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An Assessment of the Risk Management Capability Level of Building Contractors

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The capability of a contractor to successfully manage risks that arise in building construction projects reduces the negative consequence and impact of the risk events on the objectives of the project. As potential risk factors on construction projects are many and dissimilar, it is vital to have proper understanding of the capability of the contractors handling those risks. The aim of this research is to assess the capability of contractors in the Nigerian construction industry with a viewing to establishing and improving the contractors about their performance in risk management. The study reviewed literature and conducted questionnaire survey. The questionnaires were distributed to 75 Building Contractors in Kaduna state where 61 of the questionnaires were retrieved. The findings from the research showed that the contractors have attained "Very High" capability in: "Experience from previous projects" and "Abilities of carrying out RM", "Moderate" capability in: "Well defined RM responsibilities within the organisation", "Formal RM steps", "Realisation of RM in every stage of a project", "Availability of a RM system", "Diffusion of RM" and "Allocation of adequate budget" and "Low" capability in: "Documentation of RM in every project". Results also showed that there is need for the firms to define clearly RM responsibilities within the organisation. The contractors should also improve their documentation of RM. There is also need for the firms to provide formal RM steps.

Keywords: risk events, building construction projects, capability, risk management performance, contractors.

Introduction

The occurrence of uncertainty in our daily activities as well as in our organisations has become a vital issue and to manage it appropriately has become a challenge. Due to the changing and intricate environment that occur around organisations, uncertainty becomes a vital concern that must be considered for the successful reaslisation of any project (Rohaninejad & Bagherpour, 2013). Hillson (2004) indicated that uncertainty and risk are connected. Risk is a degree of probability and severity of adverse effects (Hubbard, 2009; Aven, 2011) affecting project objectives at different stages (Baloi & Price, 2003; Nielsen, 2006). Risk may be a complicated notion (Wang & Yuan, 2011), which is now a concern for any organisation. In the construction industry, risks are inescapable and they occur throughout the life cycle of the construction projects and the organisations are expected to manage them pre-emptively (Tah & Carr, 2001a; Goh, Abdul-Rahman & AbdulSamad, 2013; Zhao, Hwang & Low, 2013). Even though some risks are associated with negative results, not all risks have negative impact.

In the construction industry, it is necessary for organisations to have a transparent knowledge of their real risk management performance so as to be able to define their goals and a precise approach for risk management according to their proficiency (Zou, Chen & Chan, 2010).

Mafakheri, Breton and Chauha (2012) argued that if an organisation is vastly capable in project risk management, the

magnitude of the risk impacts on project performance objectives will be greatly reduced. Therefore, due to the numerous and diverse probable risk factors on construction projects, it is important to have proper understanding of the risk management capability of the contractors. There are few studies on the assessment of risk management capability of contractors in developing countries. Hence, this paper seeks to assess the risk management capability of the building contractors in Nigeria.

Mu et al. (2013) indicated that it is very important to properly understand the ability of contractors to manage risk due to the high risk nature of the construction industry. Results of this research will inform contractors about their performance in RM and allow them to improve the RM performance of their firms.

The aim of this research is to assess the risk management capability of building contractors in Nigeria through: (i.) Identification of the criteria for assessing risk management capability of building contractors. (ii.) Identifying the attributes and dimensions of risk management capability for effective assessment of risk management capability of building contractors. (iii.) Establishing the extent to which each attribute is met by the firms. (iv.) Identifying areas of strength and areas requiring improvement in the RM practices of the firms.

Related Past Research

Risk management capability is the level of intricacy that an organisation possesses in comprehending its risk cases, managing the risks that arise and dealing with the subsequent complications of those risks through its in-house professional continuousness systems (Zou *et al.*, 2009). The capability was assessed by using various sets of models which measure the levels of capability in different areas, which include risk. The models used include the Organisational Project Management Maturity Model (OPM3®) developed by the Project Management Institute (PMI®), the Portfolio, Programme and Project Management maturity Model (P3M3®) and the PRINCE2 Maturity Model (P2MM®), which were both developed by the UK Office for Government Commerce. The International Project Management Association (IPMA) developed its own Project Excellence Model (Hopkinson, 2012). The aim is to objectively target the organisations' risk management capabilities compared to a set of accepted criteria, a largely established framework, so as to promote advancement concerning increase in capability (Hillson, 1997). Although various capability models are in existence, what they share in common is the segmenting of capability into distinctive levels, often four or five, characteristically comprising an initial and ad hoc level, a repeatable level, a managed level and finally an optimized level. Each phase indicates the capability of the organisation to manage risks.

In order to ascertain which phase an organisation has attained, a questionnaire is typically filled out where one is required to rank various risk attributes on a rated scale. The subjective averages are then used to assign the results to one of the above-mentioned levels (Zou *et al.*, 2009). Hopkinson's (2012) Project Risk Maturity Model (RMM) follows a related course, it is split into four different levels: Naïve (Level 1), Novice (Level 2), Normalised (Level 3) and Natural (Level 4). The first level for a project risk management process is very easy to reach but it is as well profoundly defective and most at times does not increase value. In the novice stage, the project risk management process has an effect on results that steer advancements measured against project goals. Although value may be added, faults that arise either in the design of the process or in its execution hamper it from reaching the desired benefits. In the third stage which is the normalized phase, the risk management process has been schematised and is adopted in a systematic technique. Value is achieved by the execution of effectual management reactions to substantial sources of ambiguity that tend to influence the accomplishment of

the project's goals. In the fourth and peak phase, the risk management process has led to a choice of risk-proficient tactical results in devising project goals and determining between distinctive project results or deliverance (Hopkinson, 2012).

A capability model is progressive, it is composed of a number of stages in which the intricacy phase is increased from one level to another in search of excellence (Serna, 2012). In general, a risk capability model is a tool developed to assess the risk management capability of an organisation (Hopkinson, 2011).

Research Methodology

The study adopted a quantitative research approach using a questionnaire to elicit data from respondents. The questionnaire was used for the purpose of collecting data relevant to the capabilities of the Nigerian Building Contractors. The questionnaire was carefully designed in a way that each question is stated clearly, precisely and simple to understand. There are two main parts in the questionnaire. The first part contains questions relating to the general information about the respondents' demographic profile and organisational detail. The second part was designed to assess the Risk Management Capability of the Nigerian building contractors.

The questionnaire was designed using six (6) factors which were obtained from models developed by individuals and organisations found in literature. The factors were further broken down into twenty-three (23) sub-factors as obtained from literature. The respondents were then requested to choose the most appropriate answers. For each question the respondents had been provided with five options in form of Likert scale (1 to 5). The options indicate the level of existence of each criterion in the firms.

As it is not possible to consider the entire population due to time and other logistic reason as mentioned above, the sample size required from the population was ascertained based on statistical principles. A probabilistic or random sampling method known as stratified sampling was strategically employed for the sample size study and the main advantage of using random sampling is its simplicity.

Data analysis method

Descriptive statistics was used to produce frequency counts of the occurrences in the form of tables and bar charts. Measures of central tendency (means) were computed. The six capability areas were also ranked in accordance to their computed means values.

For the purpose of explanation; the Arithmetic mean scored "1" depicts very low capability, "2" low capability, "3" moderate capability, "4" high capability and "5" very high capability (Umar, 2014). But if the issue is scored "1.3" then it will consider to be between very low capability and low capability but tends more towards very low (Umar, 2014). In addition, if the variable was scored "4.3" then it lies within high capability and very high capability but tends more to the high capability (Umar, 2014) in line with assessing the RM capability of the Nigerian Contractors.

Results and discussion

The result of the survey in Figure 1 shows that (95.1%) of the respondents are male and (4.9%) of them are female. It also shows that 24 of the respondents (39.3%) have National Diploma whereas 27 (44.3%) of them have First Degree and 7 (11.5%) have Master's Degree and 3 have (4.9%) Doctorate Degree. It presents the distribution of the respondents' working experience. According to the result of the analysis, 26 (42.6%) of them have 1 to 5 years of experience, 16 (26.2%) have 6 to 10 years while 10 (16.4%) are between 11 to 15 years, 5 (8.2%) are within 16 to 20 years of experience and 4 out of the total number of respondents indicating (6.6%) have over 20 years of experience. These further validate the cogency of the research as the opinions received from the respondents cut across lower to higher experience personnel. Finally, it shows that 8 of the respondents (which constitute 13.1%) are Architect, 16 (26.2%) are Quantity Surveyors, 10 (16.4%)

are Engineers, while 25 (41.0%) are Project Managers and 2 (3.3%) Procurers. This can be deduced that majority of the respondents are Project Managers.

Ranking of Results

The capability attributes identified from the literature were presented in the questionnaire and the respondents rated them using Likert scale of 1-5 as such; 1 (Very Low), 2 (Low), 3 (Moderate), 4 (High) and 5 (Very High). Therefore, the more the mean tends to 5, the more it attained hence more RM capability in the Nigerian Contractors whereas the more it tends to 1 the less it has attained RM capabilities in the firms. The frequency of occurrences was calculated, mean scores and ranking of the responses were also computed to allow for further analysis of the result.

Commitment of organisation members to policy & RMP

The ranking of culture shows that *Commitment of organisation members to policy & RMP* is ranked highest with a mean of 4.41, a standard deviation of 1.00. Then it is followed by *Trust/confidence of organisation members towards RMP* which has a mean of 4.01, a standard deviation of 0.90. *Awareness of RM value by members of the organisation* comes third with a mean of 3.65 with a standard deviation of 1.07. *Attitude to RMP* comes next with a mean of 3.53, a standard deviation of 0.96. *Well defined RM responsibilities within the organisation* which has a mean of 3.11 is ranked lowest with a standard deviation of 1.17.

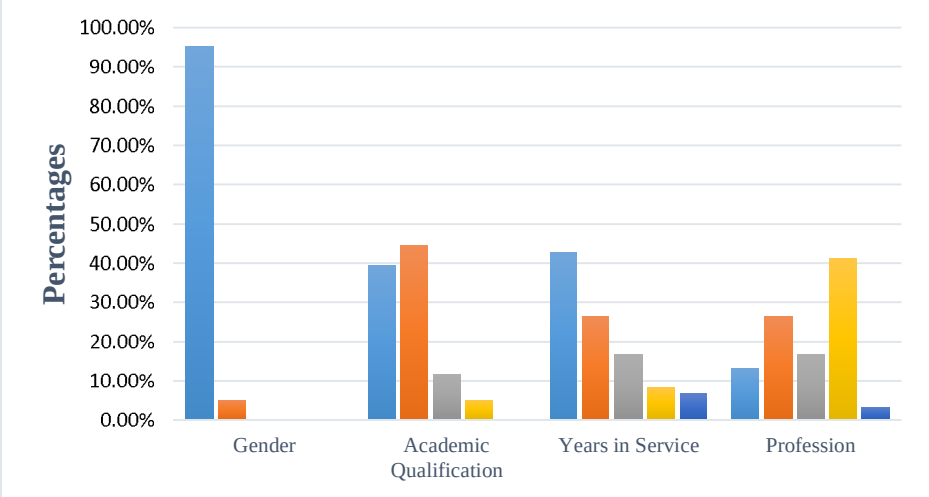

Figure 1: Demography of Respondents

Table 1: Means/ranking of responses to assess culture

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Commitment of organisation members to policy & RMP	61	4.41	1.00	High	1
Trust/confidence of organisation members towards RMP	61	4.01	0.90	High	2
Awareness of RM value by members of the organization	61	3.65	1.07	High	3
Attitude to RMP	61	3.53	0.96	High	4
Well defined RM responsibilities within the organization	61	3.11	1.17	Moderate	5

RM from the beginning of every project

In the ranking of practice and application, *Adequate planning of RM from the beginning of every project* which has a mean of 3.81 is ranked highest, a standard deviation of 1.06. Then it is followed by *Application of RM at every stage of the project* having a mean of 3.71 with a standard deviation of 0.84. *Scope of the RMP covers every aspect of RM* is ranked next with a mean of 3.53, a standard deviation of 1.01 and *Formal RM steps* having a mean of 2.97 is ranked lowest with a standard deviation of 1.14.

Abilities for carrying out RM

Ranking of knowledge shows that *Abilities for carrying out RM* has a mean of 4.56 with a standard deviation of 0.87 and therefore is ranked highest. It is then followed by *Degree of RM knowledge among organisation members* which has a mean of 3.75 with a standard deviation of 0.90.*RM knowledge management* is ranked lowest, a mean of 3.71 with a standard deviation of 1.01.

Integration of RM process within the organisation

Ranking of process shows that *Integration of RM process within the organisation* is ranked highest with a mean of 3.59, a standard deviation of 0.91. Then it is followed by *Performance measurement of RM* with a mean of 3.56, a standard deviation of 0.87. *Realisation of RM in every stage of a project* comes third with a mean of 3.38, a standard deviation of 1.12. It is then followed by *Availability of a RM system* which has a mean of 3.20 with a standard deviation of 1.23. *Documentation of RM in every project* which has a mean of 2.45 with a standard deviation of 1.07 is ranked lowest.

Adequate communication channels

Ranking of communication shows that *Adequate communication channels* has a mean of 4.06 with a standard deviation of 1.00 and therefore is ranked highest. Next is *Common language* which has a mean of 4.01 with a standard deviation of 0.97. *Diffusion of RM* is ranked lowest with a mean of 3.36, a standard deviation of 1.01.

Table 2: Means/ranking of responses to assess practice and application

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Adequate planning of RM from the beginning of every project	61	3.81	1.06	High	1
Application of RM at every stage of the project	61	3.71	0.84	High	2
Scope of the RMP covers every aspect of RM	61	3.53	1.01	High	3
Formal RM steps	61	2.97	1.14	Moderate	4

Table 3: Means/ranking of responses to assess knowledge

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Abilities for carrying out RM	61	4.56	0.87	Very High	1
Degree of RM knowledge among organisation members	61	3.75	0.90	High	2
RM knowledge management	61	3.71	1.01	High	3

Table 4: Means/ranking of responses to assess process

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Integration of RM process within the organization	61	3.59	0.91	High	1
Performance measurement of RM	61	3.56	0.87	High	2
Realisation of RM in every stage of a project	61	3.38	1.12	Moderate	3
Availability of a RM system	61	3.20	1.23	Moderate	4
Documentation of RM in every project	61	2.45	1.07	Low	5

Table 5: Means/ranking of responses to assess communication

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Adequate communication channels	61	4.06	1.00	High	1
Common language	61	4.01	0.97	High	2
Diffusion of RM	61	3.36	1.01	Moderate	3

Experience from previous projects

Ranking of resources shows that *Experience from previous projects* has a mean of 4.66 with a standard deviation of 0.82 and therefore is ranked highest. Subsequently, *Adequate materials* which has a mean of 3.66 with a standard deviation of 0.98. *Allocation of adequate budget* is ranked lowest with a mean of 3.38, a standard deviation of 1.05.

The overall ranking shows that the criteria of *RM Knowledge* has attained the highest rank with a mean of 4.01. The next criterion is *RM Resources* with a mean of 3.90. It is then followed by *RM Communication* with a mean of 3.81. Subsequently, criteria *RM Culture* with a mean of 3.74. *RM Practice & Application* is ranked fifth with a mean of 3.51. The lowest criterion is *RM Process* with a mean of 3.24. Overall RMM of the contractors has a mean of 3.70. This shows that the capability of the contractors is high but they can still improve to attain optimum level.

Table 6: Means/ranking of responses to assess resources

MEASURES OF RM CAPABILITY	*N*	*Mean*	*SD*	*Capability*	*Rank*
Experience from previous projects	61	4.66	0.82	Very High	1
Adequate materials	61	3.66	0.98	High	2
Allocation of adequate budget	61	3.38	1.05	Moderate	3

Table 7: Means for overall assessment of rmm criteria.

RMM CRITERIA	**GROUP MEAN VALUE**	**RANK**	**OVERALL RMM**
RM Knowledge	4. 01	1	High
RM Resources	3.90	2	High
RM Communication	3.81	3	High
RM Culture	3.74	4	High
RM Practice & Application	3.51	5	High
RM Process	3.24	6	Moderate
Overall Industry RMM	**3.70**		**High**

Conclusion and Recommendations

The aim of this study was to empirically examine contractors' risk management capabilities. This is solely with the view of identifying the potential features of construction firms that define their capabilities in terms of prudent management of risk. This aim was achieved through some specific objectives. The first and second objectives were to identify the criteria for measuring assessing the risk management capability of contractors and to identify the attributes and dimensions of risk management capability of contractors. The objectives were achieved through the comprehensive review of past literature with information drawn from various sources including academic and industry publications. Information collected was then critically analysed to and used in the study. The third objective was achieved by ranking the various risk management attributes as relating to the various criteria. The final objective was obtained from the results of the assessment of the attributes and criteria.

Results showed that there is need for the firms to define clearly RM responsibilities within the organisation. They should also improve their documentation of RM. There is also need for the contractors to provide formal RM steps.

In the light of the aim and objectives of this research and the findings discussed, this study makes the following recommendations:

i. Risk management in construction projects should be part of the organisational culture. This will allow its improvement and putting into practice and it will help to become a guideline for planning and execution of projects.

ii. It is also significant to create a well-organised management of knowledge so as to have a well-established system, which can help store every lesson learned so that they can serve as precedence, be spread and reused in future projects.

iii. Having an adequate network of communication between project parties for risk management is also essential as well as conducting training on this topic so as to educate the parties concerned.

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