the groups; however, the differences were not significant. Based on the overall sample, the results of the mean score ranking indicate that "awareness of risk management processes"; "team work and communications"; and "management style" were the three highly ranked CSFs whereas "co-operative culture"; "customer requirement"; and "positive human dynamics" were considered to be the least important.

Research limitations/implications – The study did not differentiate the perceptions of the CSFs according to the ownership (local or foreign), and the sample consisted of organisations in one industry operating in Tanzania. Consequently, the findings may not generalise to other industries or to organisations operating in other countries.

Practical implications – For RAMP to be implemented effectively, Tanzanian constructional-related organisations should consider the identified CSFs as a vehicle for improving project success through reduction of risk uncertainty. Furthermore, regardless of the type of organisation, "management style", "team work and communication" are necessary for the successful deployment of RAMP.

Originality/value – This study makes a contribution to the body of knowledge on the subject within a previously unexplored context. The study provides insights on the drivers and enablers (CSFs) of risk assessment implementation across the Tanzania construction sector.

Keywords Construction industry, Critical success factors, Risk management, Risk assessment, Tanzania

Paper type Research paper

Engineering, Construction and Architectural Management
Vol. 21 No. 3, 2014
pp. 291-319

0969-9988
DOI 10.1108/ECAM-01-2013-0001

1. Introduction

While risk assessment and management practices (RAMP) have been studied in other countries, the majority of these studies have largely focused on the identification of critical success factors (CSFs) for construction projects (Ahadzie *et al.*, 2008; Toor and Ogunlana, 2009; Famakin *et al.*, 2012; Tabish and Jha, 2011; Yang *et al.*, 2009; Zwikael, 2009), and project success (White and Fortune, 2002; Salaheldin, 2009). Furthermore, the majority of these studies have focused on developed countries with a paucity of studies within the developing countries. The majority of these are drawn from the Asian region (Santoso *et al.*, 2003, p. 43). There is a growing need for specific RAMP studies especially within sub-Saharan Africa (SAA), including Tanzania. The rationale for the specific Tanzanian study is that, what might be considered by a firm to be a risk and therefore manageable in a Commonwealth country could clearly be different to a firm operating, say, for example, in the USA where the industry is structured differently/has different legal constraints.

As with other developing countries, construction is vital to the economic development. For example, the importance of the construction in Tanzania is evidenced by its contribution of more than 5 per cent of the gross domestic product (GDP) (Lema, 2008), and 9 per cent of employment creation and about 57 per cent of the capital formation (United Republic of Tanzania (URT), 2006). Despite the aspirations of Tanzania to have one of the best construction industries in the world (Ofori, 2012a), it is still inundated with poor project performance. The industry continues to deliver its products over budget, beyond original estimated construction period and at times with poor quality.

The study and implementation of risk management and assessment practices have been closely aligned with improved overall project performance (Zwikael, 2009; Agyakwa-Baah and Chileshe, 2010; Nkado, 2010; Tabish and Jha, 2011; Zou *et al.*, 2010). In contrast, several studies have failed to find support for a direct relationship between adoption of risk management practices and enhanced project performance. For example, Besner and Hobbs (2012, p. 242), notes that while the link between uncertainty and failure (or between certainty and success) seems to be well established, they point to the lack of clarity between the risk management and success linkages.

However, despite the different schools of thought on the direct correlation between risk management practices and enhanced project performance in literature, there have been a number of studies on project management undertaken in the context of Tanzania (Simkoko, 1992; Lema, 2008; Msita, 1997; Ministry of Works (MoW), 2003; Mansfield and Sasillo, 1990; Kikwasi, 1999, 2012). Other studies have focused on the human and resources management (HRD) challenges facing the construction professionals (Debrah and Ofori, 2005, 2006; Ofori, 2012a). For example, earlier studies by Lema (2008) and Msita (1997) revealed that the construction industry had not met its potential in contributing to the economic development. Drawing upon the project management examples, Kikwasi (1999, 2012) indicated that most of the projects undertaken in the country were not delivered on pre-estimated time and cost due to the adoption of conventional procurement method. According to Salewi (2003), it is common for construction projects in Tanzania to cost up to two times the original budget. There are many factors that may affect cost control such as:

- inadequate project brief;
- inadequate terms of reference;
- under budgeting;

- poor specifications;
- wrong selection of contractors for the works;
- wrong project programming including supervision;
- increase in material price;
- payment delays;
- variations; and
- weather and inflation.

Other studies in the context of Tanzania have highlighted the challenges facing the local contractors. For example, Mansfield and Sasillo (1990) and Debra and Ofori (2005) noticed this trend. They acknowledge that, local Tanzanian construction firms are finding it difficult to compete with foreign companies for projects. While these studies have not specifically addressed the issue of CSFs desirable for RAMP, some of the issues identified are very much similar to the activities undertaken within the stages of the risk assessment process. Therefore, this is a good starting point for understanding the factors affecting the internal and external environments in which the construction industry operates, and act as a reference point of departure for future identification of CSFs on RAMP.

Therefore, there is a need to explore the CSFs affecting risk management practices within the African context. This study is aimed at filling that knowledge gap through conducting studies on the CSFs (enablers and drivers) affecting the deployment of RAMP among the Tanzanian construction related organisations.

The structure of this paper gives an overview of the Tanzania Construction Industry (TCI), with the next section summarising and presenting brief discussions on the extant literature on RAMP. It provides the conceptualisation of CSFs and discusses the CSFs (drivers or enablers) and a brief discussion of the gaps in knowledge. This is followed by the methodological approach adopted and a discussion of the findings. The implications of the study follow after the methodological approach. The final section addresses recommendations made and conclusions.

2. Overview of the TCI

The construction industry is project-based, dynamic in nature and involves many participants and stakeholders. URT (2006) defines the construction industry as a sector of economy that transforms various resources into constructed physical economic and social infrastructure necessary for social-economic development. This means physical infrastructure are planned, designed, constructed/repaired or rehabilitated to serve certain purposes. However, as observed by the MoW, (2003, p. 4), a substantial part of the construction work takes place in the informal sector of industry too. About 80 per cent of the population lives in the rural areas. The buildings and other small infrastructure facilities for this major part of the population are constructed by the informal sector. Overall, the construction industry contributes far more than 5 per cent of the GDP, 9 per cent of employment creation and about 57 per cent of the capital formation (MoW, 2003; URT, 2006).

Since independence (1961), the Tanzanian government has been formulating strategies that were geared towards the development of the local construction industry in Tanzania. Such initiative included adoption of the Construction Industry Policy in 2003. This became the principle guideline for the development of a competitive

construction industry in the country by delivering quality industrial product and services which are competitive world-wide. Other initiatives included; establishment of the National Construction Council in 1981 to promote the development of the construction industry. Formulation of the Construction Industry Development Strategy in 1991; the establishment of Vocational Training Centre; and the establishment of Regulatory Institution in the Construction Industry, i.e., Contractors Registration Board (CRB); Architects and Quantity Surveyors Registration Board and Engineers Registration Board (ERB) (URT, 2006).

Despite the quest of the TCI to remain competitive, it is faced with a number of challenges. According to the MoW (2003), some of these challenges are associated with the development of adequate local capacity, and mobilisation of adequate resources in terms of finance, equipment and human resources. 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". This is further exacerbated by the industry's reliance on foreign institutions and contractors to train its indigenous professionals (Chiragi, 2000; Egmond, 2012) and further compounded by the lack of systematic integrated industry-wide training programmes for professionals in the industry (Debra and Ofori, 2006).

3. Literature review

3.1 Conceptualisation of CSFs

Rochart (1979 cited in Chen, 1999) was first to define the concept of CSFs. These were defined as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization". Pinto and Covin (1989) defined CSFs as certain rules, executive procedures and environmental conditions. Oakland (1995 cited in Salaheldin, 2009) defined CSFs as the critical areas which organisations must accomplish to achieve its mission by examination and categorisation of their impacts. The importance of CSFs has also been highlighted by Johnson and Scholes (2001) through acknowledging that one of the major shortcomings of strategy implementation in organisations is a failure to translate statements of strategic purpose. Within the concept of benchmarking, Deros *et al.* (2006) defined CSFs as a range of enablers which, when put into practice will enhance the chance for successful benchmarking implementation and adoption in an organisation. Drawing heaving on Deros *et al.* (2006) definition of CSFs and observations made by studies such as Pinto and Covin, (1989), Rochart (1979) and Johnson and Scholes (2001), within the context of this study, CSFs are defined as drivers or enablers for successful RAMP implementation. Furthermore, the conditions for their successful implementation are contingent upon a number of assumptions such as nature of study being cross-sectional; existence of casual connections or interaction among the factors, and dynamic rather than static view of the factors (Nandhakumar, 1996). A number of taxonomies of CSFs are also evident in project management literature (Pinto and Covin, 1989; Belassi and Tukel, 1996; Chua *et al.*, 1999; Fortune and White, 2006; Ika *et al.*, 2012). For example, Belassi and Tukel (1996) grouped the CSFs into the following four areas: factors related to the project; project manager and the team members; organisation; and external evironment. Chua *et al.* (1999) used analytical hierarchy process and grouped 67 success-related factors into the following four categories: project characteristics, constractual arrangements, project participants and interactive processes. However,

despite the proliferiation of studies on CSFs, none of these were specific to risk assessment and management practices. Furthermore, previous studies such Larsen and Myers (1999) have raised questions regarding the actual meaning of "success" and cautioned on how "successful implementation" eventuated into failure.

3.2 General review of literature on RAMP

While there is ample literature on RAMP, the empirical studies have largely focused on the following areas: classification of different types of risk (Edwards and Bowen, 1998a); perceptions of risk (Liu and Cheung, 1994; Adams, 2008); implementation issues (Mills, 2001; Tchankova, 2002); frameworks for assessment (Wang *et al.*, 2004; Akintoye *et al.*, 2001; Elseth and Hamann, 1999); CSFs for mass house building projects, and risk assessment (Ahadzie *et al.*, 2008; Salaheldin, 2009; Yirenkyi-Fianko *et al.*, 2012); impact of RAMP project performance (Dada and Jagboro, 2007; Aje *et al.*, 2009; Enshassi *et al.*, 2009); practices, barriers and benefits (Mok *et al.*, 1997; Edwards and Bowen, 1998b; Liu *et al.*, 2007; Tang *et al.*, 2007); awareness (Akintoye and MacLeod, 1997; Frimpong *et al.*, 2003; Luu *et al.*, 2008; Agyakwa-Baah and Chileshe, 2010); techniques for risk management practices (Ahmed *et al.*, 2007); desirable skills for performing risk management (Kim and Bajaj, 2000); and assessment and maturity models (Zou *et al.*, 2010).

Table I presents a summary of selected studies on CSFs to RAMP.

As can be seen from Table I, 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 (hence a barrier). This problem affects developing countries like Korea (Kim and Bajaj, 2000), Vietnam (see Ling and Hoang, 2012) and Singapore (Hwang *et al.*, 2014). There is a plethora of studies on CSFs to RAMP, and the list shown in Table I is just indicative. However, despite the previous CSFs derived from a cross-section of the literature, what is notable from the summary (Table I) apart from the Richard *et al* (2008) and Chijoriga (2011) studies, is an obvious omission, particularly in the Tanzanian context, of studies focused on the identification of the CSFs to RAMP. However, it is worth pointing out that, the only identified study of Richard *et al* (2008) was focused on understanding credit risk management (CRM) systems of commercial banks. While some of CRM strategies adopted by the banks such as risk identification, risk measurement, risk assessment, risk monitoring and risk control might be similar to those operating within the construction operational environments, the two industries, namely service (banking) and construction have unique features and face different challenges, hence the need for specific construction RAMP studies. Similarly, Chijoriga (2011) study applied the multiple discriminant analysis model in predicting the firm's performance and credit risk assessment from the banking perspective.

Notwithstanding the obvious omission of Tanzanian related studies from Table I, of critical importance is the notion that, given the definition of the CSF concept as it applies to this study, and the review of the limited project management and HRD related studies within the Tanzania context (Chiragi, 2000; Debrah and Ofori, 2005, 2006; Egmond, 2012; Kikwasi, 2012; Lema, 2008; Msita, 1997), the assumption is made that the identified CFSs in the studies (see Table I), despite developed and applied in another context, can be tested for their relevance as success factors for Tanzania.

Despite the noted proliferation of studies on RAMP, there has been a lack of empirical studies reported which seeks to assess the levels of awareness, usage and advocated benefits of RAMP relative to the impact on project outcomes within the

No.	CSFs as used in this study[a, b]	Previous studies
CSF1	Management style	Pinto and Covin (1989), Belassi and Tukel (1996), Mok *et al.* (1997), Frimpong *et al.* (2003), Fortune and White (2006), Toor *et al.* (2012)
CSF2	Awareness of risk management processes	Akintoye and MacLeod (1997), Chileshe and Yirenki-Fianko (2012)[c], Dada and Jagboro (2007)[c], Frimpong *et al.* (2003)[c], Kim and Bajaj (2000), Kululanga and Kuotcha (2010), Lynos and Skitmore (2004), Santoso *et al.* (2003), Manelele and Muya (2008)[c], Zou *et al.* (2010)
CSF3	Co-operative culture	Rwelamila *et al.* (1999)[c]
CSF4	Positive human dynamics	Simkoko (1992)[d], Chua *et al.* (1999), Rwelamila *et al.* (1999)[c], Tchankova (2002), Lester (2007)
CSF5	Customer requirements	Johnson and Scholes (2001), Luu *et al.* (2008)
CSF6	Goals and (strategic) objectives of the organisation	Pinto and Covin (1989), Chua *et al.* (1999), Fortune and White, 2006, Nandhakumar (1996)
CSF7	Consideration of external and internal environment	Pinto and Covin (1989), Belassi and Tukel (1996), Chua *et al.* (1999), Ika *et al.* (2012)
CSF8	Effective usage of methods and tools	Pinto and Covin (1989), Frimpong *et al.* (2003)[c], Richard *et al.* (2008)[e], Chijoriga (2011)[e]
CSF9	Teamwork and communication	Carter (1986), Belassi and Tukel (1996), Chua *et al.* (1999), Fortune and White (2006), Pinto and Covin (1989), Tchankova (2002), Lester (2007), Ika *et al.* (2012)
CSF10	Availability of specialist risk management consultants	Pinto and Covin (1989), Chua *et al.* (1999)

Table I.
List of critical success factors (CSFs) and associated similar studies

Notes: [a]The ten CSFs as used in Agyakwa-Baah and Chileshe (2010) compared with existing previous studies; [b]the same study used factor analysis and yielded two critical success factors namely, "strategic planning" and "tools and techniques", [c]African context specific studies, [d]Tanzanian project management related studies; [e]Tanzanian risk management related studies

Tanzanian construction industry, particularly among the medium to large-sized enterprises.

For example, a study conducted by Agyakwa-Baah and Chileshe (2010) within the Ghanaian construction industry found that, relative to the awareness and usage, the findings indicate that despite half of the respondents (58.30 per cent) being aware of the risk assessment and management techniques, the uptake of RAMP was low. The majority (61.90 per cent), of those aware where actually implementing the RAMP. These problems are not just confined to developing countries, for example, a study conducted by Zou *et al.* (2010) aimed at developing a risk management maturity assessment model for construction organisations. That model was tested and validated among the Australian construction industry. The study found the overall risk management maturity level to be relatively low.

3.3 CSFs to implementing RAMP

Some of the earlier studies such as Mok *et al.* (1997) have previously observed that the successful implementation of risk management process (RMP) depended on whether the CSFs could be overcome. The management style adopted in any organisation will therefore go a long way to affect the way risks are managed. More recent, studies within the context of developed countries such as Toor *et al.* (2012) have pointed to the confusion between "leadership" and "management" as one of the factors influencing the mindset of managers within the construction project management. This has led

them (managers) to manage their teams rather than leading team. This obviously has some inherent impact on the implementation of RAMP. Accordingly, this has contributed to managers who mostly end up managing their teams rather than leading them (Toor *et al.*, 2012, p. 252). Drawing on the example of executive information systems (EIS), Nandhakumar (1996) identified the need of an "Executive sponsor" who leads by example as one of the CSFs for EIS development. Therefore, construction practitioners or managers should "lead", rather than "manage" their teams for successful implementation of RAMP.

Zwikael (2009, pp. 377) suggests that construction project managers wishing to improve project performance at the planning phase of a project should concentrate more on the accurate identification of all project activities. Furthermore, the study explored the linkages between some attributes of project planning and the following indicators of project success: schedule overrun; cost overrun; project performance; and customer satisfaction.

Famakin *et al.* (2012) aimed at investigating the factors affecting the performance of partners in joint ventures. Construction projects in Nigeria established that, the following factors of communication, compatibility of objectives and mutual understanding among partners was highly important.

Another study within the African context is by Agyakwa-Baah and Chileshe (2010) was aimed at identifying the CSFs of RAMP implementation among the medium and large Ghanaian construction related organisation. The following ten CSFs were identified:

(1) management style;

(2) awareness of RMP;

(3) cooperative culture;

(4) positive human dynamics;

(5) customer requirements;

(6) goals and strategic objective;

(7) impact of environment;

(8) usage of tools;

(9) teamwork and communication; and

(10) availability of specialist risk management.

Using the same data set, the authors (Agyakwa-Baah and Chileshe, 2010) applied factor analysis to the CSFs and extracted two factors, namely, "strategic planning", "tools and techniques". While this current study does not apply factor analysis in order to identify the underlying dimensions, the subsequent discussion of the CSFs will make appropriate reference to these two general headings.

Wang and Yuan (2011) also used factor analysis in investigating the critical factors affecting contractors risk attitudes in construction projects in China, and the identified CSFs and grouped them into four categories, namely:

(1) knowledge and experience;

(2) contractors character;

(3) personal perception; and

(4) economic environment.

While the focus of the study was more on the risk-based decision making, and not directly related the overall implementation of RAMP, the results indicate, "risk attitudes" that form part and parcel of the actual process.

According to the MoW (2003), while not specific to the RAMP, "teamwork and collaboration" has been identified as a catalyst for the achievement of meaningful results within a short timeframe. The study further notes that, there is need for total commitment from all stakeholders and that a higher level of collaboration among the Tanzanian construction industry stakeholders is a prerequisite for success. Similarly, Lynos and Skitmore (2004) found "project teams" as the most frequent group to be used for risk analysis.

3.4 Summary of literature review

Despite the extensive research on (CSFs) affecting the project performance (Salaheldin, 2009; Zwikael, 2009), there is a paucity of empirical studies that examine CSFs for the deployment of risk assessment and management processes in developing countries. Moreover, the majority of the studies focused on identification CSFs have largely been related to construction projects (Ahadzie *et al.*, 2008; Toor and Ogunlana, 2009; Famakin *et al.*, 2012; Tabish and Jha, 2011; Yang *et al.*, 2009; Zwikael, 2009), and project performance (White and Fortune, 2002; Salaheldin, 2009). While some studies have been reported in developing countries, the majority of these are drawn from the Asian region. As recommended by Santoso *et al.* (2003, p. 43), knowledge and understanding of risk management is important to help identify and manage inherent risk effectively and systematically to achieve the project objectives of time, cost and quality. It is anticipated, that the observations made from the context of Indonesia, a developing country like Tanzania, inherent solutions as advocated could be applied within the context of the Tanzanian construction industry.

4. Research methods

The research method for this study is explained under research design, population and sample size, sampling procedure and data collection techniques. The specific objectives are to: identify the CSFs for risk assessment and management processes among the construction stakeholders in Tanzania; and examine the perception of construction stakeholders (professionals) on their importance.

The following hypothesis is proposed:

H1. There are significant differences among the constructional professionals in the perception of the relative importance of the CSFs.

4.1 Measurement instrument

The questionnaire was divided into four sections as follows:

(1) general demographics of the respondents;

(2) evaluation of RAMP survey;

(3) awareness of RAMP; and

(4) antecedents, comprising CSFs and barriers.

The findings reported within this paper only relates to Sections 1, 2 and 4 aspect dealing with the CSFs. It is beyond the scope of this paper to report on all issues that were covered within the research project. The statements of the ten CSFs are as identified in Table I (CSF1 through CSF 10) follows.

For the CSFs sub instrument, the respondents were asked to identify the CSFs they perceived as necessary for the implementation of RAMP, on a five point Likert-scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Drawing heavily from Pinto and Covin (1989), the respondents were required to think of a project that they had been involved in a frame of reference in completing their questionnaire (Pinto and Covin, 1989, p. 56).

4.2 Survey administration

The study design was cross-sectional with a targeted population of architects, contractors, engineers, quantity surveyors and others who were attending a construction industry forum on "50 years of independence of Tanzania" held from 5 to 7 September 2011 at Mlimani City Conference Centre in Dar es Salaam Tanzania. The type of research adopted is descriptive which tries to highlight dominant CSFs for risk management implementation in the Tanzanian construction industry.

4.2.1 Population and sample size. The forum was organised by three regulating boards namely AQRB, CRB and ERB. A total of 2,500 participants from all regions of the country attended the forum. The distribution of the delegates according to the regulatory bodies was as follows:

The majority 42 per cent (1,050) of delegates were drawn from the engineering profession body (ERB), followed by a third ($n = 826$) from contractors (CRB). A relative small sample size comprising 14 per cent (350) and 10 per cent (274) were drawn from architects and quantity surveyors (AQRB), respectively. A sample size of 600 potential respondents was estimated considering 200 from each board.

4.2.2 Sampling and data collection method. As the purpose of this research was descriptive, and the research question matched establishing the opinions of respondents on risk management CSFs and barriers, the recommended research strategy was that of analytical survey. Chileshe and Dzisi (2012) used a similar approach of knowledge, attitudes and perceptions when investigating the perceptions of UK practitioners on health and safety (H&S) related issue. In all, 600 questionnaires were prepared and distributed to randomly select potential respondents in three conference halls. Delegates were gathered according to their respective regulating boards after the opening session was completed.

Two techniques of data collection were used namely literature review and questionnaire. As regard to literature review previous works on the subject matter were reviewed to establish the gap and broaden the knowledge base in the research area. The questionnaire used in this study is based on Chileshe and Yirenki-Fianko (2012) instrument. While the Chileshe and Yirenki-Fianko (2012) study was also aimed at investigating the perceived differences in the perception of the construction professional on the CSFs for RAMP, the data analysis employed included factor analysis. The similarities were largely context specific, namely African and developing country; population sample namely, the key stakeholders comprising clients, contractors and clients, were the main reasons for using the instrument. Furthermore, as observed by Tata *et al.* (1999), usage of pre-tested constructs from past empirical studies is crucial in ensuring the validity and reliability of the measurement instruments. In addition, the future opportunities of making a cross-comparative analysis between the Tanzanian and Ghanaian samples was the second motivation for utilisation of the instrument.

Out of 600 distributed, about 300 questionnaires were collected by the delegates at an estimate of 100 questionnaires to each Board. At the end of the third day of the forum only 21 questionnaires were returned despite the call which was made by floor

managers. These comprised of eight from AQRB, eight from CRB and five from the ERB. The involvement of these boards is highly significant as they are statutory bodies mandated to regulate the relevant profession's activities and conduct of its members. For example, as observed by Watermeyer (2012), one of the requirements for registration of Engineering Consulting Firms in Tanzania includes having basic equipment and tools and carrying out engineering consulting works. Following low response to questionnaires, e-mail and postal addresses of the forum participants were sought from AQRB, CRB and ERB. This resulted in about 150 respondents of the original been contacted. It was noted that most of them could not locate the questionnaires supplied during the forum. Henceforth a further 50 questionnaires were e-mailed and 100 were hand delivered. This was followed by constant telephone reminders out of which eight and 48 responses were received from e-mailed and hand delivered questionnaires, respectively. Please note that the forum drew delegates from all parts of Tanzania not only Dar es Salaam. Of the 77 questionnaires, ten were incomplete resulting in 67 useable for the final data analysis.

Table II depicts the summary of the questionnaire responses according to the two waves of distribution.

This explanation provides the reason why respondents who came from various destinations of Tanzania wanted to know the research outcomes.

4.3 Analysis of results

The primary focus of this study was to examine the perception of construction professionals on CSFs appertaining to the deployment of risk assessment and management practice determining whether significant differences existed in their perception of the CSFs. The obtained raw data was input and analysed using the IBM Statistical package for social sciences (SPSS) computer programme version 20.0.0. Four types of analysis were conducted. Review of the literature shows that such approaches have been adopted before in survey-related studies (Tang *et al.*, 2007; Yang *et al.*, 2009; Yuan *et al.*, 2011; Famakin *et al.*, 2012). The techniques selected from the aforementioned studies were as follows:

- Ranking analysis.
- Spearman rank correlation.
- One-way analysis of variance (ANOVA).

4.3.1 Ranking analysis. The "ranking analysis" was applied to ascertain the relative importance of the CSFs through the examination of the mean values and standard

Wave of distribution	Collected/ Sent[a]	Completed	Response rate (%)
First wave: 600 distributed to construction forum delegates	300	21	7.00
Second wave: 150 comprising 50 by email and 100 (postal)[a]	150	56	37.33
Total[b]	300	77	25.67

Table II.
Profile of questionnaires distributed

Notes: [a]The targeted 150 respondents in the second wave were part of the original 300 delegates who collected the questionnaires, but did not return them during the forum; [b]this explains why the total number of distributed questionnaire or sample population remains at 300

deviations. In cases where the CSF had the same mean values, the approach adopted was to select the one with the lower standard deviation. This approach has been used in previous studies (see Ahadzie *et al.*, 2008; Chileshe and Yirenki-Fianko, 2012). Drawing upon the study by Ikediashi *et al.* (2012, p. 306) which aimed at analysing the risk factors associated with facilities management, a benchmark of 3 [$(1+2+3+4+5/5=3)$] was used to identify the significant CSFs. Subsequently, any CSFs with mean values $\geqslant 3$ were classified as significant.

4.3.2 Spearman rank correlation. The Spearman rank correlation Kendall's coefficient of concordance of the sample data were also computed (see Tang *et al.*, 2007; Cheung *et al.*, 2012; Yuan *et al.*, 2011). This was then utilised to measure agreement of the respondents on their rankings of the importance of risks, application of risk management techniques and barrier to risk management and ranking of CSFs for public private partnerships (PPP) (Cheung *et al.*, 2012). It should be noted that, some studies such as Tang *et al.* (2007) have used the alternative technique of Kendall's coefficient of concordance to determine agreement among different parties (between two groupings, i.e. mainland China and Hong Kong). However, it was deemed inappropriate to use this method in this study, as it is only good for two groups of respondents, and would have entailed the pairing up of the different groupings. The following formula for Spearman rank correlation coefficient (rs) for the CSFs was computed as applied by Cheung *et al.* (2012) and also illustrated in SPSS Inc (2002):

$$r_s = 1 - \frac{6\sum d^2}{N(N^2-1)} \quad (1)$$

where d is the difference in rank of the two groups for the same CSFs; and N the total number of responses concerning that CSF (ten in this case).

4.3.3 One-way ANOVA. A one-way between groups of variance (ANOVA) was conducted to test if there was any significant difference in the responses of respondents. The respondents were divided into three groups (Group 1: clients; Group 2 = contractors; and Group 3 = consultants). A p-value < 0.05 indicates that the two groups have different opinions on that particular CSF. Chileshe and Yirenki-Fianko (2012) used the same approach in differentiating the risk factors.

4.4 Characteristics of the sample

The characteristics of the respondents and their organisations are summarised in Tables III and IV, respectively.

4.4.1 Professional background and length of service in employment. Table III shows that the majority (28.4 per cent) of the respondents are quantity surveyors, followed by engineers (25.4 per cent). The proportion of the respondents in terms of experience was: The majority (51.5 per cent) as having considerable lengthy tenure in the construction industry (11-15 years), followed by those with more than six years, but $<$ ten years of experience.

A cross-tabulation of respondents' sector and years of experience in the construction industry was conducted, and the results showed that, half the respondents 17 (50 per cent) with more than 15 years of experience were actually drawn from the consulting organisations. As previously stated within the literature review, consultants rarely have to undertake some detailed risk assessments, as such this experience is misplaced within the context of this research. Furthermore, as noted by Debrah and Ofori (2006, p. 442), the construction firms or organisations in Tanzania, like many developing countries,

Characteristic	Number of respondents	%	Cumulative
Professional background[a]			
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
Other[b]	6	9.0	100.0
Experience in construction industry (LSCI)			
<1 year	2	3.0	3.0
1-5 years	9	13.6	16.7
6-10 years	12	18.2	34.8
11-15 years	9	13.6	48.5
More than 15 years	34	51.5	100.0

Notes: [a]The interpretation of the terminology, "professional" is based on the one adopted by Debrah and Ofori (2006, p. 460)and refers to architects, engineers and quantity surveyors who work in managerial and or/professional roles in construction and construction related firms in the Tanzanian construction industry; [b]other category comprised 4 (6%) managing directors 1(1.5%) construction manager and 1 (1.5%) contract manager

Table III.
Profile of study sample (individual characteristics)

Characteristic	Number of respondents	%	Cumulative
Sector			
Contractor (local and foreign)	24	35.8	35.8
Consultant	27	40.3	76.1
Client (private and public)	16	23.9	100.0
Size (number of employees)			
<25	31	48.4	48.4
25-49	14	21.9	70.3
50-99	4	6.3	76.6
100-199	5	7.8	84.4
200-300	4	6.3	90.6
More than 300	6	9.4	100.0
Size (turnover in Tanzanian shillings, TZS)[a]			
<100,000	3	4.6	4.6
100,000-499,999	3	4.6	12.3
500, 000-999,999	9	13.8	26.2
1,000,000-2,000,000	16	24.6	50.8
Over 2,000,000	32	49.2	100.0

Note: [a]Where $1(USD) = 1,601.49 TZS, and £1(GBP) = 2,548.18 based on 20 November 2012 exchange rates

Table IV.
Profile of study sample (organisational characteristics)

is comprised of small-to-medium sized organisations and, therefore do not have the facilities to provide training and career development. The inference to be drawn is that, irrespective of the experience, the majority of the respondent might not have the desirable competencies and training necessary for overseeing risk management practices.

4.4.2 Organisational characteristics (turnover, sector and number of employees). The profile of the respondents according to the organisation characteristics (sector and size) is shown in Table IV. Two indicators of organisation size are used here, namely number of employees and turnover.

As can be seen from Table IV, the majority 46.3 per cent (31) of the respondent organisations had <25 employees, followed by 20.9 per cent (14) with more than 25 but <49 employees. This finding is also consistent from the contractor's perspective. According to CRB (2010), data show that, there are over 4,470 contractors registered in Tanzania, both local and foreign, out of which 3 per cent are foreign and 97 per cent are local. Out of the 97 per cent that are local, over 94 per cent are small contractors. However, for a long time, foreign contractors have dominated construction business in Tanzania (Materu and Uriyo, 2000; MoW, 2003; Debrah and Ofori, 2005). Examination of Table IV also shows that, the majority 32 (49.2 per cent) of the respondents had turnover in the excess of 2,000,000 Tanzanian shillings. These findings also confirm the composition of respondents as SMEs, as opined by the MoW (2003), 74 per cent of the registered 531 civil works were small contractors but capable of undertaking works of up to about Tshs. 375,000,000; of which 97 per cent of them were local. The proportions of the respondents in terms of the sector were: the majority 40.3 per cent (27) of the respondents were consultants. This was followed by 35.5 per cent (24) of contractors and 23.9 per cent (16) clients. Based on the sector, the low number of clients is rather surprising, given that the Tanzania Government is the major client of the construction industry. More respondents would have been expected from this category.

5. Results and discussion

5.1 Reliability analysis

The reliability and internal consistency of the survey instrument comprising the ten CSF as itemised in Section 4.1 were examined using the Cronbach's α's coefficient. According to Cronbach (1951), this is one of the most popular reliability statistics which is aimed at determining the internal consistency or average correlation of items in a survey instrument to gauge its reliability. The Cronbach α was found to be 0.807 (F-statistic $= 5.261$, sig. $= 0.000$) for the CSFs subinstrument. While the Cronbach α coefficient for the CSF subinstrument was >0.7, thus indicating a high reliability of scales (Nunnally, 1978), the same study by Nunnally has pointed out that, lower thresholds are sometimes used in the literature.

5.2 Awareness and usage of RAMP

The respondents were asked to indicate whether they were aware of RAMP. If they had, they were asked to indicate whether they had used RAMP on any of the projects that they had worked on. Figure 1 shows the profile of the respondents according to the awareness of RAMP.

As can be seen from Figure 1, majority 82.1 per cent (55) of respondents are aware of risk management techniques. The respondents were further asked if they had used any risk management techniques on any of the projects they had worked on. While the results were positive, with almost two-thirds (67.2 per cent) responding affirmatively, these findings contradict those of Kululanga and Kuotcha (2010). They study found relatively low implementation of formal project risk management methods in practice among the Malawian contractors. While the setting was different, Like Tanzania, Malawi, is also a developing country. Similarly, a study conducted by Agyakwa-Baah and Chileshe (2010) in the Ghanaian construction related organisations, revealed that despite the moderate (more than half of the respondents, 61 per cent) levels of risk management practices (and processes) awareness, there was a poor uptake or usage of these practices among half of the respondents. Results from literature review of earlier studies within developed countries drew similar findings. For example, a study

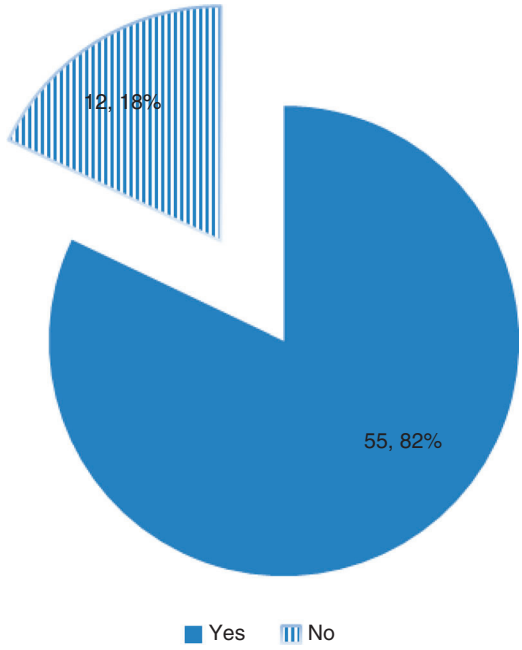

Figure 1.
Respondents' awareness of risk assessment and management practices

conducted by Kim and Bajaj (2000) among Korean contractors cited lack of familiarity with risk management concepts and methods as one of the reasons for the lack of usage.

5.3 Overall ranking of CSF

This subsection examines the contractor's, clients and consultant's perception of the CSFs to risk assessment and management processes. Table V summarises the results of the analysis of CSFs for the group wise ratings of the respondents. Examination of Table V show that, the mean scores of the ten factors critical for RAMP ranged from 3.652 (positive human dynamics) to 4.318 (awareness of RMP) with an average score of 3.937.

Further examination of Table V also shows that, all the CSFs were significant as their mean score exceeded the set benchmark of 3.00 as previously stipulated within Section 4.4.1 for the ranking analysis. For ease of debate, only the CSFs with ranking of >4.00 are presented here. Based on the overall mean score, the following five CSFs are identified as highly ranked (mean score $\geqslant$ 4.00):

(1) awareness of RMPs (mean score = 4.318);

(2) teamwork and cooperation (mean score = 4.167);

(3) management style (mean score = 4.136);

(4) effective usage of methods and tools (mean score = 4.076); and

(5) goals and strategic objectives of the organisation (mean score = 4.015).

5.3.1 Awareness of RMPs. While there were no statistical differences of opinion in the perception of the CSFs by professionals working for different types of

Overall MS[a] (Rank)	Critical success factors	Contractors ($n = 24$) MS[b]	Rank	Clients ($n = 16$) MS	Rank	Consultants ($n = 26$) MS	Rank
4.136 (3)	Management style	4.208	2	4.000	2	4.154	3
4.318 (1)	Awareness of risk management processes	4.083	3	4.434	1	4.462	1
3.849 (8)	Cooperative culture	3.708	7	3.750	8	4.039	6
3.652 (10)	Positive human dynamics	3.708	8	3.500	9	3.692	10
3.712 (9)	Customer requirements	3.833	6	3.500	10	3.731	9
4.015 (5)	Goals and strategic objectives of the organisation	4.000	5	3.875	6	4.115	5
3.833 (7)	Consideration of external and internal environment	3.708	9	3.934	5	3.885	8
4.076 (4)	Effective use of methods and tools	4.083	4	4.000	3	4.115	4
4.167 (2)	Teamwork and cooperation	4.333	1	3.813	7	4.231	2
3.864 (6)	Availability of specialist risk management	3.708	10	3.938	4	3.962	7
3.9622	Average Scores	3.9372		3.8744		4.0386	

Notes: [a]MS, Mean score based on Valid $N = 66$ (list wise); [b]MS, mean score of the critical success factor where 5 = strongly agree; 4 = agree; 3 = neutral; 2 = disagree; and 1 = strongly agree. The higher the mean, the more important the critical success factor

Table V.
Group-wise ratings of CSFs according to sector of organisation

organisations, it is evident that whilst "Awareness of risk management processes" ranked first overall, it also ranked first under the clients and consultants. It, however, ranked third (mean score = 4.462) under the scoring by the consultants. The fact that this CSFs was ranked first might be indicative of the growing "risk appetite" among the Tanzanian professionals within the construction industry. It should also be pointed out that, as with many developing countries, the risk management concepts are relatively new to Tanzania. This could be one of the reasons for the "high ranking assigned to this CSFs". One implication emerging from this is that, in order for the "practices" to be adopted, there needs a better understanding of the issues at hand. However, the results further suggest that, of the three parties (clients, consultants and contractors), the contractor's should be at the forefront of having a realistic attitude to risk as they have to incur the financial burden, unlike the consultants and clients (mostly government). Second, despite the acknowledgement of the importance of this CSF, there is a need of translating this awareness into the actual usage and implementation of the tools and techniques of RAMP.

This finding is also consistent with literature on developed countries (Lynos and Skitmore, 2004) as well as developing countries. The specific studies within the African context such as Chileshe and Yirenki-Fianko (2012) within Ghana, Manelele and Muya (2008) in Sub-Saharan country, namely Zambia; Dada and Jagboro (2007) have drawn similar conclusions. For example, Dada and Jagboro (2007) in examining the impact of risk on project cost overrun in the Nigerian construction industry identified improper assessment of risk factors as a contributory factor to ineffective project delivery. The study by Manelele and Muya (2008) is also worth mentioning as Zambia, like Tanzania share some commonalities through belonging to the same economies markets such as the Southern African Development Community as well as sharing borders. The study by Manelele and Muya (2008) attributed the project initiation risks affecting community based projects in Zambia to the lack of technical advice. While the

emphasis is on advice, it could be inferred as the absence that advice being linked to the lack of awareness. Similarly, within the context of developed countries, a survey conducted by Lynos and Skitmore (2004) in Queensland (Australia) ranked this as the second highest barrier out of the nine listed.

5.3.2 Teamwork and communication. The second overall ranked CSFs was that of "teamwork and communication" (mean score = 4.167). This was also ranked first and second under the contractors and consultants, respectively. However, it achieved a low ranking seventh (mean score = 3.813) under the scoring by the clients. One plausible explanation for this disparity, despite the lack of significant differences is that, while "Teamwork" is also evident in Tanzanian construction industry; there are cases where when a job is advertised by a certain client some consultants and even contractors will not bother to tender. This happens as a result of the knowledge that a consultant or even a contractor is already known if not predicted. This findings accords with the earlier works of Lynos and Skitmore (2004) who concluded that the "project teams" are most frequent group to be used for risk analysis, and further reinforced by Toor *et al.* (2012) who highlighted the complexity and largeness of teams involved in construction projects. It is noted that this has the potential of exacerbating the communication and coordination problems among the various diverse team members.

Team members have a role to play in success on any project as construction works are more dependent on the interaction of the project participants rather than a particular process or equipment. For instance, poor communication among members may lead to delay in issuing of instructions by the team leader and details by the design team. This can deter the decision making process in a bureaucratic organisation.

5.3.3 Management style. The third overall ranked CSFs was that of "management style" (mean score = 4.136). This was also ranked second by contractors and clients, with the consultants ranked it third. This finding suggests that, the Tanzanian stakeholders acknowledge the importance of having an appropriate management style that enables the establishment of a project risk management team within the organisational and project environment. It also accords with the earlier works of Pinto and Covin (1989) which identified the initial clarity of goals and general directions as one of the desirable project CSFs. This is only achievable with the right management style. The results are further reinforced by, and also consistent with literature on developing and developed economies (Belassi and Tukel, 1996; Mok *et al.*, 1997; Frimpong *et al.*, 2003; Toor *et al.*, 2012). For example, the study by Belassi and Tukel (1996) linked 'lack of top management support together with the project manager's lack of competence to project failure. Similarly, the seminal study by Mok *et al.* (1997) observed that the successful implementation of RMP depended on whether the CSFs could be in place. It could thus be argued that, the management style adopted in any organisation will therefore go a long way to affect the way risks are managed.

5.3.4 Availability of specialist risk management consultants. Although this CSFs was ranked sixth overall (mean score = 3.664) and also considered as the least important by the contractors (mean score = 3.708, rank = tenth), it's worth discussing, given that it also appears as one of the barriers identified in literature. The low ranking of this CSF by the contractors is hardly surprising given the contradictory results reported in literature (Lynos and Skitmore, 2004; Toor *et al.*, 2012). For example, the recent study by Toor *et al.* (2012) provides support by acknowledging that construction projects are technically complex, and large. As such, they require a combination of specialist skills to undertake them, and the ability to manage a wide range of risks. On the contrary, Lynos and Skitmore (2004) identified that project teams are the most likely group to be

used for risk analysis, as opposed to (or ahead of) in-house specialists and consultants. However, it is worth noting that, in our present study, we did not differentiate between in-house specialists and consultants (working within the same organisations, as with other professions) and external specialists and consultants upon whom the contractors and clients could engage in their quest in implementing RAMP. This suggests that, in identifying and evaluating these risks, the contractors would require the help of specialist management consultants to training them in understanding the various techniques and processes involved. A further reason for the low ranking of these CSFs by contractors could be for purely financial reasons. As previously identified, the majority of local Tanzanian contractors are SMEs, and lack the financial resources to engage these consultants.

5.3.5 Discussion of lowly ranked CSFs: co-operative culture, customer requirements and positive human dynamics. Examination of Table V also reveals that based on the overall sample, "cooperative culture" (mean score = 3.849, rank = eighth), "customer requirements" (mean score = 3.712, rank = ninth), and "positive human dynamics" (mean score = 3.652, rank = tenth), are the lowest ranked CSFs necessary for the effective implementation of RAMP. This finding suggests that, while the Tanzanian stakeholders (clients, contractors and consultants) are aware of RAMP, there is little or no "culture" of its (RAMP) adoption within their respective organisations. This is more profound among the client and contracting organisations that ranked these CSFs lowly. One of the probable explanations could be due to lack of trust, cultural or training background differences and competing interests which might subject the projects to various risks. The findings also contradict the observations of previous studies such as Famakin *et al.* (2012), Lester (2007), Tchankova (2002), and Carter (1986) which highlighted the importance of these risk factors to the success of construction projects.

5.6 ANOVA

A one-way between-groups ANOVA was conducted to explore the impact of the role of professionals practising with construction client (private and public); consultant and contractor organisations, on the perception of the CSFs for the implementation of RAMP. The respondents were divided into five groups according to the professional background (Group 1 = quantity surveyor; Group 2 = engineers; Group 3 = project manager; Group 4 = architects; and Group 5 = others). The results for ANOVA are shown in Table VI.

As can be seen from Table VI, there are no statistical significance differences ($p < 0.05$) in the perception of the CSFs necessary for the deployment of RAMP among the five groups. This suggests that construction professionals within the Tanzanian construction industry, irrespective of the sector (clients, consultants or contractors) that they worked to generally have similar opinions regarding the CSFs influencing the deployment of RAMP. As such, the null hypothesis (*H1*) of no significant difference in the perception of different professional (from the three types of organisations) to the CSFs to RAMP is upheld.

5.7 Spearman rank correlation

In order to confirm and test whether there was a consensus among the three groups (clients, contractors and consultants) on the ranking of the importance of the CSFs, the Spearman's rank correlation coefficient r_s was computed. This approach has previously been utilised by a number of studies to demonstrate whether there is the

Critical success factors	Due to different professional backgrounds Sum of squares	df	Mean square	*F*-value	Sig.
Management style					
Between groups	1.496	4	0.374	0.596	0.667
Within groups	38.276	61	0.627		
Total	39.773	65			
Awareness of risk management processes					
Between groups	2.510	4	0.627	0.836	0.508
Within groups	45.808	61	0.751		
Total	43.318	65			
Co-operative culture					
Between groups	0.650	4	0.162	0.191	0.942
Within groups	51.835	61	0.850		
Total	52.485	65			
Positive human dynamics					
Between groups	0.904	4	0.226	0.344	0.847
Within groups	40.081	61	0.657		
Total	40.985	65			
Customer requirements					
Between groups	1.016	4	0.254	0.274	0.893
Within groups	56.514	61	0.926		
Total	57.530	65			
Goals and strategic objectives of the organisation					
Between groups	1.887	4	0.472	0.542	0.706
Within groups	53.098	61	0.870		
Total	54.985	65			
Consideration of external and internal environment					
Between groups	3.151	4	0.788	0.890	0.476
Within groups	54.016	61	0.886		
Total	57.157	65			
Effective usage of methods and tools					
Between groups	0.930	4	0.233	0.274	0.983
Within groups	51.691	61	0.847		
Total	52.621	65			
Teamwork and cooperation					
Between groups	3.705	4	0.926	1.363	0.257
Within groups	41.462	61	0.680		
Total	45.167	65			
Availability of specialist risk management					
Between groups	6.355	4	1.589	1.285	0.286
Within groups	75.418	61	1.236		
Total	81.773	65			

Table VI.
One-way ANOVA on significant differences of CSFs due to respondents of varying professional backgrounds

agreement or disagreement among each pair of parties (Tang *et al.*, 2007; Cheung *et al.*, 2012). For example, in a survey conducted by Tang *et al.* (2007) aimed at investigating overall aspects of risk management among various project participants (five to be precise) whereas, Cheung *et al.* (2012) in exploring CSFs necessary for PPP. Table VII illustrates the results of Spearman coefficient and significance level calculations.

As can be seen from Table VII, the highest degree of agreement belongs to this pair (81.8 per cent with mean scores) between the contractors and consultants. The lowest degree of agreement appears between contractors and clients (about 32 per cent).

These results indicate a general consensus on the ranking of the CSFs among the different group of respondents.

6. Implications of the findings

Relative to the factors affecting the deployment of the RAMP which in turn affect the construction projects, the study has a number of managerial implications for the researchers, policy makers and practitioners (top management) within the Tanzanian constructional related organisations. The following four can be singled out as having major implications.

First, the findings may help practitioners in reviewing the necessary CSFs when considering implementing RAMP. Furthermore, the identified CSFs could be used as a road map for the successful implementation of RAMP.

Second, the findings can have an impact upon society through influencing public attitudes and perceptions through the positive aspects that arise from the effective implementation of RAMP. Some of noted benefits are improved project performance through minimisation of delays, an issue strongly associated with negative images of the construction industry.

Third, drawing upon Yuan *et al.* (2011), researchers could use these CSFs as a sound basis to develop RAMP strategies that are tailored to the practice of Tanzania.

Finally, at a National level, the study contributes to the aspirations of the National Construction Council which seeks to improve the capacity and competitiveness of the local construction enterprises (contractors, consultants and informal sector). Application and usage of risk management could aid these stakeholders through the improvement of their decision-making processes as whether or not to carry out projects. Most importantly, as stated by Ofori (2012b), the Millennium Development Goal of eradicating extreme poverty and hunger can be achieved through the attainment of an effective and efficient production of buildings and infrastructure. Effective implementation of RAMP is indirectly linked to some of the identified indicators for construction, *vis-à-vis* time, cost and quality.

While the implications for practice are set out within the context of the Tanzanian construction industry, it's prudent that caution or "a health warning" is heeded in understanding the following recommendations as will be made in section associated with the recommendations. The authors and the literature review acknowledge that they are different schools of thought on the benefits of CSFs in RAMP, as well as the direct correlation between risk management and project performance. Furthermore, the authors acknowledge that construction engineering and management industry does not exist exclusively in the relative microcosm of Tanzania, and neither should the research. Against that background, it is suggested that the readers in interpreting and understanding these recommendations, should take into considerations the geographic specific findings when applying them to the broader global community.

Pairing	Mean scores Spearman rank correlation coefficient	Significance level
Contractors – clients	0.321	0.05
Clients – consultants	0.685	0.05
Contractors – consultants	0.818	0.05

Table VII.
Spearman rank coefficient

7. Conclusions

There is a growing awareness of the need for implementation and adoption of RAMP within both developed, and developing countries. While a number of studies have been conducted on the CSFs for "construction projects" and "project performance", no study has been made of the CSFs to RAMP among the construction organisations in Tanzania.

The purpose of this research is to investigate the perception of the CSFs for the implementation of RAMP among the construction professionals in Tanzania. This involved a questionnaire survey of the clients (or owners, both private and public), contractors and consultants involved with construction projects. The results demonstrated that the construction professionals drawn from client, contractors and consultants ranked the following CSFs as important or excellent (mean score >4.10):

- awareness of RMPs (mean = 4.318);
- teamwork and cooperation (mean = 4.167); and
- management style (mean = 4.136).

Whereas, the least ranked CSFs were as follows:

- cooperative culture (mean = 3.849);
- customer requirements (mean = 3.712); and
- positive human dynamics (mean = 3.652).

One of the main contributions of this study lies in the identification of an ordered grouped set of CSFs 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 CSFs necessary for the implementation of RAMP within the Tanzanian construction sector, an area previously under-researched. It also expands the efforts of studying and evaluating the CSFs across the developing economies and particularly within the (East) African context.

The findings can be used by the practitioners and stakeholders as a road map for the successful implementation of RAMP. By focusing on the CSFs having low scores (such as "positive human dynamics" and "customer requirements"), more emphasis could be placed activities aimed at improving human dynamics (e.g. team building activities) or measures aimed at improving customer requirements such as partnering (as a procurement option).

From the contractor's perspective, there needs to be a closer monitoring of the risk management practices by the CRB. The underlying premise is that, since the establishment of the CRB, which is currently the only board which deals with contractors' registration in Tanzania, the duties of monitoring the RAMP activities could be extended to its portfolio. It is assumed that the concept of registration criteria can successfully be adopted by stakeholders and help to improve quality of registration criteria through multiplier and accelerator principle to success, therefore improving the local contractor's performance at large.

8. Recommendation for further research

As observed by Chileshe and Yirenki-Fianko (2012), using the case of Ghana as an example, when it comes to developing countries, they are no clear-cut solutions to the use of RAMP. However, the following recommendations which will be of benefit to

consultants, contractors, clients, practitioners and the general public for the usage of an effective RAMP in Tanzanian constructional related organisations are suggested:

- *Awareness campaign* – the relevant regulating boards such as the CRB, AQRB, and ERB representing the contractors, "architects and quantity surveyors" and engineers professions, respectively, should introduce training programmes associated with RAMP as well as focus on mechanisms (such as workshops and seminars) that are aimed at sensitisation of their members on the benefits of implementation of RAMP.
- *Best practice* – as proposed by Agyakwa-Baah and Chileshe (2010), research should be carried out on construction organisations that have successfully implemented RMP in developing countries as case studies to identify the CSFs that helped them succeed and the challenges they faced and how they overcame them. The resultant findings could be used as best practice or guidelines for risk management deployment within developing economies.
- *Training* – construction professionals need to specialise in risk management and set up consulting practices so that others can seek expert advice and assistance on how to carry out the RMP on projects. One notable area found wanting is the handling of risk. As observed by Debrah and Ofori (2005, p. 1407), Tanzanian construction professionals lack the ability to handle risk, manage employees and prepare strategic corporate plans with accurate projections of demand. Some of these competencies are indirectly linked to risk management. For example, the first step within the risk management framework is that of "establishing the context", and this involves the identification of key stakeholder demands and also provides organisations the opportunities for prioritising these demands within a framework of constrained resources. Other studies such as Johnson and Scholes (2001), Luu *et al.* (2008) and Agyakwa-Baah and Chileshe (2010) have shown the linkages between strategic management and risk management. Therefore, the need for further training in "preparation of strategic corporate plans" is also rooted in risk management aspects such as analysis of the markets and environmental analysis (Johnson and Scholes, 2001), and the CSFs of "consideration of external and internal environment" (Agyakwa-Baah and Chileshe, 2010). Furthermore, the results of the survey shows that "Goals and strategic objectives of the organizations" as one of highly ranked CSFs by the respondents.
- *Joint ventures* – studies such as Egmond (2012, p. 455) and Chiragi (2000) have shown that collaborating with foreign contractors can act as a vehicle for acquiring further skills for the Tanzanian employees. Against that background, this research recommends that, where possible, those seeking to improve their project management, including risk assessment and management techniques would be better placed in targeting such opportunities of "joint venture ship". As previously noted by Chiragi (2000, p. 2), traditionally, the country (Tanzania) has depended on foreign institutions to train her indigenous professionals and contractors and consultants to execute big construction projects. This would further enhance their opportunities to external exposure, which according to Debrah and Ofori (2005) is lacking among the local Tanzanian practitioners.

Future research should attempt to differentiate the perceptions of the CSFs across the different groupings, as each class of contractors (according to grading) as well as ownership (local or foreign) may have its own challenges and problems in their

approach to RAMP, despite the fact that all of the respondents (including contractors) were drawn from the relevant registration bodies. As pointed out by the MoW (2003), foreign contractors have undue competitive advantage over the local contractors as evidenced through ownership of the market share with 62 per cent attributed to foreign contractors, and the remainder, 32 per cent to local contractors. This advantage further extends to the competence related issues. It could thus be argued, the approach to risk management needs to be differentiated.

9. Limitations of the study

While the study makes *sev*eral contributions to risk management theory and practice, several limitations of the research need to be acknowledged. The limitations of the study relate to the sample data, snap shot nature of studies, and assumptions undertaken. First, this study did not distinguish between local organisations (i.e. contractors) and those that tended to collaborate with the foreign contractors as skills levels among the employees tended to differ, with Tanzanian contractors working with foreign contractors been the more experienced (Egmond, 2012). Furthermore, 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 CSFs identified in this study are generic.

There are several limitations related to the sample. First, the sample consisted of organisations in one industry, namely construction operating in Tanzania. Consequently, the findings may not generalise to other industries or organisations operating in other East African or SAA countries. Second, there is the issue of population validity which refers to whether the sample is representative and whether the results are significant. Although the sample of this study (66) was limited, the findings represent a snapshot of the uptake and CSFs necessary for the implementation of RAMP. However, the use of quantitative approaches normally requires a large number of cases representing the population of interest, in order to determine the statistical significance of the results. Furthermore, cross-section studies as this one only captures the perception of Tanzanian construction professionals at a point in time. One of the limitations of a cross-section study of complex concepts such as CSFs and RAMP involves the view points of multiple actors over time. The other limitation is that, some aspects related to the organisations and historical contexts within the implementation of RAMP are not captured. However, despite the noted limitations, the study does provide some valuable insights on the CSFs associated with the implementation of RAMP.

Third, this study relied on the usage of self-report data and indicators of the construct are sensitive and difficult for respondents. As observed by Cassell *et al.* (2002), surveys based on the self-reported views of a single representative of a company may not provide reliable estimates of the CSFs necessary for the implementation of RAMP. However, 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 that has examined the implementation issues associated with RAMP within both the developed and developing economies.

Finally, the study is based on the assumption that adoption of the identified CSFs will lead to the effective implementation of RAMP. The premise of this assumption is based on the evidence from the literature review as a number of studies have provided support for this school of thought. However, to further confirm this assumption within the context of the Tanzanian construction industry, future studies should employ

rigorous statistic analysis such as correlation, regression analysis and factor analysis. These parametric tests such as Pearson correlation and multivariate techniques (multiple regression and factor analysis) will provide the desirable support for the testing of the proposition that there is a significant positive relationship between each of the ten CSFs and effective implementation of RAMP. This would enable the exploration of the linkages between implementation of RAMP and enhanced project performance. It is further suggested that future studies should be longitudinal in nature in order to draw the casual inferences between adoption of RAMP and delivery of greater project success. Secondly, as previously noted, the application of factor analysis would establish the existence of casual connections among the CSFs. According to Nandhakumar (1996), this would enable the interpretation of these CSFs in a dynamic context, rather that the static one.

References

Adams, F.K. (2008), "Risk perception and Bayesian analysis of international construction contract risks: the case of payment delays in a developing economy", *International Journal of Project Management*, Vol. 26 No. 2, pp. 138-148.

Agyakwa-Baah, A. and Chileshe, N. (2010), "Critical success factors for risk assessment and management practices (RAMP) implementation within the Ghanaian construction organizations", in Wang, Y., Yang, J., Shen, G.Q.P. and Wong, J. (Eds), *Proceedings of the 8th International Conference on Construction and Real Estates Management (ICCREM 2010), Leading Sustainable Development Through Construction and Real Estates Management', 1st-3rd December 2010, Brisbane (ISBN 978-7-112-12612-5)*, China Architecture & Building Press, Beijing, Vol. 1, pp. 345-352.

Ahadzie, D.K., Proverbs, D.G. and Olomolaiye, P.O. (2008), "Critical success criteria for mass house building projects in developing countries", *International Journal of Project Management*, Vol. 26 No. 6, pp. 675-687.

Ahmed, A., Kayis, B. and Amornsawadwatana, S. (2007), "A review of techniques for risk management in project", *Benchmarking: An International Journal*, Vol. 14 No. 1, pp. 22-36.

Aje, O.I., Odusami, K.T. and Ogunsemi, D.R. (2009), "The impact of contractors management capability on cost and time performance of construction projects in Nigeria", *Journal of Financial Management of Property and Construction*, Vol. 14 No. 1, pp. 171-187.

Akintoye, A., Beck, M., Hardcastle , C., Chinyio, E. and Assenova, D. (2001), *Framework for Risk Assessment of Private Finance Initiative Projects. Report of an EPSRC Sponsored Research Project*, Glasgow University, Glasgow, p. 10.

Akintoye, A.S. and MacLeod, M.J. (1997), "Risk analysis and management in construction", *International Journal of Project Management*, Vol. 15 No. 1, pp. 31-38.

Belassi, W. and Tukel, O. (1996), "A new framework for determining critical success-failure factors in projects", *International Journal of Project Management*, Vol. 14 No. 3, pp. 141-151.

Besner, C. and Hobbs, B. (2012), "The paradox of risk management; a project management practice perspective", *International Journal of Managing Projects in Business*, Vol. 5 No. 2, pp. 230-247.

Carter, R.K. (1986), "General review project management", *Facilities*, Vol. 4 No. 12, pp. 37-44.

Cassell, C., Nadin, S., Gray, M. and Clegg, C. (2002), "Exploring human resources management practices in small and medium sized enterprises", *Personnel Review*, Vol. 31 No. 6, pp. 671-692.

Chen, F. (1999), "Critical success factors for various strategies in the banking industry", *International Journal of Banking Marketing*, Vol. 17 No. 2, pp. 83-91.

Cheung, E., Chan, A.P.C., Lam, P.T.I., Chan, D.W.M. and Ke, Y. (2012), "A comparative study of critical success factors for public private partnerships (PPP) between Mainland China and the Hong Kong special administrative region", *Facilities*, Vol. 30 Nos 13/14, pp. 647-666.

Chileshe, N. and Dzisi, E. (2012), "Benefits and barriers of construction health and safety management (HSM): perceptions of practitioners within design organisations", *Journal of Engineering Design and Technology*, Vol. 10 No. 2, pp. 276-298.

Chileshe, N. and Yirenki-Fianko, A.B.E. (2012), "An evaluation of risk factors impacting construction projects in Ghana", *Journal of Engineering Design and Technology*, Vol. 10 No. 3, pp. 306-329.

Chua, D.K.H., Kog, Y.C. and Loh, P.K. (1999), "Critical success factors for different project objectives", *Journal of Construction Engineering and Management*, Vol. 125 No. 3, pp. 142-150.

Chijoriga, M.M. (2011), "Application of multiple discriminant analysis (MDA) as a credit scoring and risk assessment model", *International Journal of Emerging Markets*, Vol. 6 No. 2, pp. 132-147.

Chiragi, F.V. (2000), "Building construction industry in Tanzania-case study: youth sports centres complex at Mwananyamala, Dar-es-salaam", alumni papers series, Lund University, Lund, available at: www.lth.se/fileadmin/hdm/alumni/papers/icm2000/ICM2000-17.pdf (accessed 29 December 2012).

CRB (2010), *Constructors Registrations Board Consultative Meeting: Capacity and Competence of Contractors' – A Key to Sustainable Infrastructure Development*, Colour Print (T) Limited, Dar es salaam.

Cronbach, L.J. (1951), "Coefficient alpha and the internal structure of tests", *Psychometrika*, Vol. 16, pp. 297-334.

Dada, J.O. and Jagboro, G.O. (2007), "An evaluation of risk factors impacting construction cash flow forecast", *Journal of Financial Management of Property and Construction*, Vol. 12 No. 1, pp. 37-44.

Debrah, Y.A. and Ofori, G. (2005), "Emerging managerial competencies of professionals in the Tanzanian construction industry", *The International Journal of Human Resource Management*, Vol. 16 No. 8, pp. 1399-1414.

Debrah, Y.A. and Ofori, G. (2006), "Human resource development of professionals in an emerging economy: the case of the Tanzanian construction industry", *The International Journal of Human Resource Management*, Vol. 17 No. 3, pp. 440-463.

Deros, MD B., Yusof, S.M. and Salleh, Md.A. (2006), "A benchmarking implementation framework for automotive manufacturing SMEs", *Benchmarking: An International Journal*, Vol. 13 No. 4, pp. 396-430.

Edwards, P.J. and Bowen, P.A. (1998a), "Risk and risk management in construction: a review and directions for research", *Engineering, Construction and Architectural Management*, Vol. 5 No. 4, pp. 339-349.

Edwards, P.J. and Bowen, P.A. (1998b), "Practices, barriers and benefits of risk management process in building services costs estimation: comment", *Construction Management and Economics*, Vol. 16 No. 1, pp. 105-108.

Egmond, E.V. (2012), "Case studies of construction technology development and innovation in developing countries", in Ofori, G. (Ed.), *Contemporary Issues in Construction in Developing Countries*, Spoon Press, Taylor & Francis, London and New York, NY, pp. 442-477.

Elseth, B.O. and Hamann, R.J. (1999), "An evaluation of risk management tools", *The Cost Engineer*, Vol. 37 No. 4, pp. 13-18.

Enshassi, A., Al-Najjar, J. and Kumaraswamy, M. (2009), "Delays and cost overruns in the construction projects in the Gaza strip", *Journal of Financial Management of Property and Construction*, Vol. 14 No. 2, pp. 126-151.

Famakin, I.O., Aje, I.O. and Ogunsemi, D.R. (2012), "Assessment of success factors for joint venture construction projects in Nigeria", *Journal of Financial Management of Property and Construction*, Vol. 17 No. 2, pp 153-165.

Fortune, J. and White, D. (2006), "Framing of project critical success factors by a systems model", *International Journal of Project Management*, Vol. 24 No. 1, pp. 53-65.

Frimpong, Y., Oluwoye, J. and Crawford, L. (2003), "Causes of delay and cost overruns in construction of groundwater projects in a developing countries; Ghana as a case study", *International Journal of Project Management*, Vol. 21 No. 5, pp. 321-326.

Hwang, B-G, Zhao, X. and Toh, L.P. (2014), "Risk management in small construction projects in Singapore: status, barriers and impact", *International Journal of Project Management*, Vol. 32 No. 1, pp. 16-124, available at: http://dx.doi.org/10.1016/j.ijproman.2013.01.007

Ika, L.A., Diallo, A. and Thuillier, D. (2012), "Critical success factors for World Bank projects", *International Journal of Project Management*, Vol. 30 No. 1, pp. 105-116.

Ikediashi, D.I., Ogunlana, S.O., Boateng, P. and Okwuashi, O. (2012), "Analysis of risks associated with facilities management outsourcing: a multivariate approach", *Journal of Facilities Management*, Vol. 10 No. 4, pp. 301-316.

Johnson, G. and Scholes, K. (2001), *Exploring Corporate Strategy*, 6th ed., Prentice Hall, London.

Kikwasi, G.J. (1999), "The selection of project procurement system in the Tanzanian construction industry", unpublished masters dissertation, University of Dar es Salaam, Dar es Salaam.

Kikwasi, G.J. (2012), "Causes and effects of delays and disruptions in construction projects in Tanzania", in Chileshe, N. et al (Eds), *Proceedings of the 6th International Conference and Workshop on Built Environment in Developing Countries "Fragmented Futures: The Built Environment in a Volatile World", 4-5 December*, University of South Australia, Adelaide, pp. 138-148.

Kim, S. and Bajaj, D. (2000), "Risk management in construction: an approach for contractors in South Korea", *Cost Engineering*, Vol. 42 No. 1, pp 38-44.

Kululanga, G. and Kuotcha, W. (2010), "Measuring project risk management process for construction contractors with statement indicators linked to numerical scores", *Engineering, Construction and Architectural Management*, Vol. 17 No. 4, pp 336-351.

Larsen, M.A. and Myers, M.D. (1999), "When success turns into failure: a package-driven business process re-engineering project in the financial services industry", *Journal of Strategic Information Systems*, Vol. 8 No. 4, pp. 395-417.

Lema, N.M. (2008), *Project Management Practice in Engineering Performance and Future Challenges*, University Press, Dar es Salaam.

Lester, A. (2007), *Project Management, Planning and Control*, 5th ed., Elsevier Ltd/Butterworth-Heinemann, Amsterdam, Boston, MA/London.

Ling, F.Y.Y. and Hoang, V.T.P. (2012), "Project risks faced in international construction projects in developing countries – case study of Vietnam", in Ofori, G. (Ed.), *Contemporary Issues in Construction in Developing Countries*, Spoon Press, Taylor & Francis, London and New York, NY, pp. 347-375.

Liu, A.M.M. and Cheung, S.O. (1994), "Perceptions of risk distribution in construction contracts", in Rowlinson, S. (Ed.), *Proceedings: CIB International Symposium. Commission W92 Procurement Systems – 'East Meets West*, Department of Surveying, University of Hong Kong, Hong Kong, pp. 35-42.

Liu, J., Li, B., Lin, B. and Nguyen, V. (2007), "Key issues and challenges of risk management and insurance in China's construction industry – an empirical study", *Industrial Management & Data Systems*, Vol. 107 No. 3, pp. 382-396.

Luu, T., Kim, S., Cao, H. and Park, Y. (2008), "Performance measurement of construction firms in developing countries", *Construction Management and Economics*, Vol. 26 No. 4, pp. 373-386.

Lynos, T. and Skitmore, M. (2004), "Project risk management in the Queensland engineering construction industry: a survey", *International Journal of Project Management*, Vol. 22 No. 1, pp. 51-61.

Manelele, I. and Muya, M. (2008), "Risk identification on community-based construction projects in Zambia", *Journal of Construction*, Vol. 12 No. 1, pp. 2-7.

Mansfield, N.R. and Sasillo, S.M. (1990), "International construction contracts in Tanzania", *International Journal of Project Management*, Vol. 8 No. 2, pp. 90-94.

Materu, S.N and Uriyo, A. (2000), "Overview of contractors performance in 1999", paper presented to the Contractors Registration Board Tanzania, Annual Workshop, Dar es salaam.

Mills, A. (2001), "A Systematic approach to risk management for construction", *Structural Survey*, Vol. 19 No. 5, pp 245-252.

Ministry of Works (MoW) (2003), "Construction industry policy", Government printer, Dar es Salaam, available at: www.ncc.co.tz/CI-P.pdf (accessed 17 December 2012).

Mok, C.K., Rao Tummala, V.M. and Leung, H.M. (1997), "Practices, barriers and benefits of risk management process in building services cost estimation", *Construction Management and Economics*, Vol. 15 No. 2, pp. 161-175.

Msita, K.M.I.M. (1997), "Performance of the construction industry in Tanzania from 1992 to 1996", *Journal of National Construction Council*, Vol. 1 No. 4, pp. 10-14.

Nandhakumar, J. (1996), "Design for success?: Critical success factors in executive information systems development", *European Journal of Information Systems*, Vol. 5 No. 1, pp. 62-72.

Nkado, R.N. (2010), "Cost escalation of major infrastructure projects: a case study of Soccer City Stadium in Johannesburg", in Laryea, S., Leiringer, R. and Hughes, W. (Eds), *Proceedings West Africa Built Environment Research (WABER) Conference, 27-28 July*, West Africa Built Environment Research (WABER) Conference, C/O School of Construction Management and Engineering, University of Reading, London, pp. 265-270.

Nunnally, J. (1978), *Psychometric Theory*, 2nd ed., McGraw-Hill, New York, NY.

Ofori, G. (2012a), "The construction industries in developing countries – strategic review of the book", in Ofori, G. (Ed.), *Contemporary Issues in Construction in Developing Countries*, Spoon Press, Taylor & Francis, London and New York, NY, pp. 1-15.

Ofori, G. (2012b), "Built environment research and the millennium development goals", in Laryea, S., Leiringer, R. and Hughes, W. (Eds) *Proceedings West Africa Built Environment Research (WABER) Conference, 27-28 July*, West Africa Built Environment Research (WABER) Conference, C/O School of Construction Management and Engineering, University of Reading, London, pp. 9-25.

Pinto, J.K. and Covin, J.G. (1989), "Critical factors in project implementation: a comparison of construction and R&D projects", *Technovation*, Vol. 9 No. 1, pp. 49-62.

Richard, E., Chijoriga, M., Kaijage, E., Peterson, C. and Bohman, H. (2008), "Credit risk management system of a commercial bank in Tanzania", *International Journal of Emerging Markets*, Vol. 3 No. 3, pp. 323-332.

Rochart, J.F. (1979), "Chief executives define their own data needs", *Harvard Business Review*, Vol. 57 No. 2, pp. 81-93.

Rwelamila, P.D., Talukhaba, A.A. and Ngowi, A.B. (1999), "Tracing the African project failure syndrome: the significance of 'Ubuntu' ", *Engineering, Construction and Architectural Management*, Vol. 6 No. 4, pp 335-346.

Salaheldin, I.S. (2009), "Critical success factors for TQM implementation and their impact on performance of SMEs", *International Journal of Productivity and Performance Management*, Vol. 58 No. 3, pp. 215-237.

Salewi, K.W. (2003), "Project management system within total quality management framework in the Tanzanian construction industry", dissertation prepared for the degree of doctor of philosophy, Washington International University, Washington, DC.

Santoso, D.S., Ogunlana, S.O. and Minato, T. (2003), "Assessment of risks in high rise building construction in Jakarta", *Engineering, Construction and Architectural Management*, Vol. 10 No. 1, pp. 43-55.

Simkoko, E.E. (1992), "Managing international construction projects for competence development within local firms", *International Journal of Project Management*, Vol. 10 No. 1, pp. 12-22.

SPSS Inc (2002), *SPSS 11.0 Statistical Algorithms*, SPSS Inc, Chicago, IL.

Tabish, S.Z.S. and Jha, K.N. (2011), "Identification and evaluation of success factors for public construction projects", *Construction Management and Economics*, Vol. 29 No. 8, pp. 809-823.

Tang, W., Qiang, M., Duffield, C.F., Young, D.M. and Lu, Y. (2007), "Risk management in the Chinese construction industry", *Journal of Construction Engineering and Management*, Vol. 133 No. 12, pp. 944-956.

Tata, J., Prasad, S. and Thorn, R. (1999), "The influence of organisational structure on the effectiveness of TQM programs", *Journal of Managerial Issues*, Vol. 11 No. 4, pp. 440-453.

Tchankova, L. (2002), "Risk identification – basic stage in risk management", *Environmental Management and Health*, Vol. 13 No. 3, pp 290-229.

Toor, S.-u.-R. and Ogunlana, S.O. (2009), "Construction professionals' perception of critical success factors for large construction projects", *Construction Innovation: Information, Process, Management*, Vol. 9 No. 2, pp. 149-167.

Toor, S., Ogulana, S.O. and Ofori, G. (2012), "Leadership and its development in construction in developing countries", in Ofori, G. (Ed.), *Contemporary Issues in Construction in Developing Countries*, Spoon Press, Taylor & Francis, London and New York, NY, pp. 242-267.

United Republic of Tanzania (URT) (2006), *Construction Industry Policy*, Ministry of Works, Government Printer, Dar es Salaam.

Wang, S., Dulaimi, M. and Aguira, M. (2004), "Risk management framework for construction projects in developing countries", *Construction Management and Economics*, Vol. 22 No. 3, pp. 237-252.

Wang, J. and Yuan, H. (2011), "Factors affecting contractors' risk attitudes in construction projects: case study from China", *International Journal of Project Management*, Vol. 29 No. 2, pp. 209-219.

Watermeyer, R. (2012), "The critical role of consulting firms in acceleration of infrastructure delivery and the improvement of the quality of life", in Ofori, G. (Ed.), *Contemporary Issues in Construction in Developing Countries*, Spoon Press, Taylor & Francis, London and New York, NY, pp. 282-324.

White, D. and Fortune, J. (2002), "Current practice in project management-an empirical study", *International Journal of Project Management*, Vol. 20 No. 1, pp. 1-11.

Yang, J., Shen, G.Q., Ho, M., Drew, D.S. and Chan, A.P.C. (2009), "Exploring critical success factors for stakeholder management in construction projects", *Journal of Civil Engineering and Management*, Vol. 15 No. 4, pp. 337-348.

Yirenkyi-Fianko, A.B., Chileshe, N. and Stephenson, P. (2012), "Critical success factors of risk assessment and management processes (RAMP) implementation in Ghanaian construction related organisations", *International Journal of Project Organisation and Management*, Vol. 4 No. 4, pp. 379-396.

Yuan, H., Shen, L. and Wang, J. (2011), "Major obstacles to improving the performance of waste management in China's construction industry", *Facilities*, Vol. 29 Nos 5/6, pp. 224-242.

Zou, P.X.W., Chen, Y. and Chan, T. (2010), "Understanding and improving your risk management capability: assessment model for construction organizations", *Journal of Construction Engineering and Management*, Vol. 136 No. 8, pp. 854-863.

Zwikael, O. (2009), "Critical planning processes in construction projects", *Construction Innovation: Information, Process, Management*, Vol. 9 No. 4, pp 372-387.

Further reading

Aniekwu, A.N. and Audu, H.O. (2010), "The effects of management on productivity: a comparative study of indigenous and foreign firms in the Nigerian construction industry", in Laryea, S., Leiringer, R. and Hughes, W. (Eds), *Proceedings West Africa Built Environment Research (WABER) Conference, 27-28 July*, West Africa Built Environment Research (WABER) Conference, C/O School of Construction Management and Engineering, University of Reading, London, pp. 567-578.

Fellows, R., Langford, D., Newcombe, R. and Urry, S. (2001), *Construction Management in Practice*, 2nd ed., Blackwell Science Ltd, London.

Lee, A., Wu, S., Cooper, R. and Aouad, G. (2000), "The process protocol, a solution for the problems of construction", available at: www.processprotocal.com (accessed 24 November 2012).

Project Management Institute (2008), *A Guide to the Project Management Body of Knowledge*, Project Management Institute, Newtown Square.

Zulu, S. and Chileshe, N. (2010), "Service quality of building maintenance contractors in Zambia: a pilot study", *International Journal of Construction Management*, Vol. 10 No. 3, pp. 63-81.

About the authors

Dr Nicholas Chileshe is a Senior Lecturer in Construction & Project Management in the School of Natural and Built Environment at the University of South Australia. He is also the Research Education and Portfolio Leader and Program Director responsible for the doctorate in project management. Nicholas obtained his PhD in construction management from the Sheffield Hallam University in 2004. Prior to his appointment in July 2009, he was at the Sheffield Hallam University (UK) from 1999 to 2009 where he also served as the course leader for the BSc (Hons) Construction Commercial Management programme within the Built Environment Division and an Assistant Program Leader for the MSc in construction programme. Dr Chileshe is also a Fellow of the Chartered Institute of Building (FCIOB), Fellow of the Australian Institute of Building (FAIB), Fellow of the Association of Building Engineers (FEBng), Fellow of the Higher Education Academy (FHEA), Member of the Chartered Institute of Management (MICM), and Member of the Australian Institute of Project Management (MAIPM). Nicholas's ongoing professional involvement includes membership and Chair of the Australasian Education Committee, and the CIOB International Accreditation Panel; and as acted as a PhD external examiner for Universities in South Africa and Australia. He also regularly reviews proposals for the National Research Foundation (NRF) in South Africa, and the Higher Education Academy (UK). His current research interests include total quality management, sustainability, construction management, risk and value management, project management and project success. Dr Nicholas Chileshe is the corresponding author and can be contacted at: Nicholas.Chileshe@unisa.edu.au

Dr Geraldine John Kikwasi is a Senior Lecturer in Construction & Project Management in the School Construction Economics and Management and the Director of Gender Dimension Unit at

Ardhi University, Dar es Salaam, Tanzania. She holds a PhD in management science and engineering (construction project management) from the Beijing University of Technology (BJUT) in 2005, and masters in engineering management project management from the University of Dar es Salaam in 1999. Prior to joining the Ardhi University as a Lecturer in 2006, she worked with Ardhi University as part-time lecturer from 2003. She also works on various construction projects in Tanzania as a consultant. Dr Kikwasi is also a registered quantity surveyor with the Architects and Quantity Surveyors' Registration Board of Tanzania; Vice Chairperson Board of Directors of Architects and Quantity Surveyors' Registration Board of Tanzania; Honorary Secretary and an Associate Member of Tanzania Institute of Quantity Surveyors (TIQS), Vice President of Association of Construction Schools of Southern Africa (ASOCSA), and an Associate Member of Tanzania Institute of Arbitrators and panel member of National Construction Council arbitrators. Dr Kikwasi also has been involved as an external examiner of masters and PhD dissertations/thesis for various universities in South Africa. Her areas of research interest include: construction management, risk management, health and safety in construction, gender and construction, construction skills and project management.