

# A Conceptual Framework for Mitigating Effect of Factors Affecting Cost Performance of Small Scale Contractors in Nigeria

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**Abstract** - This study proposed a conceptual framework for mitigating factors affecting cost performance of small scale contractors in Nigeria. The framework proposes constructs that affect cost performance small scale contractors in Nigeria. In addition, the study also considers the mitigating construct as a mediator variable between the factors and cost performance of contractors. The mediating construct is client financial support, which will reduce the effects of the main factors on the cost performance of small scale contractors. Considerable research interest in the field of performance measurement and improvement leads to the development of new tools to measure and improve performance in the construction industry. However, due to the shortcoming and inadequacies identified in the previous performance tools by researchers and the nature of construction industry, there is need to develop a suitable framework that will mitigate the effects of the major factors that affect performance of small scale contractors in the industry. The proposed framework aimed to provide a foundation from which future researches can be carried out to identify ways of improving contractors' performance through identification and mitigating the factors that affect the performance. It is hoped that this study will motivate researchers to focus more on improvement of the performance of small scale contractors.

**Keywords:** *Factors Cost Performance, Small Scale Contractor, Client Support.*

## 1.0 INTRODUCTION

The cost performances of small scale contractors is a widely discuss topic among the practitioners in construction industry globally, this is because the contractors serve as catalyst for employment generations, national growth, poverty alleviation and economic development (Mohammed & Obeleagu-Nzelibe, 2013). Cost performance of small scale contractors is important to the development of any nation. The cost performance of small scale contractors leads to the increase firm's profit margin, minimized cost and time overruns and satisfaction of project clients; enhance competitiveness in the construction industry and general economic development of a country (Pheng & Chuan, 2006). The performance of small scale contractors has been accused in many aspects of productivity like cost, time and quality. This is possibly due to the effects of factors that affects cost of construction project (Cox, Issa, & Ahrens, 2003; Masrom, 2012). Pinto and Pinto (1990) stated that mitigating the effects of factors affecting cost performance of small scale contractors

should also include ethical due process and client support. The success of any contractor is to deliver a project on budgeted cost that conforms to client's expectations, meets specifications, attains good workmanship and minimizes construction defects and conflicts (Songer & Molenaar, 1997).

Globally, researches have attempted to improve performance of contractors for example in Singapore a set of key performance indicators similar to those used in manufacturing and service industries were developed to measure the performance of contractors. The key performance indicators were developed in the areas of cost performance factors, schedule/time, quality, waste management, customer satisfaction, profitability, productivity and safety. These performance indicators KPIs are benchmarked to identify key the factors that affect contractors' performance which includes cash flow problems, effects of fraudulent practices and the effects of the nature of construction environments (Brah, Ong & Rao, 2000; Ling, Yean & Peh, 2005). The cost performance of construction projects have been a source of concern to the stakeholders in the construction industry. Cost deviation from initial cost plan is the most prevalent factor in the construction industry. However, little or no efforts has made to curtail the phenomenon of poor cost performance of contractors (Amusa, 2009). Cash flow problems and poor nature of construction environment are the most important factors that affect cost performance of contractors (Memon, Abdul Rahman, Mohd & Abdul Azis, 2012). Poor cost performance of contractors in the united state represent a large cost loss to construction industry due to poor productivity, cost overrun and delays. The study described that cost of completing a delayed project against the percentage of the work done by the contractor's failure occurs either at 0 – 20% or later 80 -99% progress of works and deduce that cost of non performance is proportional to the facility's contract cost (Russel, 1991).

Researchers in the area of performance management have attempted to developed a model for improving contractor performances. Johnson (2010) developed a model to estimate the benefit-cost ratio performance of housing projects in New-Zealand with the sole aims of identifying potential reductions in the total cost and resources used to

sustain performance. In Iran Jafari (2013) developed a model for contractor pre-qualifications based on quality functions of project and considers both the projects owner's requirements and contractor's ability to satisfy client needs. Wong (2004) developed a model contractor performance prediction for the United Kingdom contractors based on selection criteria of contractors, forty eight (48) of United Kingdom public and private construction projects were selected for the study the model linked contractors' selection criteria to the contractor performance prediction. All these studies do not resolve the problems of poor cost performance of contractors. Mitigating the effects of factors affecting cost performance of contractors has to come from industry's based research by identifying major factors that affect cost performance and introduction of mediating variable that mitigates the effects of the factors.

## 2.0 LITERATURE REVIEW

### 2.1 Cost Performance

Construction cost performance is one of the most important criteria of contractor's success from inception to completion of any project and is of serious concern to major stakeholders in the industry (Memon, Abdul Rahman, Abdullah, & Abdu Azis 2011). In a construction

$$\text{Netcashflow} = \text{PositiveCashflow}(\text{Cashin}) - \text{NegativeCashflow}(\text{Cashout})$$

Therefore based on the definitions positive cash flow is derived from the monies or payment receipts by a firm during a period of time and negative cash flow is the monies expended on a contract for the procurements of materials, plant, equipments, services, wages and salaries, and other overhead cost. Cash flow problems occur where the contractor's expenses exceeded the income (Odeyinka, Lowe & Kaka, 2008).

Memon, Abdul Rahman, Abdullah, and Abdu Azis (2011) said that a cash flow problem is the main causes of contractor's financial difficulties in the Malaysian construction industry.

Iyer and Jha (2005) identified that fraudulent practices in the construction industry are the main factors affecting cost performance of small scale contractors in India. Elinwa and Buba (1993) stated that fraudulent practices, kickbacks are the most important factors leading to poor cost performance of contractors in Nigeria. Rosenbaum (1997) mentioned that all government-funded projects in developing countries are mostly political in nature. Political problems in turn, invariably lead to poor cash flow, fraudulent practice. Fraudulent practice is seen as the intent to deceive through false representation of a matter or a fact, whether by word or by conduct, or by concealment of information, which should have been disclosed in order to cause an entity relying upon that false information (Mathew, Patrick & Denise, 2013). Fraudulent practices are most important factors that affect performance practices of contractors. The problems associated with fraudulent practices in construction industry are: actions not taken for non-compliance with the terms and conditions of contract, double payment for same item, and substitution of specified item with used or inferior ones, expenses paid when not incurred, falsification of contract documents and

industry very rarely projects are completed within initial cost. Previous studies have identified that cash flow problems, effects of fraudulent practices and effects of the nature of construction environments are the most important factors affecting cost performance of projects in developing countries (Odeyinka, Lowe & Kaka, 2008). Cash flow is viewed in construction projects in two ways. Firstly cash flow is view as the net receipt or net disbursement resulting from receipts and disbursements occurring in the same period (Odeyinka, Lowe & Kaka, 2008).

$$\text{Cashflow} = \text{Receipts} - \text{Disbursements}$$

The equation above indicates that a positive cash flow shows a net receipts in a particular period of interest, while a negative cash flow indicated a net disbursement in that period. Secondly, cash flows is defined here as the actual movement or transfer of cash (money) into a firm or out of a firm (Kenley. 2003) in (Odeyinka, Lowe & Kaka, 2008). Therefore based on this definition money coming to the firm is termed as cash flow positive because the money is credited to the account of the firm and money going out from the firm is term cash flow negative because the money is debited from the account of the firm, so the different between the two is termed net cash flow.

given gratitude to induce a party in the contract (Mathew, Patrick & Denise, 2013).

Nature of the construction environments affect cost performance of projects most which has become a major issue to stakeholders in construction industry (Shen & Tam, 2002). The problems associated with the nature of construction environments are: harsh construction sites, civil commotion/disturbances, topography of the construction/working site, site's constraints and storage limitations, availability and supply of labour to the site, hostile political and economic environments etc (Yassamis, Arditi & Mohammadi, 2002). The problems of water pollution are also seen as important factor affecting performance practice of contractors (Shen & Tam, 2002). The effects of the nature of construction/working environments have significant impact on both financial, technical and management practices of contractors (OSPAR, 2008). The report also indicated that the effects have cumulative impact on the quality of products and further divided it into permanent and temporary effects. The permanent effects comprised of meteorological trends like storms, geological process like soil and strata characteristics and long term environmental trend like climate changes. The temporary effects are comprised of chemical, biological and ecological effects as well as social and political conditions such as land use acts, development trends, regulations, social trends and public safety (OSPAR, 2008). The nature of construction/working environments affect not only the projects themselves but also the project sites, materials and equipment used to build the projects such as concrete, timber, clay, sand, gravel steel etc.

## 2.2 Client Support

Client support is one of the important factors for improving cost performance of contractors. Client support is divided into three dimensions: Nature of support, time of support and method of support recovery (Ekpo, 2004). Nature of client support in a construction contract is the process by which a project owner makes a direct intervention to enhance cost performance of contractors or subcontractor for either executed or non-executed service (Ekpo, 2004). Client intervention could be financial, technical or management intervention. When intervention made timely it enables a contractor to maintain reasonable speedy work flow plan for timely execution of a project but if made late tend to disrupt the sequence of project execution (Aminu-Kano, 2004; Ndah, 2004). Project client support is a system of support that is made directly to a contractor to enhance cost performance of a project (Ofoegbu, 2011). Client support mitigates the effects of factors affecting cost performance of small scale contractors (Talagala, 1997).

Payment timing is the process whereby a client gives timely intervention to a contractor Stone (2002) stated that client support should be given to a contractor based on request. A contractor therefore has to apply for the intervention. Aminu-Kano (2004) suggested that the intervention should be given to a contractor on request or after achieving certain milestone activity but Hussin and Omran (2009) suggested the interventions in stages while Onwusonye (2004) stated that the intervention supports goes a long way towards improving performance of small scale contractors and suggested given it full after signing of the contract. Ndah (2004) opined that the intervention should be sufficient to cover the requirements of a contractor.

Method of support recovery is the process whereby client would recover the intervention support given to a contractor if the need arise. According to Onwusonye (2004) the recover method of client support rested on the expressed provisions of the terms of contract such as recovery during progress of work. Spreading of support recovery from first to the third quarter of the project period improved cost performance of contractors by allowing adequate support into a project (Abubakar, 2004). Ndah (2004) stated that recover should be left at the completion period of a project.

## 3.0 CONCEPTUAL FRAMEWORK FOR MITIGATING EFFECT OF FACTORS AFFECTING COST PERFORMANCES OF SMALL SCALE CONTRACTORS IN NIGERIA

An assessment of the mediation effects of client support to mitigates the effects of factors that affect cost performance of small scale contractors could be achieved by two test that involved the use of a mediator variable to assess the direct, indirect and total effects of the mediator variable i.e. client support. The following methods of mediation analysis could be used to assess mitigating effects of client support:

- i. Causal steps as presented by Baron and Kenny (1986)
- ii. Percentile and bias-corrected bootstrap CIs presented by Hayes & Scharkow (2013)
- iii. Sobel Test by Sobel (1982)

Baron and Kenny (1986) suggested some important causal steps to test the mediation effects of mediator variable namely:

- i. The direct effects between independent variable (factors affecting cost) and dependent variable (cost performance) should be significant.
- ii. The effect of independent variable (factors affecting cost) on the mediator (client support) and the effects of the mediator (client support) on dependent variable (cost performance) must be significant; and
- iii. The magnitude of the direct effect between independent variable (factors affecting cost) and dependent variable (cost performance) after including mediator should not be significant or have to be reduced.

Hayes & Scharkow (2013) recommended bias-corrected bootstrap CIs as the most trustworthy test if power is of utmost concern. The percentile bootstrap CI is a good compromise test. The test has the followings procedures:

- i. Use the specific model in question including both the direct and indirect paths;
- ii. Perform N number of bootstrap resampling.
- iii. Explicitly calculate the product of the indirect paths from the direct path under assessment ( $a*b$ );
- iv. Estimates the significance using percentile bootstrap CIs (where  $z.975$ ) is equal to the constant 1.96).

$$\left( \hat{a} \hat{b} \right) \pm S \hat{a} \hat{b} Z.975$$

Sobel test is used to calculate or determine the relationship between the independent variable and dependent variable is significantly reduced after inclusion of the mediator variable. In other words, this test assesses whether a mediation effect is significant. The test examines the relationship between the independent variable and the dependent variable compared to the relationship between the independent variable and dependent variable including the mediation factor. Sobel test is more accurate than the Baron and Kenny approach. However, it does have low statistical power. As such, large sample sizes are required in order to have sufficient power to detect significant effects. This is because the key assumption of Sobel's test is the assumption of normality. Because Sobel's test evaluates a given sample on the normal distribution, small sample sizes and skewness of the sampling distribution can be problematic. Thus, the rule of

thumb as suggested by MacKinnon, Lockwood and Williams (2002) is that a sample size of 1000 is required to detect a small effect, a sample size of 100 is sufficient in detecting a medium effect, and a sample size of 50 is required to detect a large effect.

Figure 1.0 presents framework for direct effect between independent variable factors affecting cost of construction

projects and dependent variable cost performance of small scale contractors. the figure shows direct relationship between cash flow problems, effects of fraudulent practice and effects of the nature of construction environment with the dependent variable cost performance of small scale contractors. The three factors have severe effects on the cost performance of particularly small scale contractors in developing countries.

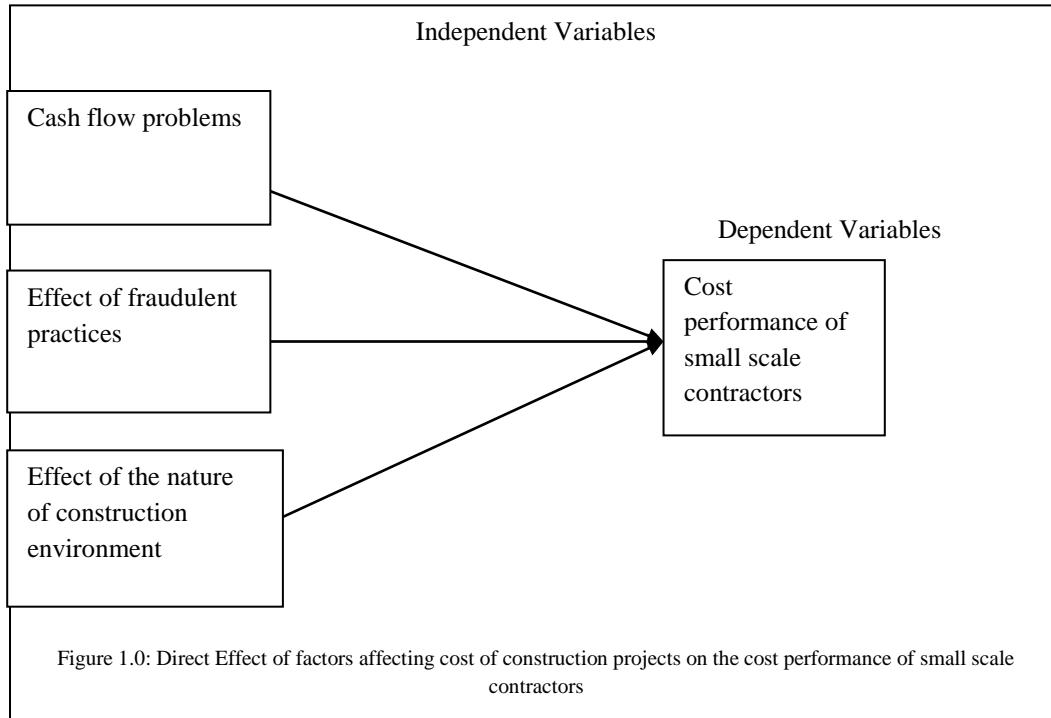
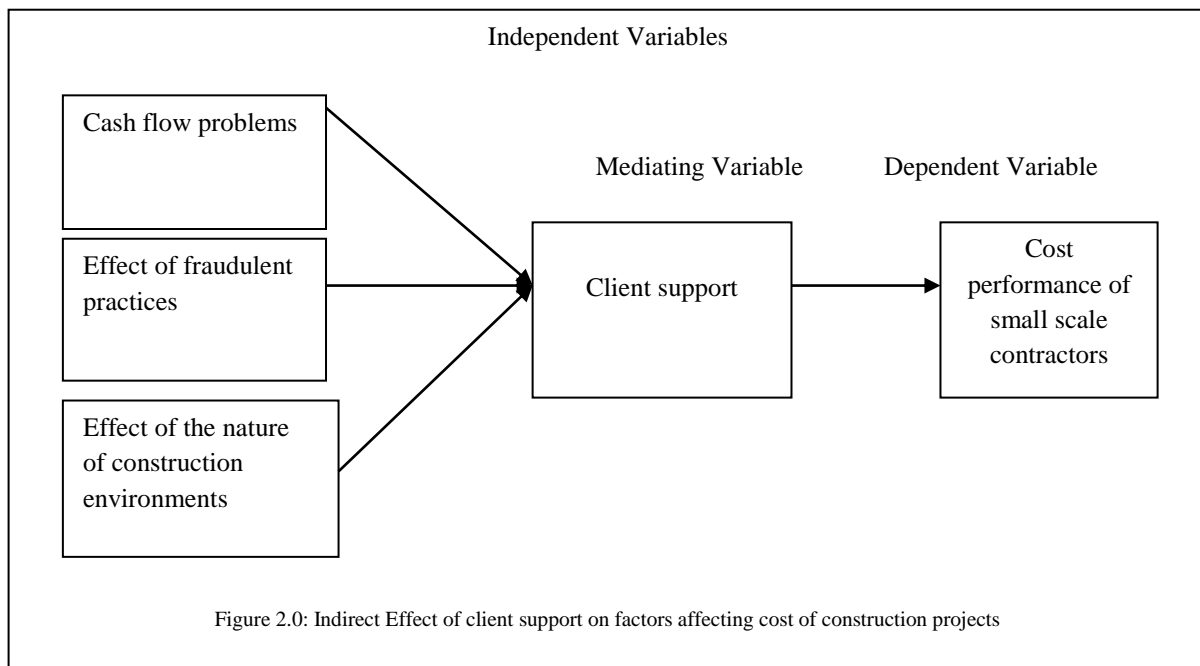


Figure 2.0 presents the indirect effect of client support on the factors that affects cost performance of small scale contractors. The mediating variable in the framework serves as a shock absorber on the effects of the factors thereby mitigating or reducing these effects on the cost performance of contractors.



#### 4.0 CONCLUSION

This conceptual paper presents a framework for mitigating the effects factors that affect cost performance of small scale contractors in Nigeria. Hence the framework would evaluate and improve the cost performance of small scale contractors in Nigeria. The causal relationship between the main factors and the cost performance is shown in the first framework. The framework indicated that three factors namely: cash flow problems; effects of fraudulent practices in the construction industry and the effects of the nature of construction environments affect cost performance of small scale contractors. The second framework introduces a mediator variable client support that would mitigate the effects of the main factors. Minimizing the effects of the main factors could enhance cost performance of the contractors. This would improve the general performance of contractors and client would get value for their money (VFM) and overall the economic development of Nigeria. Client support would facilitates in building the capacities of small scale contractors in Nigeria to the extent that they can compete directly with their foreign counterpart. Future research will determine the validity and reliability of the constructs in the proposed frame work.

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