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The general understanding of risk in construction industry in Ghana: The consultant perspective.

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ABSTRACT

The roll of consultants in construction industry cannot be under estimated, from project conception to final completion the consultants are front liners. There is a need to understand their perception on risk in construction industry for their effective functioning. The purpose of the study was to understand how consultants in Ghana perceived risk in construction industry. The study objective was to identify consultant's perception on the causes of risk in construction industry in Ghana and examine the relationship between consultant's concept of risk and perception on uncertainty.The study adopted a quantitative approach involving a cross-sectional design using survey, questionnaires administered to a population of 355 consultants of the Ghana Consulting Engineering Association (GCEA). Descriptive statistics, cross tabulations, Chi-square were used to analyze the resulting data. The study found that the major causes of risk in construction are usage of substandard materials in construction industry, harmful work-related experience, and the dangers in construction. The study further shown that risks were not the same as uncertainties in construction projects that risks could not lead to positive outcome but the positivity of risks depends on the type of projects the consultants worked on. It also reveal that theft and lack of a critical checklist were the major sources of risks in the construction industry. On the bases of the founding's the study sort to recommend that effective and efficient monitory system should be implemented at construction site to curtail all issues related to theft. Again investigation should be conducted to examine consultants' perception on the impact of risks in the construction industry.

Keywords: Risk, Consultants, Uncertinty, Construction Project, Causes Of Risk, Sources Of Risk.

INTRODUCTION

Generically, risks are conceptualised as uncertainties, events or conditions that result from the network form of work, having an impact that contradicts expectations (Chileshe, 2004). Therefore, project risks refer to an uncertain event that has a positive or negative effect on the prospects of achieving project objectives (Ijaola, 2012). A Project risk may, thus, not necessarily be negative, such as increased costs or decreased quality. A risk can also be positive, for example, a new valuable product features due to the use of new technology or opening up a new market segment due to some project adjustments (Ijaola, 2012; Eshan et al., 2014).

Studies in Ghana, have shown that the construction industry is mostly challenged by financial risks which stems from overdue payments to Contractors, Consultants, Suppliers, Subcontractors (Agyakwa-Baah; 2009; Frimpong et al., 2003; Odonkor, 2011). These studies also indicated that the industry is also exposed to political, natural, construction and design risks, but they are heightened at the construction stage. Studies, including Agyakwa-Baah (2009) has identified brainstorming as the commonest risk identification method, whereas other studies such as Frimpong et al. (2003) and Odonkor (2011) identified interviews, expert judgement and observations as the main risk identification methods in Ghana's construction industry.

Generally, consultants on a single project may include architects, engineers, quantity surveyors, estimators and designers. Their perspectives of risks and how they manage risks influence major segments of the project, including the design phase, as well as the budgeting and construction phases (Dadzie et al., 2012).It is therefore important to examine the perspective of project consultants with regards to projects risks. This paper is part of bigger study that focuses on consultants' perspective on risk management practices in Ghanaian construction. This study therefore focuses on how consultants generally understand risk in construction industry.

Statement of the Problem

Construction industry is highly risk prone, with complex and dynamic project environments creating an atmosphere of high uncertainty and risk (Eshan et al., 2010). The industry is vulnerable to various technical, socio-political and business risks. As a result, construction firms bear various failures, such as, failure of abiding by quality and operational requirements, cost overruns and uncertain delays in project completion (Eshan et al., 2014). An effective system of risk assessment and management for construction industry, therefore, remains a challenging task for the industry practitioners. Given that consultants' perspectives in their field of specialisation directly influences the success of the project (Dadzie et al., 2012), it is important to examine their orientation on their perception on risk based on their experience and knowledge. Moreover, there has been many research on risk in financial, fall in the construction industry, construction project work and application to manufacturing. However, the few researches on risk in Ghana failed to address risk from stakeholder's perspective. This study, therefore, seeks to address this gap in literature by focusing on the consultants' general understanding of risk in the construction industry.

AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to assess consultant's general understanding of risk in construction projects in Ghana. The objectives were to:

1. Identify consultants perception on the causes of risk in construction industry in Ghana
2. Examine the relationship between consultants concept of risk and perception on uncertainty

RESEARCH QUESTIONS

The study answers the following research questions in line with the stated research objectives:

1. What are consultants perception on the causes of risk in construction industry in Ghana
2. What are the relationship between consultants' concept of risk and perception on uncertainty?

Definition Of The Concept Of Risk

Generally, the concept of risk is encapsulated in potential losses, which refer to the probability of losses occurring (Carter & Doherty, 1974; Flanagan & Norman, 1993). Bernstein (1996) also

notes that probability is the key to determining and managing risk. Jones (2006) further established that a risk is the probable frequency and probable magnitude of future loss. In this concept, risk is seen as a probability, which refers to the continuum between absolute certainty and impossibility. Risk is also addressed as both a frequency and a magnitude component, which suggests that the frequency of the risk can have relations to the magnitude and probability of incurring a future loss (Jones, 2006). Thus, in spite of significant differences between field of inquiry and application, risk is generally defined in probabilistic terms and accordingly at the intersection between achievements of instrumentally constructed means to goals and the likelihood of failure and negative outcomes.

Based on the ISO 31000:2009, Hopkin (2012), on the other hand, conceptualises risk not in terms of probability of loss, but the effect of uncertainty on objectives, thus causing the word risk to refer to positive possibilities as well as negative ones. However, this has been criticised an unnecessary attempt to alter a universally understood word in a way that causes considerable confusion and that as always, the word risk should be used to refer only to undesirable possibilities (Popva-Clark, 2011). Thus, Hopkin (2012) establishes that a risk is generally the probability of an unwanted event or the cause of an unwanted event which may or may not occur. Similarly, Popva-Clark (2011) also maintains that risk is the potential that a chosen action or activity, including the choice of inaction will lead to a loss or an undesirable outcome. The notion implies that a choice having an influence on the outcome sometimes exists or existed. Calycamp (2012) emphasised that any concept of risk is built on fundamental concepts of chance, likelihood, or probability, and that the probability concept in risk is conceived as a combination of frequency-based calculation and a degree of belief. Thus, in any field or business, risk is constructed as an objective structure-agency phenomenon that influences the possibility that a target or goal is achieved. Hubbard (2009)also asserted that risk applies equally well regardless of its conceptualisation within investment, market, credit, legal, insurance, information risk, or any of the other risk domains that are commonly dealt with in business, government, and life

Risk in Construction Projects

Akintoye and Macleod (1997) have defined risk in relation to construction as a variable in the process of a construction project whose variation results in uncertainty as to the final cost, duration and quality of the project. Due to construction projects' complexity and uniqueness, not only does the number of risks present invariably go beyond those found in other industries, but the risks also change from one construction project to the next (Panthi et al., 2009).Risk is an inevitable phenomenon in an industry as dynamic as construction, irrespective of the size of the project. For example, Zou et al. (2006) maintain that in construction, decisions including the scope of the project, the quality standards, time, purchases and costs, communication channels and the contract management options vary from one project to the next.

Smith (2003) establishes that the construction industry is subject to more risks because of distinctive characteristics of construction such as financial intensity, complex procedures, lengthy duration, offensive environment and dynamic arrangements of organizations. Many other factors affect the level of risk including situation of market, level of competition, size of the project, political and economic variations, and expertise of parties (Flanagan and Norman, 1993; Akintoye and MacLeod, 1997; Smith, 2003; Smith et al., 2006). These risks are distributed through the entire project life cycle and some of the risks may happen at more than one phase.

There are, however, arguments regarding the degree of risk in different phases of a construction project. Hayes `et al. (1986) and Godfrey (1996) assert that the greatest degree of risk exist in the earliest phase of the project when available information about the project is the least. Chapman and Ward (1997), as well as Hassanein and Afify (2007) similarly stated that risk is at its peak in the conceptual phase. However, with Zou et al. (2006) contradicted that the construction phases to be more risky phase than the feasibility (conceptual) phase. In further contradiction, Wang et al. (2004) argue that risks of construction projects increase as the project progresses and this illustrates that each phase of the construction project includes more risks than the previous one. However, Ghahramanzadeh (2013) counter-argued that this greatly depends on the type of the project, the type of the contract, and type of the risks.

RESEARCH METHODOLOGY

Study Design

An important aspect of any research is the design. It is the logical sequence that connects the empirical data to the initial questions of the study and, ultimately, to its conclusions (Sarantakos, 2005). This study adopted a quantitative research approach, which is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomenon that those observations reflect (Babbie, 2005). This allowed the collection of quantitative data and also enabled the use of quantitative methods in the analysis of data.

The research designs adopted were the descriptive and cross-sectional designs. Key (1997) reports that methods involved in a descriptive study design range from the survey which describes the status quo, the correlation study which investigates the relationship between variables, to developmental studies which seek to determine changes over time. Sarantakos (1998) confirms that descriptive research aims at describing social systems, relations or social events and providing background information about the issue in question and also to stimulate explanations. A descriptive design was therefore adopted because the study ultimately sought to find consultants' perspective on general understanding of risk in construction industry in Ghana.

Study Sample

The target population was 722 members of the GCEA. However, a sample was taken due to the relative short period for the completion of the study, as well as resource constraints and the fact that a representative sample could be generalised for the entire population (Creswell, 2003). According to Krejcie and Morgan's (1970) sample size estimation table, a sample of 250 and adjusted for non-response by 42% of 250 is 105 which made up of 355 is representative of a population of 722. The underlying construct for Krejcie and Morgan's (1975) estimation is based on equal population proportions for consultants and non-consultants in the study population, as well as a t-statistic of 1.95 at an alpha level of 0.05.

Sampling Procedure

The calculated sample of respondents was selected using the simple random method; specifically the lottery method. The sampling frame consisted of a numbered list of all the members of the GCEA. The computer software, Q-Basic was programmed to generate 355 random numbers from 1 to 722 and the corresponding names to the sampling frame were selected.

Sources of Data

All the data for the study was collected from the consultants and from books, articles etc. The general purview of risks in the construction industry were covered by the study. These were collected as primary data as they were directly elicited from the respondents and those collected through books, articles and literature searches were secondary data.

Instruments for Data Collection

Questionnaires were used to solicit primary data from the consultants, because the study assumes that these groups of people are literate and can therefore read, understand and also answer the items on the questionnaire accordingly. Questionnaires were also employed by Chileshe and Yirenkyi-Fianko (2011), Buertey et al. (2012) and Adu Gyamfi and Boadaa (2015) in their studies on risks related issues in the Ghanaian industry.

Pre-test

The instruments for data collection were tested in one purposively selected consultant in construction firm in the Ashanti Region. This was done to serve as the preliminary testing of the research questions for their ability to generate the needed responses for the study. The purpose of the pre-test was to enable the researcher to make necessary changes to items which may be inappropriate, determine the level of ambiguity of the questions for corrections and determine the percentage of responses. Ambiguous items were modified and inappropriate items, made appropriate. The pre-test therefore enabled the researcher to revise the contents of the questionnaire thereby revising the instruments to achieve the reliability and validity standards required in scientific research.

Validity is the degree to which a test measures what it is supposed to measure. The researcher tested the face and content validity of the questionnaire. Face validity refers to the likelihood of a question being misunderstood or misinterpreted. Content validity refers to whether an instrument adequately covers all the topics concerned. The validity of the instrument was established through expert opinions, literature searches, and pre-testing of the questionnaire.
Reliability is a measure of the degree to which a research instrument yields consistency in its results or data after repeated trials. The questionnaire was administered on the same group of subjects twice in the pilot study with a two week grace period between the first and the second test and the coefficient of reliability from the two tests correlated. The reliability test yielded Crombach alpha of 0.89.

METHODS OF DATA ANALYSIS

The data was cleaned and checked for reliability using statistical tools in Statistical Product for Service Solutions (SPSS). The study employed descriptive statistical tools to analyse demographic characteristics of respondents. , cross tabulations Chi-square.

RESULT AND DISCUSSION

Working experience of the respondents

The working experience of the respondents was also analysed based on the years they've worked as consultants and the number of projects they've worked on. This is presented in Table 1

Table 1: Working experience of consultants

Variables	F	Min	Max	Mean	Std. error	Std. Deviation
Years of experience in the construction industry	250	2.00	21.00	7.3080	.33951	5.36809
Number of projects worked on	250	5.00	80.00	32.2120	1.66239	26.28465

Source: Field survey 2015

From Table 1, the consultants had worked on their jobs from two (2) to 21 years with an average of 7 years (mean = 7.30, S.E = 0.33). The minimum number of projects that the consultants had worked on was five and a maximum of 80. This indicated that the respondents were experienced in terms of the years of working and the quantity of projects worked-on. Thus, their responses on the risk management in the construction industry were validated by the virtue of their working experience.

Table 2: Types of projects worked on by supervisors

Types of projects	Frequency	Percent
Residential homes and buildings	170	47.6
Government roads	80	22.4
Private residential and school building	79	22.1
Commercial houses	28	7.8
Total	357*	100.0

***Multiple responses were given; sample size = 250**
Source: Field Survey, 2015

The types of projects that the consultants usually work on were also analysed by the study using descriptive statistics. According to Table 2, some of the respondents worked on multiple types of projects, but the typical projects which they worked on were elicited. It was shown that 47.6 percent of the respondents worked on residential homes and buildings, 22.4 percent worked on government funded road works, 22.1 percent worked primarily on government funded school buildings and 7.8 percent usually worked on commercial houses. This indicated that most of the consultants worked on government funded projects, thus, the government was indirectly mentioned as the biggest client for the consultants.

General Understanding of Risks

The respondents were asked to indicate their general understanding of risks, as a term in construction. The result is shown in Table 3.

Table 3: Consultants' perception about the causes of risk

Conception	Frequency	Percent
Usage of substandard materials	107	24.5
Harmful work experience	103	23.6
Dangers with construction	79	18.2
Taking chances irrespective of outcome	78	17.9
Financial impropriety	69	15.8
Total	436*	100.0

***Multiple responses were given; sample size = 250**
Source: Field Survey, 2015

It was found out from table 3. that the main understanding of what constitutes a risk in the construction industry, according to the respondents, were of five different concepts. In 24.5 percent of the cases, the respondents indicated that the usage of substandard materials was a risk in construction industry. Another 23.6 percent of the responses showed that other consultants conceived a risk as a harmful work-related experience. In relation to this, 18.2percent of the responses also conceptualised a risk as the dangers in construction. However, 17.9 percent of the cases pointed out that a risk refers to taking chances in the light of uncertainties. Furthermore, 15.8 percent of the responses in the view that a risk in construction industry as a financial impropriety.

The responses and perception of risks, as shown by the respondents did not perceive a risk to have a positive impact on construction. Inherently all the ideas given about a risk conformed to the impression that a risk has some kind of unwanted consequences for construction projects. This notion tallies with Popva-Clark's (2011) impression about construction risks that, risks are usually stated in negative terms. Quite contrary to Hopkin's (2012) notion of positive risks, the respondents were of the view that risks were generally resulted in negative consequences.

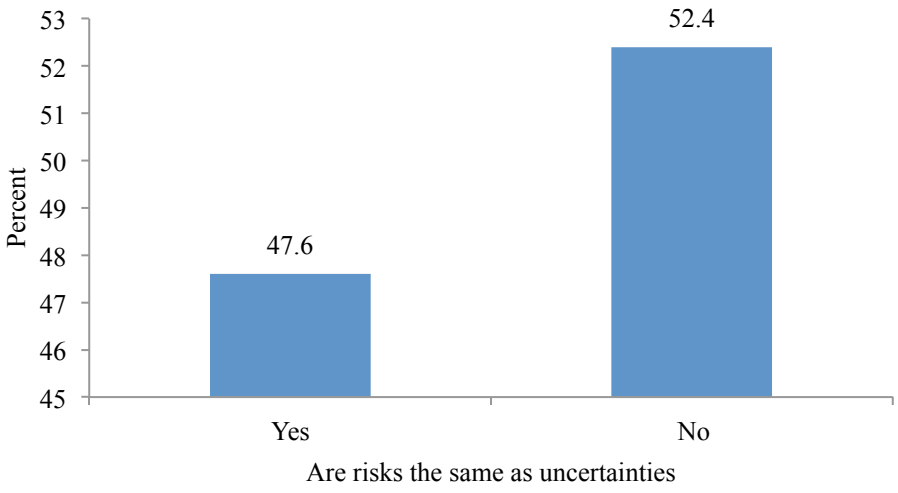

Figure 1: Conception of risks and uncertainties
Source: Field survey, 2015

From figure 1, the respondents were asked to express their understanding of risk and uncertainties in terms of construction projects. In 47.6 percent of the cases, the respondents agreed that they would equate risks to uncertainties, whereas 52.4 percent noted that risks were not the same as uncertainties in construction projects. In the majority of cases, the consultants noted that risks were not the same as uncertainties in construction projects. This was indicated by Ward (1993) by separating risks from uncertainties. The respondents also noted that while risks can be obvious, whereas uncertainties are unforeseen. They also expressed that risks could be managed but uncertainties could not and some also mentioned that risks involve danger whereas uncertainties are unpredictable events

Table 4: Relationship between consultants' concepts of risks and their conception of uncertainties

	Are risks the same as uncertainties		
Can risk lead to positive results	**Yes f(%)**	**No f(%)**	**Total f(%)**
Yes	**41(34.5)**	**52(39.7)**	**93(37.2)**
No	**78(65.5)**	**79(60.3)**	**157(62.8)**
Total	**119(100.0)**	**131(100.0)**	**250(100.0)**

Chi-square = 0.733; df = 1; p-value = 0.392
Source: Field survey, 2015

Table 4, In line with the debate on the benefits of risks to construction projects, the respondents, 62.8percent of the respondents noted that riskscould not lead to positive outcomes, whereas 37.2 percent of the respondents were of the view that risks can lead to positive outcomes. It was also noticed that majority (65.5%) of the consultants who agreed that risks were the same as uncertainties and most (60.3%) of the consultants who indicated otherwise, also noted that risks cannot be beneficial to projects. Thus, in a general view, the consultants' opinions about the similarities or differences in the terminologies of risks and uncertainties were not significantly associated with their views of the potential benefits of risks (chi-square value = 0.733; df = 1; p-value = 0.392).

Table 5: Opinions about the positivity of risks according to area of specialization

	Most usual type of project worked on			
Are there positive risks	Private contracts f(%)	Public roads f(%)	Public buildings f(%)	Total f(%)
Yes	88(54.7)	-	-	88(32.3)
No	72(45.3)	70(100.0)	20(100.0)	162(67.7)
Total	160(100.0)	70(100.0)	20(100.0)	250(100.0)

Chi-square = 95.340; df = 2; p-value = 0.000
Source: Field survey, 2015

In Table 5, the consultants' opinions about the positivity of risks were disaggregated according to the projects in which they were usually involved. This analysis therefore drew on the experience of the consultants in terms of their specific project experiences. According to the results, 54.7 percent of the respondents who worked on residential homes and buildings agreed that risks can be positive and have a desirable effect on construction project. On the other hand none of the respondents who typically worked on government road works and government funded school buildings agreed that risks can have positive outcomes. The distribution of the responses was tested and found to be statistically significant at an alpha of 0.05 (chi-square = 95.340; df = 2; p-value = 0.000), which indicated that the type of projects the consultants worked on had significant relationship with their opinions about the positivity of risks.

Table 6: Sources of risks in the construction industry

Sources	Frequency	Percent
Theft	103	17.0
Lack of critical checklist	103	17.0
Withdrawal of stakeholders	69	11.4
Poor structural design	62	10.2
Politics	41	6.8
Short schedule	41	6.8
Poor safety measures	39	6.4
Poor planning	38	6.3
Mismanagement	38	6.3
Inability to access funds from financial markets	28	4.6
Negligence of safety rules	24	4.0
Poor coordination	19	3.1
Total	605*	100.0

***Multiple responses were given; sample size = 250**
Source: Field Survey, 2015

The sources of risks in the construction industry were also analysed from the perspective of the consultants. The results, as shown in Table 6, revealed that 34 percent of the responses indicated that theft and lack of a critical checklist were the major sources of risks in the

construction industry. Besides these risks were the risk of withdrawal of stakeholders (11.4%) and poor structural design (10.2%). Other relatively less prominent risks which were noted by the consultants included politics (6.8%), short project schedule (6.8%), inability to access funds from financial markets (4.6%) and negligence of safety rules (4%).

CONCLUSIONS

The following conclusions were drawn based on the major findings of the study. They are aimed at answering the research questions. The consultants were of the opinion that risks are generally negatively implied. Most of the respondents noted that risks could not lead to positive outcomes. The consultants perceived risks as an occurrence resulting from usage of substandard material or as a harmful work-related experience, the general understanding was that risks posed detrimental consequences for construction projects. They understood risks and uncertainties to be different and that risks were most manageable but uncertainties were not.

RECOMMENDATION

- Further research should be conducted to identify critical risk factors affecting construction project execution in Ghana.
- Investigation should be conducted to examine consultants' perception of the impact of risks in the construction industry.
- The Ghana Consulting Engineering Association (GCEA) should organize regular training workshops and seminars on the modern safety precautions in all the phases of the construction project to reduce casualties and safety risks
- Effective and prudent monitory systems should be implemented at the construction site to curtail all issues related to theft.

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