

Integrated Conceptual Model on Risk Mitigation and Construction Company’s Entry Decision into African Markets

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Abstract

Risks in international construction differ across markets and the impact of risks in a particular market varies due to high localization of construction services. Compared to domestic markets, international construction markets manifest more type of risks. Earlier studies on international construction evaluated and modeled risks with a view to making strategic entry decisions into international construction markets, nevertheless limited studies considered whether companies’ capabilities interact with entry modes to mitigate the impact of risks in international construction markets. In addition, there is a dearth of research on risks in African construction markets. This paper therefore examines the risks that influence construction company entry decisions into African construction markets and thereafter develops a risk quantification index and propose an integrated model that highlights the interaction between entry modes and construction company capabilities in mitigating risk impact in African construction markets. A path model of the chain-relationship of company capabilities, risk perception and entry mode which mitigates the impact of risks in international construction markets is developed. This is to establish whether perception of risk in overseas markets influences entry decision and risk perception is moderated by the magnitude of company’s capabilities.

Keywords

African Construction Markets, Company Capabilities, Entry Decision, International Construction, Risk Mitigation, Risk Neutral Model

1. Introduction

The construction industry is distinctively a unique sector that is constantly changing; it is highly dynamic and competitive, distinctively projects-specific with a complex environment and large complex conditions (Mutti and Flanagan, 2008). Construction industry products are unique and fixed; purposely designed and built, not transportable with very high localization (Malic, 2011). Although construction works are location specific, they could be situated either locally or internationally. International construction is a process where a company resides in one country and operates in another country or a situation whereby a company is receiving and working on projects owned by a client from another country (Pheng and Leong, 2000). International construction markets absorb a significant proportion of global investments (Global Insight, 2007; Reina and Tulacz, 2010). The construction market in Africa is also experiencing massive growth due to deficit in the continent infrastructural needs (AfDB, 2011; Deloitte and Touche, 2013) and African’s countries infrastructure growth need is set at about \$93 billion per year (AfDB, 2011).

However, international contractors from US, Europe and Asia dominate the largest share of African construction market (Reina and Tulacz, 2010; Deloitte on Africa, 2013) while the participation of Africa-based contractors in international and particularly African construction market is considerably low (Reina and Tulacz, 2010). The reasons for the highly oligopolistic nature of the African construction market are not known. Consequently, the main research question posed in this paper is: what are the specific risks that influence construction company entry decision into African construction markets?

2. Background to the Study

International construction markets are hostile; fraught with uncertainties and gains (Gunhan and Arditi, 2005; Grosso et al., 2008; Xiaopeng and Pheng, 2013). Compared to domestic markets, international construction markets manifest more types of risks with inherent risk creation potential (Gunhan and Arditi, 2005). In more recent times, challenges such as financial crises, economic recessions, terrorisms, wars, and recent insurgences are the common events around the world. These uncertainties in international markets affect the business climate, harm project implementation and exposes international companies to political, socio-cultural and economic/financial risks not common in domestic markets (Zhang, 2011; Xiaopeng and Pheng, 2013). Researches in international businesses show that firms' perceptions of risks in international markets differ and firms' capabilities influence risks perception; and perception of risks influences choice of entry mode into international markets. Moreover, firm's capabilities and level of control/ownership in entry modes interact to mitigate the impact of the perceived risks in international markets (Brouthers, 1995; Forlani et al, 2007; Sadaghiani, et al., 2011). Studies in international business management theoretically established that there is a highly significant relationship between international markets risks and choice of entry modes and that impact of international market risks can be minimized through the strategic selection of entry modes.

Earlier studies in international construction examined markets opportunities, challenges and risks (Zhang, 2011, Xiaopeng and Pheng, 2013); risks assessment and management (Xiaopeng and Pheng, 2013); and entry modes/strategies (Chen, 2008). Limited numbers of researches examined the impact of international risks on entry decision into international construction markets and how construction company capabilities interact with level of control/ownership in the choice of entry modes to mitigate impact of the perceived risks in international construction markets. It becomes pertinent to ask whether entry decisions are strategically made by international construction companies to mitigate the impact of the perceived risks within African construction markets; whether the capabilities of construction companies influence their perception of risks; and whether their perception of risks influence the entry decision made by construction companies with a view to mitigate the impact of the perceived risks in African construction markets. This paper therefore examines the risks that influence construction company entry decision into African/international construction markets and thereafter proposes an integrated model that highlights the interaction between entry modes and construction company capabilities in risk mitigation and management.

3. Overview of Risk Mitigation and Entry Decision

Several studies report the prevailing issues on risks and entry decisions into international construction markets, and assessed risks and their significance in international construction markets (Hastak and Shaked, 2000, Shen, Wu and Ng, 2001, Walewski, 2003, Li, 2009 & Xiaopeng and Pheng, 2013). These studies established that, the international construction markets are hampered by the lack of standardized risks assessment (Walewski and Gibson, 2003), and advocates that risks should not be ignored in making entry decisions into international construction markets and that risk mitigation is only possible through strategic choice of market, cooperation and established relationship with overseas markets (Li, 2009). Ozcan (2008) posits that a link between risk events and their consequences must be modeled, by considering the risk events and the capability and capacity of a system reacting to the events while Chen and Messner (2011) mention the need for a process model on market entry decision, theoretical proposition on market entry mode selection and sufficient understanding of the relationship between the basic entry modes and markets constraints.

Proposals have been made towards mitigating risks in international construction markets. Among these proposals are the development of entry frameworks aimed at guiding companies in their decision to export services into overseas markets (Ozcan, 2008) and the development of risks assessment techniques that combines risk probability analysis with risk impact in international construction markets and risk models that use the markets critical variables/factors (Xiaopeng and Pheng, 2013). Other studies developed models combining the significant factors to be considered before an entry decision is made (Hastak and Saked, 2000). The challenges associated with these

frameworks/models are that most data in international construction risks assessment and market entry are inconsistent, vague and ambiguous (Hastak and Saked, 2000 & Xiaopeng and Pheng, 2013) for the purpose of practical applications. In addition, a comprehensive exploratory study by Chen (2005) on entry decision model is considered inadequate because the critical markets risks were excluded in the study. The frameworks/models proposed by earlier studies excluded the significance of the interaction between company capabilities and choice of entry mode in risk mitigation and entry decision into international construction markets as hypothesized by international business management theories and cannot adequately address issues of risk assessment and mitigation in African construction markets. However, there are limited researches that provide a clear agenda of comprehensive risks mitigation measures in international construction markets, and a dearth of researches that extensively explore the significance of construction companies' capabilities and entry decision in the risk mitigation process.

Earlier studies on international construction markets devised measures of mitigating the impact of risks and the most adopted processes include the evaluation of the degree of risks occurrence and level of impact. Limited numbers of these studies considered total risks and examined the impact of these risks on entry decision into international construction markets and measure how the significant entry modes mitigate the impact of the perceived risks. Moreover, consideration of how capabilities of the construction companies interact with entry decisions to mitigate the amount and impact of the perceived risks in international construction markets was minimal in the earlier studies. The proposed model in this paper addresses the shortcomings in the earlier researches regarding the mitigation of the perceived risks impact and the use of strategic entry decisions when accessing international construction markets.

4. Method

The study area for this research will be South Africa. The choice of South Africa within African construction markets is based on the availability of large-scale country-based construction companies who are competing in international construction markets. The study data will be collected using a mixed method research approach, which combines both the quantitative and qualitative research methods. The research design will be explanatory sequential because of the dearth of researches on risks within African construction market; in order to source for more than one type of data which could provide detail understanding of the problem; give the research outcome an ability to generalize the result obtained; enable strength of one data to compliment other data inadequacy; and explain further the findings of the objective data with subjective data (Creswell and Plano Clark, 2011). The subjective data and their analysis under explanatory sequential mixed method design refine and explain the statistical results by exploring participants' view in more depth (Tashakkori and Teddlie, 2010).

The study population for most international construction related researches are usually the “*Top ENR 225 international contractors*” and country data. Due to low representation of Africa-based contractors on the ENR list, the population for this study will be construction companies listed in Grades 8 and 9 on the Construction Industry Development Board (cidb) contractor register in South Africa. Those whose work categories are in civil engineering (CE) and general building (GB) will be surveyed as shown in Table 1. Selected experts working for these grades of construction companies based in Gauteng, Kwazulu Natal and Western Cape provinces of South Africa will be interviewed.

Table 1: Study Population

S/N	Population						Total
	Grade	Active company	Unit of company	CE	GB	CE & GB	
1	8	254	177	65	47	17	129
2	9	100	54	20	9	10	39
	Total	354	231	85	56	27	168

Key: CE: Civil engineering, GB: General Building.

Source: cidb (accessed September 8, 2014). Available at: <https://register.cidb.org.za/PublicContractors/>

Quantitative data will be obtained through online questionnaire survey while case studies of selected construction companies will be undertaken to collect qualitative data. The purpose of the case study is to ensure in-depth investigation of the problem being studied, and to provide justification for results obtained from the survey. Through the case study approach, audited financial and annual reports of the selected construction companies will be further examined. The purpose of examining the construction companies' reports is to synthesize industry data with companies' perception for the purpose of hypothesis testing and establishing theories on whether construction company capabilities influence risk perception; whether risks perception influences entry decision; and whether capabilities interact with entry decision to mitigate the impact of the perceived risks in African construction markets.

Data collected will be analyzed using both descriptive and inferential statistical tools. The descriptive statistics such as risk probabilistic index, companies' capabilities index, entry mode significance index and neutral index will be developed using mean scores. Neutral index will combine the probabilistic index for risks and significance indexes of company's capabilities and entry mode to evaluate the mitigating power of construction company' capabilities and entry decision on the risks impact in African construction markets. Moreover, inferential statistical tools such factor analysis; correlation, regression analysis, chi-square and analysis of variance (ANOVA) will be employed in establishing the significance of the relationships among the research constructs. A confirmatory factor analysis, which reduces the list of risk factors into few significant variables for easy description of data and comparison with descriptive statistics, will be employed. Chi-Square will be used in testing whether there are significant relationships among company's capabilities, risks perceptions and entry modes, while analysis of variance (ANOVA) will be used in testing the level of significance among a group of risk factors and entry modes. In other to develop a path model on relationships among company's capabilities, international risks and entry mode; inferential statistical tools such as a Spearman's correlation will be employed in measuring the type of relationships existing among the model variables, and both linear and multiple linear regressions analysis will be used in establishing how the model constructs influence each other. Partial least square structural equation model as path analysis will be used to present and validate the proposed model on risk mitigation with a view to improving the strategic entry decision made in accessing African construction markets.

5. Constructs of Risk Mitigation Model

5.1 Risk Mitigation Process

This is the process a construction company adopts in mitigating the possible or perceived impact of risks in international construction markets. The risk mitigation process in this paper will include risk quantification, establishment of the entry modes significance index and company's capabilities significance index. The proposed study will combine the entry mode significance index score with construction companies' capabilities index score to develop a strategy which can be used in mitigating the impact of the perceived risks in African construction markets.

5.1.1 Risk quantification

Risk will be quantified using the probabilistic index which combines the probability of encountering a risk in African construction markets with the degree of impact such risk will have on construction services export. Risk quantification in earlier studies used mathematical equations to model risk as a function of the probability/likelihood of occurrence of a risk and its degree/severity of impact (Hastak and Shadak, 2000, Shen *et al.* 2001; Walewski and Gibson, 2003). The models used different pre-determined scales to develop a risk significance score. The probability of risk occurrence is denoted by α and the degree of impact/loss if risk occurs is denoted by β (Shen *et al.* 2001). The risk significance score denoted as RS is described as the function of two attributes and computed through model S_j^i ;

$$\begin{aligned} RS &= f(\alpha, \beta), & 1 \\ S_{ij} &= \alpha_{ij} \beta_{ij}, & 2 \end{aligned}$$

Where S_j^i = significance score assessed by respondent j for risk i ; α_j^i = probability of occurrence of risk i , assessed by respondent j ; and β_j^i = degree of impact of risk i , assessed by respondent j . After the computation of risk significance score for each risk, an average significance score will be computed known as risk index score. The model for calculating risk index score can be written as:

$$\text{Risk Index Score (RS)} = \sum_{j=1}^n S_{ij} , \quad 3$$

Where RS = index score for risk divided by n ; S_j^i = significance score assessed by respondent j for risk i and n = the number of respondents.

5.1.2 Capabilities index (CI)

The capabilities (revenues, assets, number of permanent employees and years of international experience) of construction companies over certain period will be obtained and average values will be computed. The capabilities index of construction companies denoted as CI and can be described as the function of more than one variables where a, b to n = capabilities variables and computed through the model C_j^i ;

$$CI = f(a, b \dots n), \quad 4$$

$$C_{ij} = \alpha_{ij}, \quad 5$$

Where C_j^i = significance score by company j for capabilities variable i ; α_j^i = magnitude of variable i , obtained from company j . After computing the significance score for each capabilities variable, an average significance score can be computed as capabilities index score. The model for calculating capabilities index score can be written as:

$$\text{Capabilities Index Score (CI)} = \sum_{j=1}^n C_{ij} , \quad 6$$

Where CI = index score for capabilities divided by n ; and S_j^i = significance score obtained from company j for capabilities variable i and n = the number of companies.

5.1.3 Entry-mode significance index (ESI)

The frequency of usage of entry modes in construction services export and the level of strategic selection of these entry modes to mitigate the impact of the perceived risks will be examined using pre-determined scales of number of access/entry to measure the level of significance of the mitigating power of the entry modes on the perceived risk impact. The entry mode significance index in accessing markets by construction companies will be denoted as EI and can be described as the function of more than one mode where a, b to n = entry modes and computed through the model E_j^i ;

$$EI = f(a, b \dots n), \quad 7$$

$$E_{ij} = \alpha_{ij}\beta_{ij}, \quad 8$$

Where E_j^i = significance score assessed by respondent j for entry-mode i ; α_j^i = frequency of usage of entry-mode i , assessed by respondent j ; and β_j^i = degree of strategic selection of entry-mode i , assessed by respondent j to mitigate impact of the perceived risk. After the computation of significance score for each entry-mode, an average significance score will be computed known as entry index score. The model for calculating the entry index score can be written as:

$$\text{Entry Mode Index Score (EI)} = \sum_{j=1}^n E_{ij} , \quad 9$$

Where EI = index score for entry mode divided by n ; and E_j^i = significance score assessed by respondent j for entry-mode i and n = the number of entry modes.

5.1.4 Risk neutral index (RNI)

Risk neutral index (RNI) is an index that combines the index scores of risk impact, company capabilities and entry mode with a view to establishing to what extent company capabilities interact with the level of control and ownership in choice of entry modes to mitigate the impact of perceived risks in African construction markets. The RNI will estimate the reduction power of company

capabilities and entry mode in mitigating risk impact. The risk neutral index is annotated using the mathematical model:

$$\text{Risk Neutral Index (RNI)} = \sum_{j=1}^n (S_{ij} * C_{ij} * E_{ij}) , \quad 10$$

Where RNI = risk neutral index score; and S_j^i = significance impact score assessed by respondent j for risk i , C_j^i = magnitude score from company j for capabilities variable i , and E_j^i = significance score assessed by respondent j for entry mode i .

5.2 Risk Mitigation Path Model

Following the existing theoretical concepts and models in international business management (Brouthers, 1995, Forlani *et al.*, 2007 & Sadaghiani *et al.*, 2011). It is evident that capabilities of firms influence risks perception; risks perception influence choice of entry modes and capabilities of firms interact with level of control/ownership in the choice of entry modes to mitigate the magnitude of risks in international markets. These hypotheses establish a chain relationship among the research constructs aimed for modelling purpose. The conceptual path model for this study is situated within the theoretical ideologies of strategic management. The conceptual model is presented in Figure 1 and proposes that there is a direct linear relationship between companies' capabilities and international risks perception; and that a direct linear relationship exists between construction companies' perception of risks and choice of entry modes. It also proposes that a construction company's capabilities and entry decision interact to mitigate the impact of perceived risks in African construction markets. The level of these interactions among construction company's capabilities, international risks and entry modes are further presented using both linear and multiple linear regressions in equations 11, 12 and 13.

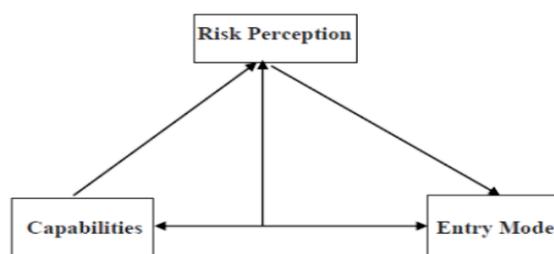


Figure 1: Conceptual Model

The constructs of this model are construction companies' capabilities, international risks and entry modes into international markets. Company's capabilities constructs are revenues, number of permanent employees, years of international experiences and assets (Brouthers, 1995). International risks are country and project risks; country risks are political, socio-cultural, and economic/financial risks (Ozorhon *et al.*, 2007; Zhang, 2011 & Xiaopeng and Pheng, 2013). Political risk will include all risk factors associated with political events, government changes and discontinuity in the business environment due to political changes, legal and government policies (Xiaopeng and Pheng, 2013). Economic/financial risks are described as host country macroeconomic conditions which include fluctuations in economic conditions, inflation, foreign exchange rates, and shortage of resources. (Ozorhon *et al.*, 2007); while socio-cultural risk cover a company's vulnerability to social issues such as a potentially inflammatory policy, ethical practices, pressure on the organization to change its approach; human rights and labour issues, environmental sustainability challenges, war, civil war/unrest and terrorism (Ozcan, 2008). The project risks cover procurement-related, design-related and construction-related factors (Zhi, 1995; Hastak and Shaked, 2000).

In addition, comprehensive entry modes as outlined in previous studies (Chen, 2008; Chen and Messner, 2011) will be employed and these are strategic alliance, local agent, licensing, Joint Venture Company, sole venture company, branch office/company, representative, joint venture project, sole venture project and Build Operate and Transfer (BOT)/equity project. The entry modes will be classified into integrated/wholly owned (High control/ownership), cooperative (Equal control/ownership) and independent (Low control/ownership) (Brouthers, 1995).

5.2.1 Interactions between firm's capabilities, risk perception and entry decision

The relationships among international risks, company capabilities and entry modes are modeled using linear (Equations 11 and 12) and multiple regressions (Equation 13).

$$Y (\text{Risks Perception}) = X (\text{Firm's Capabilities}) , \quad 11$$

$$Y (\text{Entry Decision}) = X (\text{Risks Perception}) , \quad 12$$

$$Y (\text{Risks Mitigation}) = X1 (\text{Firm's Capabilities}) + X2 (\text{Entry Decision}), \quad 13$$

In equation 11, risk perception is the dependent variable while firm's capabilities is the independent variable (moderator). This means that as firm's capabilities change, the firm's perception of risks in international construction markets also changes. Also in Equation 12, entry mode is the dependent variable while risk perception becomes the independent variable meaning that as perception of firm risks in international construction market changes, the choice of entry mode will also change. Since the risks perception, which was the dependent variable in Equation 11 becomes the independent variable in Equation 12; it suggests that there is a continuous linear relationship between firm's capabilities, international risks and entry modes. This bi-relationship mitigate the impact of perceived risks in the chain-relationship. However, since firm's capabilities and entry decision interact to mitigate impact of perceived risks in international markets, this means that mitigating the amount of the perceived risks is a function of interaction between firm's capabilities and the type of entry decision made. Equation 13 is a typical risk mitigation model where risk mitigation is the dependent variable and firm's capabilities and entry decision are independent variables. This implies that as a firms' capabilities increases and a strategic entry decision is made about a particular international market, the impact of the perceived international risks decreases and vice versa.

5.3 Model Constraints

The proposed risk mitigation model is conceptualized within certain boundaries and constraints. Firstly, the numbers of the larger sized construction companies in South Africa who specialize in civil engineering (CE) and general building (GB); and involved in the export of construction services are limited. Therefore, the accuracy of the anticipated level of responses from the experts might influence the precision of the model. The generalization of the risk mitigating power of the model to the larger sized construction companies in South Africa who are exporting services into African construction markets is also dependent on their responses. In addition, the assessment of international construction market risk impact on strategic choice of entry modes will focus on countries where South African construction companies have significant presence and large economies in Africa.

6. Expected Contribution to Knowledge

The proposed integrated model is expected to make the following contributions to the body of knowledge in international construction in general and international construction risk management research in particular. First of all, the model proposes a strategy for risk mitigation with a view to enhancing entry decision of companies into African construction markets. Secondly, it develops a risk quantification index for assessment of total market risks and a risk neutral index that combines the mitigating power of company capabilities and entry mode in mitigating the impact of the perceived market risks. The capabilities and entry mode indexes will show which of their variables has the strongest mitigating power against the impact of the perceived risks within African construction market. In addition, the paper presents a path model that establishes a bi-relationship among company capabilities, risks perception and entry mode. The impact of the perceived risks is mitigated in the chain-relationship of the model.

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