Analyzing the Risk of Investment in the Construction Industry of Ghana

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Abstract

This study was undertaken to examine the risk associated to Construction projects investment in Ghana and the relationship between risk and investment in the construction industry of Ghana with more attention and focus on international joint ventures.. To accomplish the objectives of the study, investigations were conducted regarding the following factors of risks to investment: Political risk, Financial risk, Management risk, Technical risk, Legal and Policy risk, Strategic risk and Market risk, Specific areas such as human Resource, plant and equipment, software and technology, bidding and tendering stage, Legal and administrative work and no or low credibility of lenders and shareholders were outlined to determine how investment are done and the results or impact they give. Relationship between risk and investment was carefully examined.

The results of the analysis indicate that the majority of professionals in the industry have a good understanding of risk, and this means that their responses were of a professional view and its impulses reflect what happens on site or in the construction industry. The analysis of General Construction Industry (GCI) further indicates that financial risk during the investment of a project is high and very risky to venture into even though the less risky aspect of financial risks is considered. IJVs companies investment are channelled to software and technology, with the other elements such as human resource, plant and equipment, bidding and tendering, legal and administrative work having less investment channelled to them.

Keywords: Risk, Investment, International Joint Ventures (IJVs), Construction Firms/Companies, Construction Projects

1.0 Introduction

In the 21st century, developments are important tool for the growth of a firm, organization, company and a country as a whole. To follow the trends of development the party involved needs to invest, put or allocate more resources in the area it deems fit and profitable. New opportunities are continuously emerging as a result of globalization in construction sector to have projects done internationally. (Otoo – Annan 2011)

Most indigenous or local construction firms or companies are in the categories or range of D3K3 and D4K4. Most projects of very high magnitude are financed by the government or an international body with the government as the sole beneficiary. Such projects only require companies with registration certificate of D1K1 to tender for the project. Majority of the local companies end up going bankrupt and finally they die out leaving the foreign companies to excel and gain more root in the country. As a result of this, individuals and/or entrepreneurs with capital to invest in the construction area or invest in the local companies divert their resources to other areas because they see the degree of risk to invest in the local companies as very high, and lack the understanding of investment risk in the construction field or industry.

Analysis for the changes in the investment legislation in Ghana shows progressive moves to favor Joint Venture formation. For instance, the Ghana Investment Promotion Acts have consistently made it easier to form a Joint Venture, as against a totally owned subsidiary, by requiring or placing lower equity capital requirement on prospective Joint Venture investment (Frimpong 2011)

A Joint Venture is defined as an enterprise entered into by two or more companies, with a clearly defined business purpose, in which the partners combine their assets and skills in a single undertaking, often sharing their risks and profits/losses (Harris and McCaffer 2005). It could also be a series of business enterprises where the parties combine property, money, skill and knowledge to achieve their purpose. The nature of a Joint Venture may be defined by the terms of agreement between the parties involved.   Joint Ventures are typically temporary or selective arrangements

for the purpose of carrying out a single project usually a project of a higher magnitude. Joint Ventures are regarded as selective when the parties, aside being involved in the Joint Venture, continue with their respective business activities independently or sometimes in competition. International Project can be define as one in which the owner and/or contractor is from a country different to that of where the project is to be executed. It can be undertaken by a separate legal organizational entity representing the partial holdings of two or more parent firms in which the headquarters of at least one is located outside the country of operation of the Joint Venture (Frimpong 2011). This discrete organizational body is an International Joint Venture (IJV). Competitive advantage is defined as the acquirement of knowledge-based management and organizational learning practices which allow companies to develop technological-based resources, capabilities and core competencies through inter-organizational co-operation, trust and commitment while jointly solving problems (Frimpong 2009).

Although risks such as civil unrest and economic stability are typically outside the scope of normal business, understanding and dealing with these risks are critical for companies working internationally.

1.   1.1 Nature of the Construction Industry in Ghana

The Construction industry in Ghana is a very vibrant sector and much promising, but the growth of the industry is no different from any other construction industry of a developing country, it is a critical one due to its broad linkages with other economic sectors. Infrastructure and facilities enables other sectors to efficiently carry out their services. For instance, housing for basic needs, schools for education and training, hospitals for health care, factories and shops for commercial and business activities, buildings for national communications networks, among others, are generated from construction. With a population of 24 million and fledgling democracy, Ghana has been rated the most peaceful nation in Africa by the Institute for Economics and Peace in 2008 (now third behind Botswana and Mozambique in 2010). The country was given a sovereign credit rating of B+ (Standard & Poor's Financial Services, 2009), the fastest reforming nation on the continent and also as one of the top ten business reformers in the world in the World Bank Doing Business report in 2008.

The two main bodies that supervise and oversee the activities of construction in Ghana are the Ministry of Works, Water Resources and Housing basically responsible for housing infrastructure as well as the Ministry of Roads and Transport responsible for civil-related infrastructure. Aside these main entities, subsidiary organizations are in place as supporting agencies of these ministries. Agencies supporting these ministries include the Ghana Highway Authority (GHA) responsible for trunk roads covering 13400km distance. The Department of Feeder Roads (DFR) is responsible for feeder roads of 32000km length. The Department of Urban Roads (DUR) also connects 3700km roads within the metropolitan and municipal areas in Ghana. The Ministry of Works, Water and Housing classifies contractors into categories D and K, while the Ministry of Roads and Transport classifies the contractors into categories A, B, C and S (Lim and Liu 2010). Financial classes 1, 2, 3 and 4 into which contractors are grouped by taking into account their technical and managerial expertise (human resource), financial standing, equipment holding and previous performance. Hence, a contractor can be classified as A1–A4, B1-B4, D1-D4 and K1-K4.

History divulges that the root of the Ghanaian Construction Industry is founded in the pattern adopted by the British who were Ghana's colonial masters. Construction in the past was mainly the provision of shelters of mud and wood which were known as wattle and daub construction or in the local parlance as "Atakpame" buildings. Since construction was known to be a non-commercial family craft, family heads designed simple rectangular and circular structures as houses while family members and friends, through communal laboring built the shelters. The construction practices could be described as "crude at its best" especially because of its very elementary and unscientific nature. (Sullivan et al 2011).   Obviously, traces of such shelters can still be found in many of the typical rural villages across the breadth and length of the country.

2.   1.2 Forms of Risk

From the lay man's point of view risk is any negative effect that will retard the success of an activity or project. Many well established organizations have different definition, classification, and identification of risk. Risk is an uncertain event or condition that, if it occurs, has a positive or a negative effect on a project objective. A risk has a cause and, if it occurs, a consequence (Project Risk Management Handbook, First Edition, 2003). Risk can be defined as a combination of the probability of an event and its consequences (ISO/IEC Guild 73). PMI BoK/PRAM defines risk as an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives. The UK HM Treasury Orange Book also define risk as uncertainty of outcome, whether positive opportunity or negative threat, of actions and events. It is the combination of likelihood and impact. From the definitions it is clear that risks are uncertainty and affect project objectives both positively or negatively.

3.   **1.3 Management of Risk**

Managing risk is a crucial and central part of any organization's strategic management. All construction projects attract risks, but risks appear to be critical with international construction projects than local or domestic projects. For instance, the international business environment is more heterogeneous, hostile and complex. Nelson, (2005) states that this setting is characterized by its fragment industry structure, geographic spread, decreasing demand, the provision of long-term loans, high levels of risk (including climatic conditions, currency fluctuations, profit repatriation, early abortive tendering). In addition, international construction requires high turnovers to absorb market entry costs. Also, the fluctuations in the macro economy and the government policies in a country may have a substantial impact on its international construction projects. And they become more critical when developing countries are involved. Consequently, the major categories of risk in construction are technology risk, construction risk, operating risk, supply risk, revenue risk (BOT project), financial risk, environmental risk, political risk, legal risk and exchange risk. Risk management becomes more crucial for international construction projects. In order to effectively manage risk in such situations, a simple and systematic approach to manage risks as suggested by Berkeley and others (1991) must be employed. This approach has four distinct stages: risk classification, risk identification, risk assessment, risk response.

4.   **1.4 Investment in the Construction Industry of Ghana**

Many companies have turned to various types of co-operative arrangements as a strategic response to uncertainty relating to increased global competition, the emergence of new markets and rapid technological change. Under such circumstances, it is difficult for a single firm to possess all resources needed to develop and sustain existing competitive advantages while simultaneously trying to build new ones.

According to the Ghana Investment Promotion Center (GIPC), the property development is divided into three namely Public Sector Real Estate Development, Emerging Private Sector Real Estates Development and Private individuals. The activities of these groups are facilitated by the banks and mortgage market, which although at its early stages of development, has demonstrated enormous growth potential. The property development industry consists of three main segments namely Residential property, Commercial property and Industrial property. The industry is dominated mainly by residential and commercial developers. Records have shown that in the last ten years the residential market, undoubtedly the most vibrant in the industry, has registered an estimated 85,000 transactions yearly.

The commercial property segment, which includes office accommodation and retail space, is the second largest segment in the industry. Third is the industrial segment which is considerably smaller in size. Recreational and civil/cultural property developments are new areas that are gaining interest among the industry stakeholders.

The property industry, especially the residential and commercial segments is dominated by private companies, which control over 90% of Ghana Real Estate Developers Association (GREDA) property holdings. The government participation in the property market is minimal, compared to the private sector. The Tema Development Corporation (TDC), State Housing Corporation (SHC) and the Social Security and National Insurance Trust (SSNIT) are the only public sector-controlled agencies involved in the property market.

The Ghana Real Estate Developers Association (GREDA), an organization of private real estate developers, has played an active role in property development in the country. They mainly, service the upper income and expatriate demand for housing, especially in Accra and Tema. Regimanuel Gray, Parakuo Estates, NTHC Properties Ltd, ACP Estates Ltd and Manet Housing Company Ltd account for about 75% of the GREDA group's residential property development.

The property development market in Ghana is currently in its infant stage, with very few property sales. The market however is growing as the younger generation of Ghanaians realize the capital gains made from property is a quick path to wealth in periods of rapid inflation.(source from GIPC 2011). On the other hand, the roads and bridges construction industry of Ghana has not seen much growth, because most of the investment done in this industry is by the Government of Ghana (GoG)

2.0 Research Design and Methodology

Zikmund states that a survey is a technique in which information is collected from a sample of people through a questionnaire. Since this research is explanatory and the aim of the study is to collect answers from Contractors, Engineers and Quantity Surveyors in order to formulate the answers of the investigated research problem, a survey was used as a research strategy.

Following a research purpose and its type, research approach and strategy of this study, the next step was to device a

research design. Research design is a plan to be carried out the research strategy and specifies the methods and procedures for the collection, measurement analysis of data. In this case, a pilot study was conducted to ensure the success of the research. As mentioned before that the survey was formulated, the design and format of the survey is so that the needed results to determine the significance of the relationship between risk and investment.

There are two types of data that can be collected in a research, and these are primary and secondary data. Primary data is recognized as data that is gathered for a specific research in response to a particular problem through interviews, questionnaires or observations. Whereas secondary data information can be obtained through various kinds of documents e.g., research reports, annual reports, books and articles. In this research both type of data were used. The greatest use of questionnaire was made by the survey strategy.

In this research various statistical methods have been used such as frequency distribution tables, percentage, variance and standard deviation in order to examine and compare the collected data from the questionnaires. In the section of inferential statistic various statistical tests have been run. For data analysis, the MS Excel and SPSS software was selected for used. The statistical tests which were run in this research are as follows:

5.   2.1 Multiple Regressions

This allows researchers to examine the effect of many different factors on some outcome at the same time. The general purpose of multiple is to learn more about the relationship between several independent or predictor variables and a dependent variable. For some kinds of research questions, regression can be used to examine how much a particular set of predictors explains differences in some outcome. In other cases, regression is used to examine the effect of some specific factor while accounting for other factors that influence the outcome. Multiple regression is also used to test theoretical causal models. The general form of the multiple regression equation is

$$Y = a + b_1 X_1 + b_2 + \ldots\ldots\ldots + b_n X_n$$

The variables in the equation are Y (the variable being predicated) and X_1, $X_{2\ldots}X_n$ (the predictor variables in the equations). The "n" in the X_n indicates that the number of predictors included is up to the researcher conducting the study. It is not unusual for a researcher to use 4 or 5 predictors because the more predictors your research has, the more accurately the criterion will be predicted. In this research in order to test the causal hypotheses that we have, we summed up the items that make up each of the concepts (namely management risk, technical risk, legal and political risk, market risk and financial risk) and then run a multiple regression with these as independent variables and investment commitment as the dependent variable

3.0 Data Analysis and Research Findings

6.   3.1 Introduction

The GCI questionnaires had 35 features or indexes made up market index, Legal, policy and political index, Financial index, Technical index and Management index and respondents were asked to rank each feature to the extent that is considered to be important on a scale of 1 to 5 points i.e. 1 (Low), 2 (Moderately Low), 3 (Fair), 4 (Moderately High) and 5 (High) and the IJV questionnaires had 7 features or index each representing risk and investment, and respondents were asked to rank each to the extent that it consider it magnitude on a scale of 1 to 5 points where 1 (Very Low), 2 (Low), 3 (Fair), 4 (High) and 5 (Very High). The other related features or index for IJVs questionnaires included; Magnitude of Investment (MoI), Risk Effect on Investment(REI), Percentage of Magnitude Affected(PMA) and Relationship between Risk and Investment (RnRI).

3.2 Reliability of the Research

Reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error (Howell et al, 2005).

$$\alpha = (k/(k-1)) * [1 - {}^{\Sigma}(s_i{**}2)/s_{sum}{**}2]$$

This is the formula for the most common index of reliability, namely, Cronbach's coefficient alpha (α). The Cronbach's Alpha is interpreted as a coefficient Alpha and its value ranges from 0 to 1.When calculating Cronbach's reliability coefficient, reliabilities less than 0.6 are considered poor, reliabilities within 0.7 are considered acceptable; those coefficients over 0.8 are considered good. It further states that the closer the coefficient is to 1.0, the greater the reliability of the instrument. Since all reliability Alpha scores are greater than 0.8, the reliability of the questionnaire may be considered good. In order to calculate Cronbach's coefficient alpha for each dimension the total variance of each dimension was calculated by SPSS software. The result indicates that the true score variance or reliability score variance of 96% is considered

In this research various statistical methods have been used such as frequency distribution tables, percentage in order

to examine and compare the collected data from the questionnaires. In the section of inferential statistic various statistical tests have been run. For data analysis, the SPSS and excel software have been used.

3.3 Information about the Respondents – General Professionals in the Construction industry

In this section the data related to general specifications of respondents such as profession, country of origin, nature of the company or firm, kind of projects normally undertaken, understanding of risk and ownership of the company. The pie chart showing percentage of each item of questionnaire has been mentioned and the diagram has been shown.

    1.   Profession

Under this section, the respondents are classified under Quantity Surveyors (QS), Engineers, Contractors, Consultants and Others. Others refer to Estate developers and other professionals in the construction industry. According to the chart, out of 91 respondents from the construction industry, 23 of them are Q.S representing 25%, 9 are Engineers representing 10%, 35 of them are Contractors representing 39% , 14 of them are Consultants representing 15% while 10 of the respondent are other professionals representing 11%. So as shown on the table, the highest respondents are the contractors group.

□□□ **Figure 4.1 here** □□□

    2.   Country of Origin

Under this section, respondents have been classified into countries from which they hail. These are group into Ghana, United Kingdom (UK), Italy, China and Others representing Malaysia, Australia and United States. According to the chart Ghana had the highest respondents of 45 representing 49%, followed by United Kingdom and China with respondents of 16 representing 18% for each, with Italy coming close to 9 respondents representing 10% and 5 respondents for Others representing 5%.

□□□ **Figure 4.2 here** □□□

    3.   Understanding of Risk

Under this section, respondents have been classified into level of understanding of risk as in the construction industry. According to the chart, out of 91 respondents 23 of them have an excellent idea of risk representing 25%, 60 of them have a good idea of risk representing 66% and the highest of the respondents, 8 of them have a fair idea of risk and none of them having no idea of risk representing 0%. At least all the respondents had an idea of risk, the chart below shows the details.

□□□ **Figure 4.3 here** □□□

3.4 Analysis of Risk in the Construction Industry of Ghana

3.4.1 Analysis based on Financial Risk

The figure and table below shows the indexes of financial risk. According to the table, out of 91 professionals (respondents), the majority strongly agreed that bankruptcy of project partner (F1) is low recording 36 as the highest followed by 26 as fair, 18 as moderately low, 4 as moderately low and 7 as high, implying that, their agreement with the fact of bankruptcy of project partner have low risk with respect to financial risk. The index (F2) representing difficulty in converting currencies, the respondents have similar views with 57 responding to low, 24 responding to moderately low, 7 responding to fair, 3 responding to moderately high and 0 opting for high. This clearly shows that there is not much difficulty when converting foreign currencies, so the risk of changing currencies is minimal or absolutely low.

Analysis for Index (F3), thus fluctuation of inflation and interest rate losses shows there is a high financial risk involved or associated with fluctuation of inflation and interest rate losses. Respondents indicated that there is a high risk, recording 47 respondents opting for high, 15 opting for fair, 14 opting for moderately high, 12 for moderately low and only 3 opting for low. Index (F4) recorded the following, 26 respondents selected low, 18 respondents selected moderately low, 20 respondents for fair, 24 respondents for moderately high and 3 for high. This means that risk of shareholders and lenders having no or low credibility when it comes to financial risk is low.

3.4.2 Analysis based on Management Risk

Out of 91 respondents assessing the management risk in the construction industry of Ghana, the index (M6) denotes the poor collaboration with government departments, 2 out of 91 respondents ranked poor collaboration with government departments as low, 21 out of 91 ranked as moderately low, 29 out of 91 ranked as fair, 15 out of 91 ranked as moderately high and 24 out of 91 ranked as high. This means that the respondents have varied opinions with respect to index (M6) but on the scale? almost half of the respondents agree that there is poor collaboration with

government departments.

Responses to index (M7) clearly suggest that 21 respondents agrees that misunderstanding and disputes with partners is fair, thus on the average side and the same number of respondents also agrees that misunderstanding and disputes with partners is high? (meaning not too clear), with 17 and 18 rating (M7) as moderately high and moderately low respectively, the other 14 respondents agrees that misunderstanding and disputes is low. This means that only 21 are neutral to the count, with 38 agreeing that misunderstanding and disputes with partners is moderately high or high with respect to management risk. Out of 91 respondents assessing the management risk in the construction industry of Ghana, the index (M8) denotes poor project feasibility study. 9 out of 91 respondents ranked poor project feasibility study as low, 0 out of 91 ranked as moderately low, 33 out of 91 ranked as fair, 34 out of 91 ranked as moderately high and 15 out of 91 ranked as high. This means that the respondents have diverse opinion with respect to index (M8) but almost half of the respondents agree that there is poor project feasibility study with respect to management risk.

Out of 91 respondents ranking the management risk in the construction industry of Ghana, the index (M9) denotes poor project planning and budgeting, 4 out of 91 respondents ranked poor project planning and budgeting as low, 5 out of 91 ranked as moderately low, 28 out of 91 ranked as fair, 40 out of 91 ranked as moderately high and 14 out of 91 ranked as high. This means that the respondents' agreement to index (M9) swings to high indicators, with almost half of the respondents agreeing that there is poor project planning and budgeting with respect to management risk.

Responses to index (M10) clearly suggest that 14 respondents agrees that incomplete terms with project partner is low, 30 respondents also agrees that incomplete terms with project partner is moderately low, with 16 and 3 rating (M10) as fair and moderately high respectively, the other 28 respondents agrees that incomplete terms with project partner is high. This means that only 16 are neutral to the count, with 44 agreeing that incomplete terms with project partner is moderately low or low with respect to management risk.

Responses to index (M11) clearly suggest that 23 respondents agrees that incompetence of project management team is fair, thus on the average side and the same number of respondents also agrees that incompetence of project management team is high, with 11 and 19 rating (M11) as moderately high and moderately low respectively, the other 15 respondents agrees that incompetence of project management team is low. This means that only 23 are neutral to the ratings, with 34 on each side agreeing that incompetence of project management team is high or low with respect to management risk the ratings were either lo or high both recording the same level of ratings.

Out of 91 respondents ranking the management risk in the construction industry of Ghana, the index (M12) denotes improper selection of project type and location, 15 out of 91 respondents ranked improper selection of project type and location as low, 12 out of 91 ranked as moderately low, 20 out of 91 ranked as fair, 14 out of 91 ranked as moderately high and 30 out of 91 ranked as high. This means that the respondent's agreement to index (M12) swings to high indicators, with almost half of the respondents agrees that there is improper selection of project type and location with respect to management risk. Out of 91 respondents ranking the management risk in the construction industry of Ghana, the index (M13) denotes increase in project overheads, 4 out of 91 respondents ranked increase in project overheads as low, 8 out of 91 ranked as moderately low, 24 out of 91 ranked as fair, 29 out of 91 ranked as moderately high and 26 out of 91 ranked as high. This means that the respondent's agreement to index (M13) to be high, with almost half of the respondents agrees that there is increase in project overheads with respect to management risk.

3.4.3 Analysis based on Technical Risk

Out of 91 respondents assessing the technical risk in the construction industry of Ghana, the index (T21) denoting accidents on site, 20 out of 91 respondents ranked accidents on site as low, 29 out of 91 ranked as moderately low, 18 out of 91 ranked as fair, 4 out of 91 ranked as moderately high and 20 out of 91 ranked as high. This means that the respondents have different opinions with respect to index (T21) but the respondents agree that accidents on site are low with respect to technical risk. Thus safety on site is not taken for granted.

Responses to index (T22) clearly suggest that 37 respondents agree that design changes and error in design drawings is fair, thus not high or low and 4 of respondents also agree that design changes and error in design drawings is low, with 29 and 17 rating (T22) as moderately high and moderately low respectively, the other 4 respondents agree that design changes and error in design drawings is also high. This means that majority of the respondents are neutral to the count, that design changes and error in design drawings is neither high nor low with respect to technical risk.

Out of 91 respondents assessing the technical risk in the construction industry of Ghana, the index (T23) denoting increase in site overheads, 12 out of 91 respondents ranked increase in site overheads as low, 6 out of 91 ranked as

moderately low, 25 out of 91 ranked as fair, 34 out of 91 ranked as moderately high and 14 out of 91 ranked as high. This means that majority of the respondents agree that there is increase in site overheads, with respect to technical risk is high, thus site overheads increases frequently.

Out of 91 respondents ranking technical risk in the construction industry of Ghana, the index (T24) representing industrial disputes, 16 out of 91 respondents ranked industrial disputes as low, 34 out of 91 ranked as moderately low, 13 out of 91 ranked as fair, 24 out of 91 ranked as moderately high and 4 out of 91 ranked as high. This implies that the respondents' agreement to index (T24) is that undoubtedly to the sense that industrial disputes are low in the industry with respect to technical risk.

Responses to index (T25) clearly suggest that none of the respondents agrees that material shortage is low, 40 respondents also agree that material shortage is moderately low, with 21 and 10 rating (T25) as fair and moderately high respectively, the other 20 respondents agree that material shortage is high. This means that majority of the 91 respondents agree that material shortage is quite low when it comes to technical risk.

Responses to index (T26) clearly implies that 29 respondents agree that poor quality of procured materials and plants and equipment is fair, and the 22 respondents also agree that poor quality of procured materials and plants and equipment is high, with 6 and 28 rating (T26) as moderately high and moderately low respectively, the other 6 respondents agree that poor quality of procured materials and plants and equipment is low. This means that poor quality of procured materials and plants and equipment is low with respect to technical risk. Out of 91 respondents ranking the technical risk in the construction industry of Ghana, the index (T27) denoting shortages in skilled workers, plant and equipment, 14 out of 91 respondents ranked   shortages in skilled workers, plant and equipment as low, 9 out of 91 ranked as moderately low, 38 out of 91 ranked as fair, 9 out of 91 ranked as moderately high and 21 out of 91 ranked as high. This means that majority of the respondents are neutral to the count, those shortages in skilled workers, plant and equipment is neither high nor low with respect to technical risk.

Out of 91 respondents ranking the technical risk in the construction industry of Ghana, the index (T28) denotes subcontractor's low credibility and incompetence, 18 out of 91 respondents ranked subcontractor's low credibility and incompetence as low, 22 out of 91 ranked as moderately low, 23 out of 91 ranked as fair, 2 out of 91 ranked as moderately high and 26 out of 91 ranked as high. This means that the respondents' agreement to index (T28) to be low, with almost half of the respondents agreeing that the subcontractor's low credibility and incompetence with respect to technical risk is minimal or low.

Responses to index (T29) clearly suggest that 6 respondents agrees that unknown site physical conditions is low, 19 respondents also agree that unknown site physical conditions is moderately low, with 19 and 11 rating (T29) as fair and high respectively, 36 respondents agrees that unknown site physical conditions   is moderately high. This means that unknown site physical conditions are moderately low or low with respect to technical risk.

Out of 91 respondents ranking technical risk in the construction industry of Ghana, the index (T30) representing unusual weather and force majeure, 12 out of 91 respondents ranked unusual weather and force majeure as low, 14 out of 91 ranked as moderately low, 10 out of 91 ranked as fair, 29 out of 91 ranked as moderately high and 26 out of 91 ranked as high. This means that the respondents' agreement to index (T30) is that indisputably the unusual weather and force majeure is high in the industry with respect to technical risk.

7.   4.4.4 Analysis based on how risk is measured on the project

The respondents were of the opinion that 9 out of 27 of them agreed that one can only measure the risk by experience, 2 out of 27 of them agreed that it is measure by appraisal and 16 out of 27 of the respondents did agreed that risk is measured by data entries. Based on the responses of the respondents keeping and entering data helps managers, projects engineers, architects and clients to find the trend of risk as and when they occur.

4   Conclusion

The analysis revealed that, all the respondents had clear knowledge about investment risk and have been involved actively in the construction industry of Ghana between the period of two and ten years. The majority of the construction firms were Ghanaian based while a lower percentage is foreign based with majority having undertaken projects in the roads, bridges and building housing category. The respondents agreed that the financial risk during the investment of a project is high and very risky to venture into even though the less risky aspect of financial risk is considered. Management risk also has certain degree of risk but its extent depends on the quality of the management team and personal. The respondents clearly agreed to the fact that poor feasibility studies, poor budget and project planning and incompetence of project team will jeopardize the success of the project. The legal, policy and political risk when investment is made in the construction industry must be monitored closely. The respondents admitted that

the major aspect, that is loss which is incurred due to political changes, corruption and bribery, bureaucracy for approvals and breach of contract by both parties have a very high risk. Consequently, diligence and care must be taking when investing in any construction project in Ghana.

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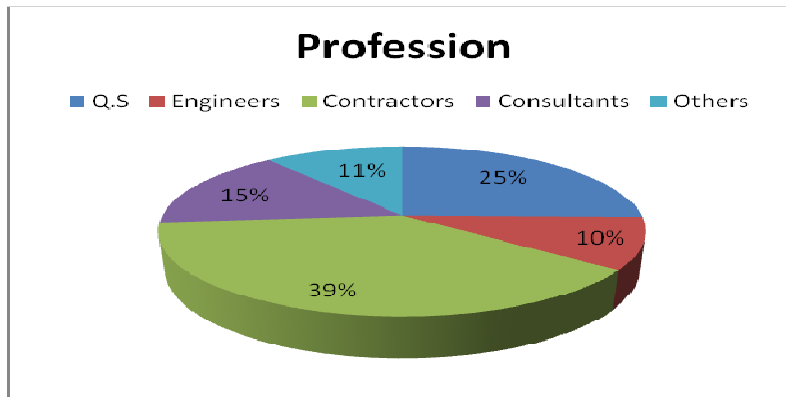
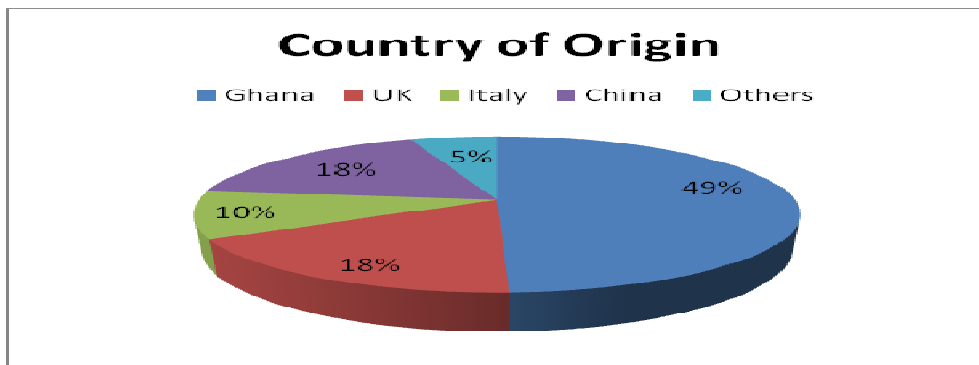**FIGURES**

Figure 4.1: Respondents based on Profession

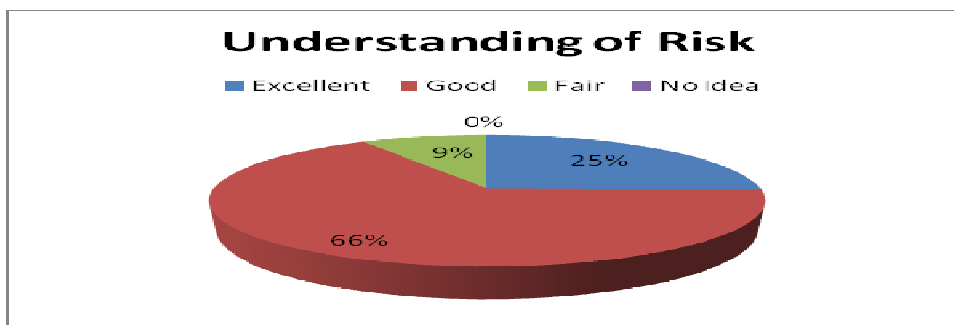
Figure 4.2: Respondents based on Country of Origin

Figure 4.3: Respondents based on Understanding of Risk

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