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Predictors of Procurement Selection: An Investigation of Traditional and Integrated Methods in Nigeria

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Abstract: A nation's construction industry plays a pivotal role in the nation's development. While the arrangement and organisation of participants for construction procurement is critical to project delivery, participants are often faced with a maze of possible procurement paths. This study used 94 construction projects in Nigeria that were executed or being executed with the traditional or integrated project procurement methods. A logistic regression analysis was conducted using dependent and independent variables. A model for predicting the chosen procurement method evolved from this analysis. The developed model was significant, and its robustness was validated. The model's predictive use is recommended for projects in the research environment. Further examination of ethical and cultural issues with respect to construction procurement in the research environment is recommended. Furthermore, a similar study should be done in countries with similar or dissimilar characteristics to elicit the effects of geographical and cultural differences.

Keywords: Model development, Procurement, Selection, construction, Nigeria

INTRODUCTION

A nation's construction industry plays a critical role in the development of that nation through the provision of infrastructure and contribution to the country's gross domestic product (Dada and Oladokun, 2008; Ogunlana, 2010). The state of a nation's construction industry can thus signal the direction of development in the nation, at least in terms of infrastructure. The industry is responsible for the provision of shelter, buildings and other infrastructure that adds to or supports the quality of life of the population. Infrastructure development remains a sine-qua-non to national development regardless of the method used to procure projects (Dada, Okikiolu and Oyediran, 2006).

The contractual arrangement and organisational deployment of participants for the realisation of the building project are important processes. The traditional procurement method imposes a contractual and organisational separation between design and construction; in the integrated method, the design and construction are under the same contractual and organisational umbrella. Examples of the integrated method are the design-and-build, turnkey, package-deal, and build-operate-transfer methods, as well as their variants. While the literature recognises that the dominant procurement method in many countries, including Nigeria, has been the traditional method (Gordon, 1994; Ling, Ofori and Low, 2003; Nubi, 2003), the fastest growing procurement method in some countries is the design-and-build method (Petersen and Murphree, 2004). In Nigeria, for example, the traditional method has partly been used due to the institutional requirements for releasing public sector contracts on a competitive basis with the assumption that doing so can promote accountability. However, public and private clients are being presented with emergent options from which

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to choose. In Nigeria, there is already a legal backing for the use of the public-private partnerships for certain public sector projects through the Infrastructure Concession and Regulatory Commission at the federal level. This research thus set out to determine the predictors of the selection of procurement paths between the historically dominant method (the traditional method) and the emerging integrated method. The fact that Nigeria, like other developing countries, must still provide a huge volume of critical housing and other infrastructure to residents and yet has choices regarding procurement paths underscores the relevance and current nature of this research. The study thus has the potential to contribute to the body of knowledge on procurement selection in the study area and can be a guide for decision makers.

PROCUREMENT SELECTION: THEORETICAL PERSPECTIVES

There are several worldviews from which procurement is perceived by researchers and practitioners, including the view of an organisation as a system (scientific management); a biological organism (system approach); states of flux and transformation; or a socio-technical framework [McDermott, 1999 citing Green (1994)]. Furthermore, the selection of procurement can be studied using the situational or contingency approaches. This perspective acknowledges that no single procurement method is applicable and adaptable to all situations (Yinghui and Eng, 1999; Rowlinson, 1999) and no one method is a cure-all. A related perspective is the socio-technical perspective, which assumes that the selection of a procurement method cannot be based solely on objective data; instead, it must be based on a combination of objective and subjective considerations. The approach acknowledges the interaction between objective and subjective realities through the human aspect. The subjective reality, though intangible, can have tangible and far-reaching influences on the procurement selection. As human beings are not mechanistic, they play a part in the procurement process and thus influence procurement decisions.

While the choice of a procurement method is principally that of the client through its organisation or an advisor organisation, clients can vary depending on their exposure and experience and the volume and repetitiveness or continuity of their works. Furthermore, construction projects may differ in scope, nature and complexity; project objectives may also differ in importance (Mbanjwa, 2003). A client organisation may thus have a variety of needs to which different priorities and weights are attached; the client organisation will then be required to make a decision based on its enlightened best interests, taking both objective and subjective issues into consideration (Kumaraswamy and Dissanayaka, 1998; Chen-yu and Ive, 2002).

Some studies on procurement in Nigeria have sought to compare certain aspects of some selected procurement paths. Ogunsanmi, Iyagba and Omirin (2001) investigated the factors contributing to the performance of a procurement path using the traditional and labour-only methods. Their study explored the relationships between variables including client characteristics, project characteristics and desired performance measures. The study by Ogunsanmi, Iyagba and Omirin (2001) was similar to that of Naoum (1994), who also investigated the selection and performance of procurement paths. However,

Naoum (1994) investigated the traditional and management contracting methods. Furthermore, Naoum's (1994) study was not based in Nigeria. Ojo (2009) investigated the performance of procurement methods in Nigeria using performance indices. Like Babatunde, Opawole and Ujaddugbe (2010), he acknowledged that the traditional procurement method is the most commonly used method in the country. Ojo (2009) further investigated a variant of the traditional method (lump-sum contract method) and the management-contracting, design-and-build, and build-own-operate-transfer methods. The selection criteria he used were speed, cost certainty, time certainty, price competition, quality, risk avoidance on time and risk avoidance on cost. However, his work did not attempt to present a conceptual framework for the development of a predictive model. Some studies on procurement have been conducted in other countries, but these studies have not focused specifically on the selection between the two methods under investigation in this study (Naoum, 1994; Chan, 1995; Alhazmi and McCaffer, 2000; Love et al., 2008). Love et al. (2008) analysed the procurement selection criteria in the public sectors of two states in Australia. Alhazmi and McCaffer (2000) developed a procurement selection model while adopting an analytic hierarchy process with Parker's judging alternative of value engineering, dove-tailing with a multi-criteria multi-screening method. The study of Naoum (1994) culminated in the ways in which the respective variables affect project performance. The study of Chan (1995) dwelt on procurement selection. The current research also investigates the selection of the procurement path between the traditional and integrated methods. All of the studies on the selection and performance of procurement paths are relevant because while selection is different from performance, there is a relationship between the two; procurement selection contributes significantly to project performance (Naoum, 1994; Rwelamila and Meyer, 1999). Thus, some of the relationships among some variables subsist when studying the performance of a procurement path.

This research builds on previous studies, especially regarding the contingency and socio-technical perspectives, to propose that the selection of a procurement method is a function of both hard and soft factors, consisting of a mix of independent variables such as client characteristics, project characteristics, team composition and relationship characteristics. This concept formed the basis of the development of the procurement selection model. Interestingly, this study has included another dimension of soft issues while investigating procurement method selection. Specifically, relationship or personality issues, which Fryer (1991) identified as intangible but potential influences on procurement selection and performance, are included as conceptualised variables in this study. Some previous studies on procurement selection and performance referred to in this paper have not studied the impact that desired relationships among project participants can have on procurement selection. This study thus attempted to add the desired nature of a relationship as one of the variables in the model development.

While many procurement selection approaches have been reported, no generally applicable solutions have been found (Chan, 1995; Love, Skitmore and Earl, 1998). The perspective on procurement that no single method is judged suitable for all situations emphasises the importance of this study. Furthermore, while it is posited that no one method can be useful in all situations, not choosing an appropriate procurement method can have dire consequences on project

objectives and can lead to project delays, cost overruns, team relationship problems and sometimes project abandonment and building collapse. Some of these problems are present in the construction industry in Nigeria and have been described in various reports (Aibinu and Jagboro, 2002; Oyedele and Tham, 2005). This study was embarked upon in an attempt to have an informed basis for selecting a procurement method.

RESEARCH METHODS

The research was conducted by examining relevant literature and administering a questionnaire on selected projects. The questionnaire responses were sometimes followed up by structured interviews. The projects executed or being executed with the traditional or integrated procurement methods were intentionally sampled and drawn from past or ongoing construction projects in 11 states of Nigeria and the Federal Capital Territory, Abuja. Integrated projects investigated in the work include the design-and-build, package-deal, turnkey and build-operate-transfer methods or their variations. The underlying philosophy for the method choice was the project execution under one contractual entity. Intentional sampling was used because there was no available comprehensive, reliable database of projects being executed through different procurement methods by the private and public sector clients in the country. The questionnaire asked for the respondent's personal data, as well as the project location, building or project type, size of building, number of floors in the building, foundation type, client type, characteristics of the design and construction teams (whether in-house, external or mixed teams), nature of the construction organisation, client's experience with respect to construction commissioning, and client's business focus, whether speculative or indicated. Further biographical details about the client, contracting, and consulting organisations involved in the project that were judged relevant were requested. The respondents were then asked to indicate the procurement method used for the project and supply information on the method of tendering for the project. Additionally, the respondents were asked to supply some other project particulars, including the initial contract price or estimated total cost, when appropriate, followed by the final contract price/anticipated final cost. Further data provided by the respondents included the year of award, initial or programmed contract duration, year of completion or projected year of completion, final contract duration, and total design and construction time. The influence of some identified considerations on the choice of the procurement method for the project was then sought using an ordinal scale (from 1, which signifies "no influence", to 4, which represents "very high influence").

The instrument used for the pilot study was tested for reliability with the split-half method by applying the Spearman–Brown correction formula. The level of significance for the reliability tests was set at 5%. The test reliability yielded a correlation coefficient of .78. After some amendments of the instrument used for the pilot study, the final instrument yielded a split-half reliability coefficient of .94. These values are sufficiently high when considering previous works (Kaming et al., 1998).

Questionnaire responses were obtained for 94 (34%) out of the 274 targeted construction projects. The average response rate to the questionnaires was thus above 30%, which is acceptable when considering previous studies in same field (Moser and Kalton, 1971 as cited by Mills and Skitmore, 1999).

The returned questionnaire data were then entered into the Statistical Package for Social Scientists (SPSS) version 14 software. Some contributing factors were identified from the literature and experience. Twenty-one such items were identified and analysed for possible decomposition using a factor analysis. There was no convergence on the different rotations; thus these 21 factors and the variables for the logistic regression analysis were entered directly. The 21 factors were:

1. the need for client's involvement;
2. the need for specialisation and differentiation among participants;
3. the need for collaboration among project participants;
4. the need to reduce cost or enhance cost performance;
5. the need to deliver on schedule;
6. the need for clear risk allocation;
7. the need for non-adversarial relationship;
8. the need for cost certainty;
9. the need for a unique and challenging project;
10. the need for a project that enhances expected quality performance;
11. the project procurement method is fashionable;
12. disappointment with some previous alternatives;
13. it was recommended to us;
14. suits the complexity of the job;
15. user familiarity;
16. ease of application;
17. the need for knowing certainty of initial cost;
18. the need for knowing certainty of final cost;
19. the need for improvement or innovation;
20. to protect our enlightened organisation interest; and
21. the commercial and investment reasons (the need to maximise profit/value).

A logistic regression analysis was conducted with the procurement method as the dependent variable and several other variables as the independent variables. A binary logistic regression was done for both model development and group classification because the dependent variables were dichotomous. Furthermore, categorical outcomes were also expected. The initial regressions reported the presence of many zero cells, which was perceived as a problem. A solution to problem suggested by Mernadd (2001) was adopted. The solution was a proper examination of the data and the re-categorisation of certain covariates. The variables that were judged to contribute to the selection of procurement methods were re-categorised as follows: values of influence from 0 to 1 in the original responses were re-classified as 1 "no influence", values of influence from 3 to 4 in the responses were re-categorised as 2, implying the variable's influence on the procurement method selection. The stepwise method was used for the logistic regression analysis. This method involved the use of a sample for validation. The

capacity to set aside this sample for validation and validate the sample is already built into the SPSS 14 logistic regression software; thus, it was easy to validate the regression model. The final classification table was studied to report the probabilities of predicted cases in both the selected and unselected samples. The baseline procurement method, equivalent to "yes", was set to the integrated method. Each probability above 50% was reported to be a correct classification in the "yes" category or for "integrated method".

ANALYSIS AND RESULTS

Projects based in Lagos State accounted for 56.3% of the responses, while 43.7% of the responses were from the remaining eleven states and the Federal Capital Territory. These percentages can be explained by the fact that Lagos was the political capital of Nigeria and still remains the nation's commercial centre. Lagos is one of the world's emerging megacities and is even reported as the fastest growing city in the world [*The Punch* (2006) citing the United Nations Report 2006/2007], implying the increased demand for and considerable amount of ongoing construction.

On the projects and procurement method used, the survey shows that 30 (31.90%) projects were executed by integrated methods and 64 (68.10%) projects were executed by the conventional or traditional method. Although the umbrella term of integrated method was used, the integrated method options included the design-and-build, package-deal, turnkey, and build-operate-transfer system methods and their variants. For the projects executed with the integrated procurement method, 26 (86.7%) were design-and-build projects, one (3.33%) was a package-deal project, one (3.33%) was a turnkey project and two (6.67%) were build-operate-transfer projects or variations of the previous methods.

The next step is model development using a logistic regression analysis. For a linear model of the form $Y = \alpha + \beta 1X1$, the dependent variable can take any value. For a probability model, the probabilities are bounded and can only take values between 0 and 1. However, the relationship between the probabilities and the independent variable is typically non-linear. In an attempt to obtain a linear relationship between the probabilities of the dependent variables and predictor variables, the relationships were linearly transformed by taking the logit of the dependent variables.

Mernadd (2001) acknowledged the relevance of different regression methods and explained some of their underlying principles. For linear regressions, there are assumptions of normality. For logistic regressions, the errors are not assumed to have a normal distribution; instead, a binomial distribution is assumed. Distribution errors are assumed to have a binomial distribution, which only approximates to a normal distribution for large samples. In logistic regressions, predictors can be discrete or categorical. A logistic regression is used when the outcome variable is a categorical dichotomy. Furthermore, using logistic regression is occasioned by the fact that having a categorical dichotomy as an outcome violates the assumption of linearity in normal regressions. Additionally, linear relationships between the dependent and independent variables are assumed. According to Kinnear and Gray (2000), in logistic regression, as in ordinary regression, the values of the parameters B_o, B_1 … B_p are chosen such that

the logistic regression equation predicts the independent variable as accurately as possible. In multiple regressions, formulae can be derived from the B values that can be calculated. In logistic regressions, however, a brute force algorithm must be used, in which after so many cycles or iterations, the estimated B values appear to be converging to fixed values. The natural logarithm of the odds is used to address the deficiency of the asymmetry of odds. The SPSS 14 software internally coded the dependent variables as 0 and 1 for the traditional and integrated methods, respectively.

Tables 1 to 5 show some of the (edited) outputs of the logistic regression. Specifically, Table 1 shows some of the variables in the equation.

Table 1. Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp (B)
Step 1[a]	BNONADVE(1)	–1.958	.576	11.538	1	.001	.141
	Constant	.511	.422	1.468	1	.226	1.667
Step 2[b]	BNONADVE(1)	–2.447	.712	11.813	1	.001	0.087
	BCOMINVES(1)	2.014	.714	7.965	1	.005	7.496
	Constant	–.268	.515	.271	1	.603	.765
Step 3[c]	BNONADVE(1)	–2.598	.758	11.736	1	.001	.074
	BENORGINT(1)	–1.867	.815	5.252	1	.022	.155
	BCOMINVES(1)	2.705	.827	10.710	1	.001	14.953
	Constant	.060	.557	.012	1	.914	1.062
Step 4[d]	BNONADVE(1)	–2.922	.898	10.590	1	.001	.054
	BFASIONME(1)	–2.097	.893	5.509	1	.019	.123
	BENORGINT(1)	–2.769	1.088	6.478	1	.011	.063
	BCOMINVES(1)	3.413	1.023	11.134	1	.001	30.341
	Constant	1.426	.881	2.619	1	.106	4.161
Step 5[e]	BNCLINV(1)	–1.968	1.081	3.312	1	.069	.140
	BNONADVE(1)	–3.109	.928	11.231	1	.001	.045
	BFASIONME(1)	–2.176	.971	5.019	1	.025	.113
	BENORGINT(1)	–2.863	1.139	6.316	1	.012	.057
	BCOMINVES(1)	3.626	1.053	11.866	1	.001	37.572
	Constant	1.914	.967	3.916	1	.048	6.783

S.E. = Standard Error, Sig. = Significance, df = Degree of freedom
a. Variable(s) entered in step 1: BNONADVE.
b. Variable(s) entered in step 2: BCOMINVES.
c. Variable(s) entered in step 3: BENORGINT.
d. Variable(s) entered in step 4: BFASIONME.
e. Variable(s) entered in step 5: BNCLINV.

The significant variables in the model are shown in step 5[a] of Table 1 above. The variables are BNONADVER, BCOMINVES, BENORINT and BFASIONME, which have the following meanings:

BNONADVER = influence of the need for a non-adversarial relationship,
BCOMINVES = influence of commercial or investment considerations (i.e., influence of the need to maximise profit),
BENORINT = influence of the need to satisfy the organisation's enlightened self-interest,
BFASIONME = influence of the need for a fashionable method.

The logistic regression equation is thus,

Logit (Procurement selection) = 1.914 – 3.109 (influence of the need for a non-adversarial relationship) – 2.176 (influence of the need for a fashionable method) – 2.863 (influence of the need to satisfy the organisation's enlightened self-interest) + 3.626 (influence of commercial and investment considerations or influence of the need to maximise profit) (Eq. 1)

The implication of this equation is that these variables significantly affect the likelihood of selecting a certain procurement method between the two options. The probability greater than 50% would classify the case as being in the "yes" category, which is the selection of the integrated method. The regression is further diagnosed by examining some of the edited outputs. Table 2 presents the Hosmer and Lemeshow Goodness-of-Fit Test for the model.

Table 2. Hosmer and Lemeshow Goodness-of-Fit Test

Step	Chi-Square	Df	Sig.
1	.000	0	
2	.819	2	.664
3	2.588	6	.859
4	4.905	7	.672
5	5.615	7	.585

For the Hosmer and Lemeshow test, the model indicates a bad fit if the significance value is less than 0.05. In Table 2, the significance value is 0.585; thus, the model adequately fits the data, and there is no difference between the predicted and observed number of cases. Furthermore, the variables chosen for the model all have significant values with respect to the –2log likelihood. This result is reflected in Table 3 below.

Table 3. Model if the Term is Removed

	Variable	Model Log Likelihood	Change in –2 Log Likelihood	Df	Sig. of the Change
Step 1	BNONADVE	–42.669	12.683	1	.000
Step 2	BNONADVE	–38.986	15.284	1	.000
	BCOMINVES	–36.328	9.968	1	.002
Step 3	BNONADVE	–35.881	15.280	1	.000
	BENORGINT	–31.344	6.206	1	.013
	BCOMINVES	–35.502	14.523	1	.000
Step 4	BNONADVE	–32.407	15.309	1	.000
	BFASIONME	–28.241	6.977	1	.008
	BENORGINT	–29.461	9.419	1	.002
	BCOMINVES	–33.546	17.588	1	.000
Step 5	BNCLINV	–24.752	4.328	1	.037
	BNONADVE	–30.907	16.638	1	.000
	BFASIONME	–25.890	6.604	1	.010
	BENORGINT	–27.028	8.880	1	.003
	BCOMINVES	–32.154	19.132	1	.000

From Table 3, considering step 5, all of the variables have significant changes in their –2log likelihood. Table 4 presents the model summary, showing the different equivalents of R-squared in the linear regression analysis.

Table 4. Model Summary

Step	–2 Log Likelihood	Cox and Snell R-Squared	Nagelkerke R-Squared
1	72.656[a]	.175	.241
2	62.687[b]	.291	.400
3	56.481[b]	.354	.488
4	49.504[c]	.419	.577
5	45.176[c]	.456	.628

a. The estimation was terminated at iteration number four because the parameter estimates changed by less than .001.
b. The estimation was terminated at iteration number five because the parameter estimates changed by less than .001.
c. The estimation was terminated at iteration number six because the parameter estimates changed by less than .001.

The –2log likelihood decreases until it reaches a final value of 45.176 when iteration stops, indicating that the addition of the independent variables to the model accounts for a significant portion of the residual variance. Furthermore, while R-squared, the coefficient of determination, cannot be calculated in the logistic regression model, an equivalent pseudo R-squared can be calculated. Table 4 shows that the Cox and Snell R-squared is 0.456 at the last iteration, while the Nagelkerke R-squared is 0.628. Thus, approximately 63% of the variance in the dependent variable is explained by the covariates or independent variables. A model with a higher pseudo R-squared can typically perform better than those with a smaller pseudo R-squared. In light of this trend, several models were scrutinised for this requirement, and other diagnostic tests were conducted before this model was chosen.

Table 5. Final Classification Table[d]

Observed			Predicted					
			Selected Cases[a]			Unselected Cases[b,c]		
			Procurement Method			Procurement Method		
			Traditional	Integrated	Per cent Correct	Traditional	Integrated	Per cent Correct
Step 1	Promet	Traditional	34	9	79.1	13	4	76.5
		Integrated	8	15	65.2	4	3	42.9
	Overall percentage				74.2			66.7
Step 2	Promet	Traditional	42	1	97.7	17	0	100.0
		Integrated	13	10	43.5	5	2	28.6
	Overall percentage				78.8			79.2
Step 3	Promet	Traditional	32	11	74.4	9	8	52.9
		Integrated	4	19	82.6	4	3	42.9
	Overall percentage				77.3			50.0
Step 4	Promet	Traditional	42	1	97.7	14	3	82.4
		Integrated	10	13	56.5	5	2	28.6
	Overall percentage				83.3			66.7
Step 5	Promet	Traditional	39	4	90.7	12	5	70.6
		Integrated	5	18	78.3	5	2	28.6
	Overall percentage				86.4			58.3

Promet = Procurement method
a. Selected cases validate EQ 1.
b. Unselected cases validate NE 1.
c. Some of the unselected cases are not classified due to either missing values in the independent variables or categorical variables with values out of the range of the selected cases.
d. The cut value is .500.

Table 5 indicates that 39 out of the 43 traditional projects are correctly classified. Eighteen out of the 23 integrated projects are correctly classified, and 86.4% of the selected cases are classified correctly. The unselected cases that were not used to create the model were used to validate the subset. The table shows that 58.3% were correctly classified by the model. However, this result should be read in the context of a cut value set at 50%. This cut value may limit the 100% efficacy of the model. There are other approaches to validating the model, as stated or used by El-Choum (2000) and Lam, Chan and Chan (2008). However, in this research, the model was validated using the built-in capacity of the SPSS 14 software permitting the use of a subset validation model.

DISCUSSIONS

An application of the model to a typical case in the data will illuminate the implications of the model. In line with Ashley and Jaselskis (1988), the probability of success is defined by the logit function as follows:

$$\text{Probability of success} = \frac{e^{Y}}{1+e^{Y}}$$

where the value of *y* in the logit equation is as estimated by the derived Eq. 1. For a typical project or case from the data in which all of the covariates have the values of 1 from the data reclassification, the logit is calculated as follows:

$$y = 1.914 - 3.109\ (1) - 2.176\ (1) - 2.863\ (1) + 3.626\ (1) = 2.608$$

Thus, the probability of successfully selecting the integrated method over the traditional method is as follows:

$$\text{Probability of success} = \frac{e^{-2.608}}{1+e^{-2.608}} = 6.89\%$$

However, if the values of the independent variables are changed, different probabilities result from this equation. In cases for which there is an influence of the need to maximise profit (versus the scenario for which there is no influence), the value of one assigned to that variable changes to two, and the corresponding probability of success increases to 74%. In this situation, *y* increases to 1.018. The implication of this result is that there is a much better chance of selecting the integrated method when there is a need to maximise profit in a project. Similar iterations were made by changing the values of other independent variables in the logit equation for the selected case. Interestingly, the presence of the influence of the need for a non-adversarial relationship, even though significant in the model, can potentially decrease the probability of successfully selecting the integrated method over the traditional method. This finding warrants attention and may demand closer examination and scrutiny. One possible explanation for this finding is cultural issues. Ordinarily, integrated methods should be favoured by the

need for a non-adversarial relationship. Based on real data, this research suggests a departure of the real (what is obtained from the data) from the ideal. Perhaps this development may be due to the possible ethical abuses to which integrated project development could be subjected. Such abuses could arise from the design and construction entity (one organisation in the case of integrated method) taking undue advantage of the client, especially when there is no independent monitoring consultant. In such cases, the client may feel cheated when he has some information, possibly leading to negative reactions. Thus, these parties may not see the integrated method as a solution to relationship problems in project procurement.

The regression analysis suggests that the selection of procurement (between the integrated and traditional procurement methods) is significantly affected by the variables reported in the regression model. The variables significantly affect the likelihood of selecting a given procurement method between the two options. The developed model indicates the role that relationship issues have in a particular procurement selection. Furthermore, the need for being fashionable or doing what people are used to has an effect on the likelihood of selecting the integrated method over the traditional method. The need to maximise profit is another key issue, as is the need to meet an organisation's enlightened self-interest.

The model developed in this study is unique to the selected procurement methods and is clearly different from other models due to methodological approaches. The study also differs in the procurement paths used. While the models are different, the underlying assumptions may overlap. Love et al. (2008) indicated that among other criteria, the criteria of project value, project complexity, location, client factors and political considerations affected the selection of procurement methods. Alhazmi and McCaffer's (2000) model was built through a hierarchical process using a multi-criteria multi-screening method. While the work of Babatunde, Opawole and Ujaddugbe (2010) is not a regression model, it analyses the factors affecting procurement selection. The present research has elaborated on significant factors affecting procurement selection, showing the causal relationships and the direction of the contribution of those significant factors.

The model also suggests that soft factors contribute to the selection of a procurement method between the two alternatives. The soft factors refer to factors that are human-related and are potentially subjective. The practical implications of this model are that when the variables in the model are known, an indicative procurement selection or classification between the integrated method and methods can be made. As the developed model only includes the variables that are significant in the environment of the research, once the variables in the developed model are known and input at the required level, the probabilities of selecting a procurement path can be determined. However, the experience and judgment of the user are not discounted. This is also in line with the reasoning of Jaselskis and Ashley (1991), in that even though the variables are significant from statistical inferences, they are not the only variables that can contribute to the likelihood of selecting a specified procurement method. It should also be recalled that the probability set for regarding a prediction or classification as a success is a value above 0.50. This is a statistical decision made by the researcher and set as the default value in the SPSS 14 software. The implication is that the variables in the

developed model must be further examined and manipulated when desiring a particular level of success. However, other variables can still be examined in the process.

CONCLUSION AND RECOMMENDATIONS

In this study, data obtained for some selected projects have been used to develop a model for procurement selection between the integrated and traditional methods. A major research implication of the developed model is that procurement selection in the context of the two options is influenced by the need for a non-adversarial relationship, what is fashionable, commercial and investment considerations, and the enlightened self-interest of the organisation. In practice, these results also imply that procurement advisors or users should consider these variables and how these variables perform while advising on procurement selection between the two methods. Furthermore, with a combination of the appropriate variables, a case or project can be classified with respect to the possibility of selecting either the traditional and integrated procurement methods. The direction of influence of the need for a non-adversarial relationship on selecting the integrated or traditional methods requires further investigation. However, all of these recommendations apply to the procurement selection between the traditional and integrated methods. Further examination of ethical and cultural issues with respect to construction procurement in the research environment is recommended. A study of this nature could be undertaken in other developing countries with similar or dissimilar socio-economic conditions.

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