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Post-Contract Transaction Costs: A Waste Minimization Perspective of the Nigerian Construction Industry

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Abstract

This paper examines and distinguishes the stem causes of post-contract TCs borne by both the parties in a project in the Nigerian construction industry. Questionnaires were administered to contractors in the construction industry. The factors that affect TCs were analyzed from the clients and contractor's perspective. Statistical analyses were performed to identify the transaction expenses incurred in the course of the post-contract phases of a project relative to the public sector using Design-Build (D&B) project delivery systems. The findings indicate that the percentage rate of PTCs for D&B projects in Nigeria is 9%. Interestingly, change orders, contractor opportunistic behavior, quality of communication and material substitution were ranked high as the core roots of PTCs for D&B projects in Nigerian construction industry. The primary contribution of this paper is to explore waste from construction projects with the aim of minimizing them to optimize project performance in the Nigerian construction industry. The uncertainties for environment addressed in this study are not wholly explored. Hence, the need deeply explore the attribute of environmental uncertainties on TCs.

Keywords: Post-Contract Transaction Costs (PTCs), Benefits Maximization, Project Performance

INTRODUCTION

The transaction costs approach is found on the idea that institutions and organizations seek to attain efficiency, minimizing a wide-ranging cost including not merely the neoclassical production cost but also the transaction costs (Li *et al.,* 2013). The principal-agent theory states that transaction costs arise in a hierarchical relation between a principal (owner) and agent (contractor). Principal hires an agent for his professional service and expertise. Transaction costs are incurred during the pre-tendering stage, tendering stage and post-tendering stage (Hughes *et al.,* 2006). The transaction cost is defined as the costs of using price mechanism; discovering what the prices are, negotiating and closing a contract or the costs of carrying out a transaction with exchange good and service in the open market (Coase, 1960).

TCs are the costs that business sector members need to pay up with a specific end goal to make an agreement, create standards to execute this understanding, and set up the proper conveyance framework as a component of the game plan. In construction, TCs is basically tied to expenses at the pre and post-contract stages. Pre-contract TCs are frequently introduced and borne by clients in information inquiry and procurement, while, post-contract TCs borne by clients in contract administration and enforcement (Williamson, 2010; Li *et al.,* 2013). These inconspicuous expenses are brought about because of experts' time spent in procurement exercises, which can be seen as a waste or misuse of societal assets and wealth (Wenan & Mengjun, 2010; Wenan & Tianhua, 2010). Hence, it is seen as amongst the essential ingredients that affect the construction project execution as well as performance. Thus, there have just been a few attempts to apply the TCs structure to

determine the "hidden" expenses or costs in procurement in the construction industry across board. This is yet more obscure in the Nigerian construction development industry. The study explores the center reasons for post-contract transaction costs in the Nigerian development industry. Three key issues are being explored. To start with, what are transaction costs? Second, what is the percentage rate of post-contract transaction costs of Design-Build (D&B) in Nigerian construction projects?

Transaction Cost

In 1937, Ronald Coase initially presented the idea of exchange costs TCs (Jacobides, 2008). Coase progressively encourage researched on pricing systems and reasoned that there are costs identified with searching pertinent prices, arranging, and building up a contract (Coase, 1960, 1988, 1992). In 1985, Williamson built up the hypothesis of TCE by concentrating on the financial performing actors' behavioral suppositions 'opportunism and bounded rationality' and transaction qualities, for example, assets specificity, uncertainty, unpredictability, and contestability (Williamson, 1985, 2005, 2010). Monetary on-screen characters carrying on shrewdly with bounded rationality and uncertainties dictate contracts, which somewhat represents possibilities of unforeseen event. Outstandingly TCE has customarily concentrated on the client supplier relationship with regards to an authoritative assent. This relationship is connected with TCs including; expenses of information, negotiation, competitive advantage, contract organization and administration, market structure, requirement, and surveying/checking performance (Melese & Frank, 2005).

TCs angle has gotten critical consideration by scientists and has been connected to a scope of development topical issues. The method of reasoning behind applying TCs in development is to comprehend the participation and inspiration among undertaking partners. Eccles, (1981) conveyed an examination on the effect of benefit specificity and instability in the administration type of building firms. Eccles further embraced the hybrid contract to study the relationship amongst contractor and sub-contractual worker. Winch (1989) analyzed the relationship of socio-technical frameworks, organization and environment, and project management in construction development. Winch beliefs that the three viewpoints don't completely clear up the refinement and combination of market organization. This implies the transaction between firms in applying the open market governance administration model do not completely break down the connections amongst firms. Subsequently, Winch embraced the TCs point of view as an option approach in logically taking care of the connections inside and amongst companies. The ramifications of Winch`s work stood in deciding the origins of uncertainty or instability, multifaceted nature, and number of these circumstances confronting construction companies.

Transaction Cost in the Construction Industry

According to Hughes *et al.* (2006), transaction costs can be classified into 3 phases, which are: pre-tendering stage, tendering stage, and post-tendering stage. Pre-tendering transaction costs (TCs) include the costs of marketing strategies, forming alliances, and establishing a reputation. The tendering phase includes the costs of estimating building work, bidding the tender project and negotiating. Post-tendering phase includes the cost of monitoring project execution, enforcement of a contractual obligation, and dispute settlement. This post-tendering stage is equivalent to post-contract stage.

Pre-contract Transaction Costs

Pre contract TCs are incurred earlier than a building begins. They incorporate the expenses caused in drafting and arranging negotiations and extent with the diagram of the genuine or administration to be

given. In this study, pre-contract TCs are depicted as the TCs borne by client before the construction contract is confirmed and marked (Soliño & Gago de Santos, 2009). Pre-contract TCs comprise of the costs of ecological affect appraisal, feasibility study, preparatory plan, and bidding including documentation practice and arrangement. Soliño & Gago de Santos, (2009) really concur with Whittington portrayal of TCs. Whittington (2008) finds in six case research that pre-contract transaction expenses in the design-bid-build system vary from 0.4–8.80% (average 2.60%) of the cost of the contract; the range for the design-build system is 0–5.70% (average 2.20%). Established on their findings (Dudkin G, Välilä, 2005) conclude that TCs in the pre contract stage of projects initiatives are approximately 2–30% of the contract cost on average.

Post-contract Transaction Costs

Post contract TCs encompass the expenses incurred after the contract has been signed however earlier than the entire construction projects have been completed. Post contract TCs consist of the "setup and strolling expenses of the governance structure to which monitoring is assigned and to which disputes are referred and settled: the maladaptation charges that are incurred; the haggling costs that attend adjustments (or the lack thereof); and the bonding fees of effecting tightly closed (credible) commitments" (Williamson, 1985).

Post-contract TCs springing up from disputes and litigation ought to be excessive as evident in developed and developing nations such as 'Australia, the US, the UK, Hong Kong and Nigeria' inflict an excessive value to the industry both in expressions of direct fees "lawyers, claims consultants, management time, delays to venture completions" and oblique costs "degeneration of working relationships, effects of distrust between contributors and lack of teamwork" (Yates, 1999). Whittington (2008) studies on post-contact TCs for the design-bid-build system represent between 8.90 and 14.70% (average 12.60%) of the contract value; the variation for the design & build system is 3.4–14.30% (average 9.50%).

Nevertheless, it is premised in this paper that, post-contract TCs consists of the fees of daily contract administration, dispute resolution, trade orders and administering claims in addition to incentive payments. In this study, respondents had been requested to approximately estimate the expenses or cost of post contract TCs or variations with appreciate to contract cost in the ultimate venture they accomplished for their companies in Nigeria.

METHOD

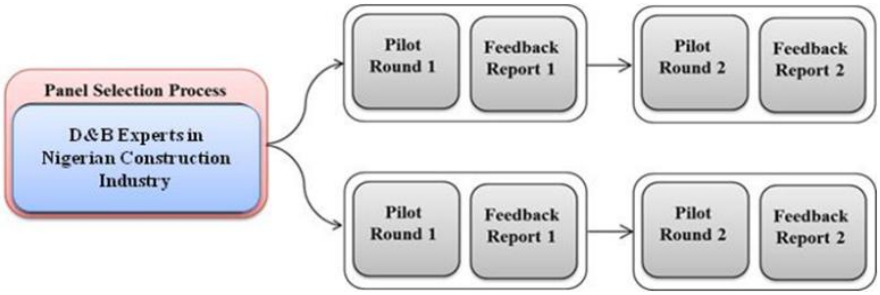
This study is grounded on a deductive research method that relies on the quantitative research approach for systematic empirical investigation of a social phenomenon through statistical techniques (Nor, 2009). Delphi technique was employed to identify the post-contract transaction costs of Nigerian D&B construction projects (Zannah *et al.,* 2016). The Delphi approach gives the possibility for researchers to gather input from members without requiring them to work face-to-face (Irdayanti *et al.,* 2015). Often, the system is utilized to achieve consensus amongst experts who have differing opinions and positions. 30 panels of experts were invited to participate in Nigeria but only 16 responded. The experts were chosen using a snowballing sampling technique to identify the experts. The Delphi was conducted in 2 rounds, which are regarded as adequate consensus among experts.

Delphi Survey Panel Selection

The most decisive stage in any Delphi study is the panel selection process (Lang, 2015) because the caliber of the panel of experts largely determines the character of the results obtained (Day &

Bobeva, 2005). The purpose of the panel selection process was to identify people that agreed the criteria outlined for inclusion in the survey. The importance of the panel selection process when conducting consensus techniques cannot be overemphasized (Campbell *et al.,* 2004). Figure 1 illustrate the Delphi process utilized in this study.

Figure 1. The Delphi process (adapted from Horan, 2010)



The sufficient working experience, sound knowledge about the practice of D&B in the industry, the relevant organizations of the selected experts and also their positions in their respective organizations thereby ensures the validity of the Delphi research conducted. Data collection was done through an online questionnaire survey using survey money. The experts were both from the industry and academia. The output of this Delphi survey will constitute a final Delphi Instrument for expert consensus on D&B post contract TCs in Nigerian the construction industry.

RESULTS AND DISCUSSION

Based on the data analysis as shown in Table 1, 19% of the experts representing 3 respondents have 5 to less than 10 years working experience in Design-Build (D&B) construction projects whilst 44% of the experts representing 7 respondents were having 10 to less than 15 years. On the other hand, 31% of the experts representing 5 respondents had 15 to less-than 20 years of D&B experience. Interestingly, only 1 expert representing 6% was having more than 2 years of working experience in D&B. However, 75% of the experts representing 12 respondents were from the industry whilst 25% of the experts representing 4 respondents were from the academia.

Similarly, 75% of the experts representing 12 respondents were a master degree holder`s whilst 19% of the experts representing 3 respondents have only degree certificates. On the other hand, 6% of the expert representing 1 respondent is a Ph.D. holder. Their experience in D&B projects includes all allied professionals in the construction industry (see Table 1). The background profile regarding the respondents shows that the responses provided could be relied on for this paper.

Furthermore, respondents were also asked to approximately estimate the cost of post- contract TCs with respect to contract value in the last project they completed for their company/organization in Nigeria (see Table 2).

However, based on the findings from the data analysis as shown in Table 2, it is evident that the approximate post-contract transaction costs in D&B are at 9% of the approximate cost of the project in the Nigerian construction industry. This result corroborates the findings of Whittington, (2008) wherein; the findings based on six case studies indicate a variation for the design & build as 3.40 - 14.30% and 9.50% on average of the contract value.

Table 1. Delphi Expert Profile

Field of Expertise	Years of Experience
Quantity Survey	10 to less than 15 years
Quantity Survey	5 to less than 10 years
Architecture	10 to less than 15 years
Construction Management	5 to less than 10 years
Civil Engineering	10 to less than 15 years
Construction Management	10 to less than 15 years
Quantity Survey	15 to less than 20 years
Quantity Survey	5 to less than 10 years
Construction Management	15 to less than 20 years
Architecture	15 to less than 20 years
Architecture	10 to less than 15 years
Architecture	15 to less than 20 years
Architecture	More than 20 years
Construction Management	15 to less than 20 years
Electrical Engineering	10 to less than 15 years
Quantity Survey	10 to less than 15 years

Table 2. Showing approximate D&B project costs vs post-contract transaction cost (PTCs)

Respondents (Delphi Experts)	Approximate Cost of Project (N)	PCTC (N)	Percentage (%)
A	150,000,000.00	-	0%
B	100,000,000.00	9,000,000.00	9%
C	180,000,000.00	-	0%
D	4,000,000.00	500,000.00	13%
E	2,000,000.00	1,000,000.00	50%
F	29,000,000.00	21,000,000.00	72%
G	120,000,000.00	8,500,000.00	7%
H	20,000,000.00	15,000,000.00	75%
I	450,000,000.00	20,000,000.00	4%
J	65,000,000.00	45,000,000.00	69%
K	120,000,000.00	10,500,000.00	9%
L	200,000,000.00	15,000,000.00	8%
M	300,000,000.00	4,000,000.00	1%
N	185,000,000.00	13,000,000.00	7%
O	72,000,000.00	10,000,000.00	14%
Q	200,000,000.00	22,000,000.00	11%
Total	2,197,000,000.00	194,500,000.00	9%

Furthermore, in this paper, the root causes of the post-contract transaction cost (PTCs) of D&B projects were identified. The respondents were requested to assess (using a Likert scale of 1-5, with 1 indicating very strongly disagree and 5 very strongly agree) on the core causes of PTCs based on the experience of D&B delivery system in Nigerian construction industry. As the findings as shown

in Table 3, indicates that change orders are ranked highest with an average mean of 3.88 whilst late payment or issuance of an architect`s certificate for payment is ranked second with 3.81. On the other hand, the frequency of claims and opportunistic behavior of the contractor were ranked 3 and 4 with an average mean of 3.75 and 3.50 respectively. Interestingly, the quality of communication is ranked 5 with an average mean of 3.44. It is clear that effective communication result in a more beneficial cooperation amongst contractors which eliminates uncertainties in terms of individuals` roles and obligations as a result minimize TCs.

Table 3. Showing root causes of D&B PCTC in Nigerian construction industry

Post-Contract Transaction Costs	Mean value(x)	Standard Dev.	A ranking based on Mean
Late payment	3.81	0.910	2
Change orders	3.88	0.619	1
Organizational inefficiency	3.31	1.352	7
Frequency of claims	3.75	0.930	3
Poor quality of decision-making	2.94	1.388	9
Quality of communication	3.44	1.030	5
Uncertainty in transaction environment	2.56	1.093	10
Opportunistic behaviour of contractor	3.50	0.632	4
Relationship with other parties	3.38	0.885	6
Material substitution (Variation order)	3.25	0.774	8

**n = 16*

CONCLUSION

The results of this study support Williamson (1998) suggestions that, human and environmental uncertainties are the fundamental causes to greater TCs in the construction industry. It was found that in Design-Build (D&B) delivery system amounts to accruing 9% post-contract TCs (PTCs) of the total approximate project costs. The finding provides useful evidence and data for decision makers on TCs in procurement for Nigerian construction industry. Accordingly, the client can minimize PTCs through: firstly, ensuring timely payment to the contractor. Secondly, verify orders and specifications before construction activities commences; hence minimize uncertainties in the project operation. Lastly, the D&B team should adopt a clear and effective communication path as well as efficient project management practices through strong leadership, and dispute management as well as quality decision making. It is foreseen that minimizing TCs may improving the process of cost estimates for D&B projects and also enhance the procurement process through better contractual agreements.

Recommendations

However, in light of the preceding conclusions, the issues around PTCs in D&B project delivery were identified through quantitative approach within a small scope; however, there is need employ a mixed methodology to cover a wide range of projects both in public and private sector to in other to establish the root cause of client-borne transaction costs. The primary goal of this research was

establishing post contract transaction costs for D&B in Nigerian construction industry. The study opens up various chances for investigation in future studies. It is necessary in the future to establish models for figuring out TCs organizational level. Finally, the uncertainties for environment addressed in this study are now not wholly explored. Hence, it will be beneficial if future research can deeply explore the attributed of environmental uncertainties on transactions costs and how it affect procurement decision.

Implication of the Research

Generally, this research will benefit the wider construction industry thru superior performance by getting rid of non-adding value cost activities in the course of undertaking project procurement processes. Some other different direct benefits include: Optimal project performance - PTCs are very frequently borne by the construction client as contractors and other different project parties, and eliminating PTCs related with non-value adding procurement activities would in the end enhance construction project performance.

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